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BOOK OF ABSTRACTS

1.1.1: Performing Legitimacy and Efficiency - Accountability (Infra)Structures as Reinvention of Democracy? I

Thinking Like A State?
Performing Quality and Accountability in Dutch Health Care.

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"Transparency on performance is a strong incentive to improve healthcare. We wish a good score for all. That is in everybody's interest, but especially in the interest of the thousands of patients that can enjoy a longer life". This quote of the Dutch Council on Public Health and Healthcare in relation to the Hospital Standardised Mortality Rate (HSMR) reflects one - rather dominant - way of translating and relating performance indicators (PIs) to the notion of transparency. The assumption here is based on the worth of transparency, that is that more transparency equals improvement. But there are different justifications and rhetorics around the introduction of PIs in the Netherlands to be explored. Some of them are centered around notions like "accountability": PIs will make health care more transparent and thereby accountable. Other justifications are centered around the claim that only by being transparent, market mechanisms, like free choice, price mechanisms, competition will work. And still other justifications are more centered around the concept of learning - only by seeing and being transparent in the practices, one can learn. Following PIs in the health care cosmos retrospectively while analyzing interviews with actants in the field of Dutch Health Care this paper addresses questions like: How did these artifacts enter the Dutch health care arena and cosmos as a form to solve public problems? Have there been other forms and worths at stake that would have entailed other consequences and other configurations ofissues and publics? How was the development of PIs justified? How do these justifications relate to forms of accountability? Who or what is held accountable by whom or what? What investments have been / are undertaken? At what costs and benefits? What forms of state(s) and governance are enacted? Following the actants I will articulate some of the constellations that have been enacted or blinded out when PIs are put front stage. This might open up other issues and worths at stake that are otherwise left unaddressed when 'more transparency' is assumed to equal quality improvement. Such an analysis might unravel different forms in which a state can think.

A Policeman Behind Every Researcher? Notions of
Accountability and Transparency in a Public Engagement Setting.

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Fostering "public accountability" and the "transparency" of policy processes and the use of expertise seems to have become a discursive gold standard in many recent policy debates on national and supra-national levels. These concepts and their implementation are expected to play a key role in addressing the perceived disturbances in the complex relations between publics, policies and technosciences. In this, (invited) public participation is often framed as a means to publicly enact a culture of openness and accountability of the policy sphere, and hence to (re)establish public trust. However, a number of STS scholars have argued that these expectations are quite likely to fail (Irwin 2006). On the one hand, the sociological

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assumptions behind the trend to build public trust on public performances of transparency have been pointed out to be rather naïve (Brown & Michael 2002). On the other hand, it has been criticized that public participation events are often seen as an end in itself, without any deeper consideration of their role in the wider context of democratizing technological societies (Jasanoff 2003). In these instances, transparency as an empty ritual supplants potentially more substantive forms of engagement. My paper attempts to critique the reductive use and performance of the notions "accountability" and "transparency" in the policy sphere by contrasting them with alternative accounts from a bottom-up perspective. It builds on an analysis of debates on governance and public participation in a long-term public engagement setting on the ethical and social implications of genome research in Austria. I will discuss both scientists' and citizens' perspectives on the role and limits of transparency and accountability in the governance of technoscience. In outlining the rich variety of strongly contextualized assessments of these concepts I will argue that at least in this case the key public interest was not so much a desire for simply more "transparency from above". Rather, the participants scrutinized which role public accountability and transparency could play in an in their view increasingly complex co-evolution of science and society. This analysis is based on data collected in the context of the research project "Let's talk about GOLD! Analysing the interactions between genome researchers and the public as a learning process" carried out in Austria (project lead by Ulrike Felt, financed by the GEN-AU).

The Challenge of Systemic Innovation in Finnish Health Care - From a Local Benchmarking Tool to a National Tool for Governance of Municipal Health Care Services?

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The need for systemic change has been well recognized in most health care systems. The Finnish public health care system is organized by mainly small-sized municipalities, and the system is dispersed. There is an urgent need to find new management models and tools to make the governance of municipal services more transparent and to secure the availability of high quality services at reasonable cost also in the future. Also, new management tools are needed for measuring the quality and cost effectiveness of health services. In a general sense, this can be considered as part of the trend of new public management and its emphasis on accountability, performance and output legitimacy. Among scholars of STS, there recently emerged an opening of a methodological discussion about the need for middle range theories (ST&HV vol. 32, no 6, Nov 2007). According to Geels (2007) diffusion and breakthrough of systemic innovations takes place as the outcome of linkages between developments at multiple levels. He proposes a multi-level model and the use of various scales of analysis in examining the transition processes. Our study opens up the dynamics of how a systemic innovation is co-produced between different local, regional, and national actors. We study how an embryo of a systemic innovation is taking shape when it is being transferred from its original local environment to wider use. In its early phase, the innovation embryo appears as a benchmarking tool for comparing the cost effectiveness of municipal health care services but it has a potential to become a sustainable tool for municipal purchaser-provider management system. However, there are several matters which have to be resolved with the users of the new management system. How to develop the management tool of one municipality to be used in a multi-municipal environment? How to

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develop local performance indicators of health care services to nationally approved standards? How to measure the quality of primary health care services beside their cost effectiveness? We analyse the beginnings of the embryo of an innovation from a small Raisio town to Jämsä region in Finland. In Jämsä, local political decision makers have recently decided to carry out major changes in the organizing of the governance and health care services. These incorporate consolidation of two municipalities, dissolution of current joint health care organization, organizational integration of social services and health services, building up of a public private partnership for ownership of local hospital, and adoption of purchaser-provider model as a new management system. We illustrate how these changes are interconnected in various regional and national change processes. The needs, interests, doubts and visions of local, regional and national key actors have been analyzed by recent interviews. The perspectives of the key actors indicate that in its early shape, the management tool is providing a trigger for renewing local social and health services.

Renegotiation of Power-Relations in the Digital Dash-Board Municipality

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We have observed in the field of Norwegian municipalities, how governing through balanced scorecards and other modern and NPM-inspired models and software have dominated ways of re-thinking the organisations. The justification of this re-thinking is connected to transparency, legitimacy and justice. If regarded as a frame for relations and practice, what does this governing through numbers produce? Which accounts are produced by what accounting? In this paper, we will answer this through practices surrounding the measurements, and how this may be related to negotiation of power relations. In former papers, I have argued that number practices in themselves bear certain potential ways of rationalizing, and also shown how we can retrace these rationalities in explanations of evaluation and decision. In this paper, I focus on the power-relations in themselves. The study is based on case-studies of three large municipality administrations, with content analysis and 47 semi-structured interviews. To structure the analysis of renegotiation, I choose to look for systematic gaps in the initiation of this organizational logic, and show how we can choose to focus on three explicit gaps in the initiation of governing through measurements: From strategy model to measurement model. From measurement model to economic model. From strategy model to economic model. Although the production of a strategy model seems to generally be open and democratic, the other models are considered technocratic, and left to experts. We observe how a gap is produced in this process.These gaps provide room for power renegotiation, and also other forms of renegotiation. In the present data, two distinct processes seem especially vivid. First, how large gaps combined with an insufficient bureaucratic and/or democratic feedback, can allow for organizational irrationality, and even absurdity, that may or may not be related to governance. Second, I show how these gaps are a low-key battlefield, where the resulting numbers are explicit part of struggles to control other departments. I finally argue that these structures of accounting not necessarily imply, but can clear the ground for less democratic organizations if the inevitable gaps are ignored.

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Politics and the Political: the Little Tools of STS

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What is politics? Within STS it is a commonplace to acknowledge that the sites of politics to be studied and taken into account are not only the political center. The single issue, social movements and politics of contestation outside the political center are important sites of study. In addition, politics as an activity is not only to be understood as ideas or opinions in their meeting with ready made issues. Science and technology, as well as the material arrangements of politics take part in shaping and transforming the emergence of political issues in the first place. The renewed and shared STS interest in studying the material or technological sides to politics, does not imply, however, that there is one shared approach or the one best way. At least two traditions and approaches seem to intersect in interesting ways: One tends to draw on policy studies and deliberative theories and notions of politics. Another is more closely inspired by laboratory studies and the ethnographic approach to studying the emergence of facts and entities. And whereas one approach is primarily concerned with the technologies or material arrangements which enable agency or citizenship, another is more concerned with the ways in which technoscientific objects take part in producing political issues in the first place. The ambition of this paper is to keep these two approaches together, yes moreover, the claim is that doing that is vital if STS is to take part in renewing studies of politics. But what is politics - or "the political"? In focusing on the emergence of political issues at the outsides of the (supposedly) center stages of government or the political center, "the political" easily becomes that which "opens up" and objects that become contested. But politics is also about closing down, about coming to decisions. So maybe there are limits to the study of the single case, the single issue? The challenge then, again, is to keep these two approaches together: to study the local case and the single issue in its relationship with the making and remaking of government, as well as its significance for the enactment of a participatory political culture. The empirical case through which I will do my arguments is, precisely, a single issue; a contested power plant which never became a reality, but which, nevertheless, or, because of this, came to redo the natural/political landscape.

What Does Politicization of Expertise Mean?

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From a STS perspective science and politics are not given entities but distinguishable fields of action which presuppose specific modes of boundary-work. In general technology controversies serve for STS scholars as important cases of analysing these boundary-struggles. These imply struggles concerning the demarcation of facts and values, and in which way knowledge and values are to be considered as legitimate resources in political decision-making processes.

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In the planned presentation I will show how these boundaries are drawn in daily action and which notion of good governance corresponds to different forms of boundary work. For these purposes I analyse the complex interaction between science and politics in the context of actual debates on biomedicine. Biomedical research and applications have turned out to be political questions in manifold manner. Controversies about biomedicine are characterised by moral uncertainty; they are negotiated as value conflicts. That means that ethics have advanced to the politically authoritative discourse of regulation - controversies about stem cell research or PGD are carried out in ethical terms. This presents a considerable challenge for politics because in modern societies there is no consensus about what we should (not) know and do. The political response to this problem is the institutionalisation of ethics expertise. The institutionalization of national ethics councils represents from an STS perspective an interesting experiment to litigate value conflicts and to make them negotiable and politically determinable. My contribution does not deal with mere assumptions about the political effects of ethics expertise (an impact of policy advice is not measurable, at all). Rather, I will focus on the interaction dynamics between politics and experts on the basis of an international comparison of bioethical policy advice in Germany, Austria and UK. It will be shown that in the political recourse to expertise implicit conceptions about good politics and legitimate decision-making occur. That can be reconstructed via the specific mode of drawing boundaries between politics and science which are implicitly carried out in the political reception of national ethics councils' reports. That means that the political dealing with expertise - in spite of its organizational form, its remit etc. being the same - will vary in practice as a result of different ideals of governance. I will argue that, in some cases, the boundaries between politics (as the realm of decision-making) and science (as the adviser) are drawn quite exactly. In other cases, these boundaries are blurred. Then, the political utilisation of expertise means to subsume it under the particular operation principles of the political system ('politicisation of expertise'). During its political utilisation expertise is reconfigured so as to establish an identity between the experts' opinions and political objectives. In an outlook it should be discussed whether the politicisation of expertise is closely connected to a de-politicisation of bioethical issues.

When is Science Political?

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The concept of the political has a long and twisted history in political theory, and it has played an equally controversial role in STS. Indeed, STS includes a variety of approaches to conceiving relations of science and politics, ranging from emphatically neutral social-scientific research on laboratory practice to avowedly activist studies of expert authority. While past debates over the comparative merits of these approaches remain unresolved, elements of each have found a place in recent research on "co-production." Research in this vein explores how science and politics shape each other in a wide range of contexts. This approach to STS overlaps in interesting ways with feminist, pragmatist, and historicist approaches in political theory. By showing how people and things become political, the co-production framework effectively challenges the widespread notion that "everything is political." Methodologically, however, research on the interaction or mutual constitution of science and politics arguably requires some prior conception of what politics is. Politics might be conceived in minimal terms (e.g., as the intersection of power and conflict), or in a more

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expansive sense (e.g., as the deliberative construction of a common world), or in ways specific to particular cultures, nations, or jurisdictions. But in any case, empirical research on contextually specific constructions of politics is most compelling when it proceeds with some conception of what to look for and where to look. Put differently, the principle of symmetry central to the co-production framework does not account for certain normative and conceptual differences between science and politics. These differences are best understood as artifacts of past processes of co-production, but they are no less real for that.

"The Europe of Proof" : Impact Assessment, Other Legitimate Factors, and the Precautionary Principle

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On its European front, Ségolène Royal's presidential campaign in 2006-2007 was articulated around her appeals to l'Europe par la preuve. Taking those Gallic appeals seriously, the present paper will probe the very practices of this "Europe through proof", in the field, at the European Commission. In fact considerable efforts are deployed to buttress the political on proof, demonstration, justification, rationale. Comment faire ses preuves? Such is the overarching question which this paper aims to open. What are the requisites to grant viability to political fictions / projects / initiatives / cosmograms / visions / imaginaries / mobilisations? How much or what proof is needed to sustain them? Can the making of science and of decisions be accomplished so as to establish their credibility among the diverse audiences, constituencies, or remote participants of the world? Can the new regulatory state (or supra-state, or international organizations) hold/claim a monopoly on the legitimate use of epistemology? How do different groups of people - within or as professions, institutions, nations - discriminate between knowledge claims? How do they establish the validity of knowledge claims, as well as the way to establish the validity of knowledge claims? And then how can such different choices about (the means to decide) truth or 'political epistemologies' coexist? 'Risk', not merely as a discourse but as a deeply institutionalized scheme to handle any and every thing as a risk (to be granted a particular problematization and ontology; to be assessed and managed and communicated in particular ways), plays the role of such a political epistemology - a monopolistic one, at that - organizing the "living together"and the "deciding together" at the international level. I have documented how the precautionary principle has been plied by its proponent on the international scene as a rival to risk analysis in that regard, and will explore its development and implications in the present paper. Impact assessment (as composed at the European Commission) is an interesting example of another form of idiosyncratic European identity, of another proposal in terms of political epistemology. At bottom, this paper examines the process of proofing (as activation, substantiation, experimentation, and reading, but also as an exercise in tugging with and embedding proof) of politico-administrative products in general, and of the precautionary principle and impact assessment in particular - by digging through their very guts, through their messy drafting process, through their development and developments. In doing so, it probes the construction/distillation of "the political" in the sense given to the phrase through these particular production processes at the European Commission and in other locales. In doing so, it also addresses the process of proofing of the European Union construct (in response to Ségolène Royal's aforementioned appeals, so to say), paying heed to the

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precautionary principle and impact assessment as occasions for the European Union to prove itself.

Sub-Politics in the Limelight: Green Homes as Sites of Publicity, and What They Might Tell Us About the Politics of Technology

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This paper considers the affordances of eco-homes, and green domestic technologies in particular, as "publicity devices," with the aim of developing a radically constructivist account of how these are acquired. Recent literature on sustainable technologies in the home, in STS and elsewhere, has proposed that these technologies have special capacities for engaging citizens in ecological issues: such socio-material objects, it suggests, are far more engaging than other means of public involvement, such as media-based publicity about environmental degradation in distant places. This kind of research, either implicitly or explicitly, seems to oppose a socio-material understanding of environmental citizenship to information-based approaches, which focus on public communication and awareness raising. This paper aims to complicate this narrative by suggesting that the affective capacities of domestic appliances must be understood as a particular kind of performative effect, produced in socio-technical-discursive assemblages, which include publicity media. Theoretically speaking, this means that the concept of the "sub-politics" of technology must be reconsidered. As publicity campaigns present a notable site for the articulation of domestic appliances as instruments of civic involvement, the notion that the "politics of technology" can somehow be reduced to built-in scripts is opened up. On the empirical side, this paper will consider one particular location where domestic objects are currently defined as technologies of citizenship: green blogs. Using basic tools of discourse and web analysis, it will describe the visual and textual techniques deployed to demonstrate green technologies' capacities to engage. I will also explore the extent to which this involves the articulation of green morality and/or politics as experimental practice, and the role played by two notable features of green blogs in this respect: carbon measurement and activity lists ("what you can do"). The paper will conclude with a broader discussion of two critiques of the "domestication" of environmental citizenship, concerning the reduction of citizenship to consumerism and/or disciplinary action - two critiques that are partly, but certainly not entirely, refuted on green blogs themselves.

1.1.3: Rethinking Care and Care Practices

Time-Economies in Breast Cancer Gene Practices.
An Ethnographic Study on Predictive Medicine in Germany.

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My paper will focus on time-economies in medical practices dealing with "Familiar Breast Cancer". The broader context of my study is the establishment and institutionalization of predictive medicine in the field of so-called breast-cancer genes and the development of gene-research in Germany. A "German Consortium for Hereditary Breast and Ovarian Cancer" has existed since the mid-nineties. 12 Centers belong to this consortium,offering molecular testing, human genetic counselling and a gynaecological program for women with "hereditary exposure". Last but not least, health-insurers entered into contracts with the centers in 2005 and the program was absorbed into the "Regelversorgung". Starting from the research-group "Tumor Genetics" at the Max Delbrück Center for Molecular Medicine in Berlin-Buch, I follow the the breast cancer-gene into human genetic counselling and gynaecological consultation/counselling. I am interested in manifolds (Mannigfaltigkeiten) in which the breast cancer gene came and comes into its diverse forms of existence, 'between science and knowledge' (Foucault 1981: 263), within and between research, diagnostic, counselling and early diagnosis.

It was during my historical and ethnographic journey through this landscapes (Gefüge) that the topic of time-economies became apparent. I assume that time always exists in a plural way. Every society, every social locus (e. g. an experimental system) harbours different time-economies at the same time. They do not exist apart from each other, but are relational. And they are not equal. Time-economies exist in a hierarchical order - indeed, they order hierarchies. Time and power are like two sides of the same coin. So we can't speak about a singular time in time, but of interdependent times in practices. In my paper I would like to consider concrete practices of working on time(s). What can we learn about the building of time-hierarchies, different time-qualities and their relationality, the struggles, troubles, resistances; the effects of these practices on humans and non-humans (patients, medical professionals, breast cancer genes, institutions, et cetera) and the processes of stabilization, standardization and institutionalization of time(s)? What is there to be said about the relationality of time(s) as an analytical tool for STS-research? On the basis of my PhD "Gene-Passages. A Study on Molecular Biological and Medical Practices in the landscapes (Gefüge) of Breast cancer Genes" I will draw attention to the relevance of time(s) and discuss the above mentioned questions

To be Able to Name What We Do: Validating Real-Time Practices
Amongst Practitioners within Mental Health Care

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It can often be seen that once skills and competencies have been attained, they become embedded so deeply into practice that they are rendered invisible; presenting the illusion that

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such practices could be carried out by 'anyone'. Yet, these skills and competencies have been attuned and embodied through a combination of both formal training and a vast range of experiences with patients and clients. This combination is so complex and heterogeneous that these practitioners are hardly able to find a way to articulate their knowledge, or as Polanyi put it: "we know more than we can tell".

By spending time within the field of mental health care practice, I have been able to gather data using an array of ethnographic tools. Such tools have allowed me the flexibility of formal and informal interviews and discussions, observations and documentary analysis. I consider the effects of space, place and timing in the exploration of practices and the consequence of governmental policies and guidelines. The ethnographic approach has enabled data to be mobilized so that I was able to elevate terms and follow them to observe how they travel and interfere (Mol & Mesman, 1996) within a variety of practice settings. This allowed me a privileged position from which I was able to examine and analyse sequences of embodied work practices as a temporally unfolding process encompassing human interaction.

Goodwin (1994) argues that, "the ability to see a meaningful event is not a transparent, psychological process but instead a socially situated activity accomplished through the development of a range of historically constituted discursive practices". He refers to professional vision being perspectival and lodged within endogenous communities of practice. In my work this can be seen in reverse; I will argue that in what may be considered as a seemingly 'meaningless event' between a health care practitioner and a client (patient), a complex web of interactions takes place. Such interactions require an enormous amount of skills and competencies which are hidden within a "patchwork of situated, disparate, locally organised cultures in which knowledge is constituted through a variety of social and political processes" (Goodwin, 1994).

A major piece of work, developed by the Care Services Improvement Partnership and National Institute for Mental Health in England, resulted in the document, New Ways of Working (2007) which aims to ensure that services have 'the right people, in the right place, with the right skills'. If implemented carefully this document has the potential of ensuring services provide high quality care that is value for money. However, if a way cannot be found to validate the skills and competencies that are rendered invisible, a great deal will be lost.

Actor-Networks of Angst - Acting with Dementia

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The paper analyses what it means to live with dementia in a long-time care facility. It presents and discusses Marion Kaintz's ethnographic film 'Der Tag der in der Handtasche verschwand' ['The day that got lost in a Handbag']. By bringing together ideas from Actor-Network-Theory and from the work of Martin Heidegger I will try to analyze and unfold what happens when the pragmatics of remembering are failing. Dementia clearly can be described in ethnomethodological terms as a crisis of common modes of social orderings (Garfinkel 1967). Relations between bodies, senses and things are exposed to 'cosmo-political events' (Schillmeier & Pohler 2006). Cosmo-political events disrupt, question and alter the cosmos of common modes of human and non-human orderings. Moreover, they also put at risk the very

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modes of how they are described, e.g. by social or natural scientists. Cosmo-political events make us slow down are own well-secured line and limits along how we think, feel and live. Hence, actor-networks of dementia disrupt, question and alter common and routinized individual and social orderings New forms of highly strange and odd actor-network are assembling, e.g. actor-networks of Angst, which mediate complex and often uncertain, ambiguous and messy modes of existence and appropriating forms of social orderings. The paper contributes to the studies of (dis-)embodied living, of health and health care and tries to open up new spaces of rethinking care and care practices in our everyday life beyond the hiatus of social and medical models of health and illness. Linking Actor-Network-Theory with Martin Heidegger's work the paper tries to provide new possibilities and fresh grounds for acting with science, technology and medicine.

1.1.4: Energy in Everyday Life. The Use of Energy Related Technology. I

Household Energy Consumption and Consumer Electronics: the Case of Television

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In recent years there has been a dramatic rise in the number of consumer electronics in households. These new technologies and the services that support them enable new highly energy intensive behaviours. Using in-depth interview data collected from 20 households in 2006 this paper explores these energy intensive behaviours, using the example of the use of televisions. In doing so it illustrates how the design and marketing of consumer electronics and the services which support them actively encourage energy intensive behaviours and how householders are reconfiguring their homes and lifestyles to fit these behaviours. This latter point is significant because as householders change their homes and daily lives to fit energy intensive consuming behaviours it will become increasingly difficult to encourage people to reduce their household energy consumption. This paper concludes with the implications of the research findings for policies and interventions designed to reduce household energy consumption.

Making Energy Invisible

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Energy production and consumption is the main source of the climate problem and thus energy efficiency and saving are important political objectives. Households are one of the targets of this policy. However, despite discouraging results, the responsibility for achieving this goal is left to the market. This paper will present an analysis of three cases concerning supply and demand where energy has a significant role: homes, heating systems and household technologies. Central questions are: Which features are important when selling a house? What do people look for when buying a house? How are white goods advertised and sold? What do people require of heating systems in their homes? These cases demonstrate that the assemblages constructed through both supply and demand of houses as well as heating- and household technologies are making energy invisible. Other issues than energy are both offered and demanded when for instance purchasing a house. The paper will discuss the processes of making energy invisible and what possible implications this invisibility can have on private energy consumption.

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Central Heating: an Energy Efficient Technology Scripting Energy Inefficient Behaviour?

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Homes use about a third of all energy consumed in the UK. Government policies to reduce home energy use rely on increasing the energy efficiency of dwellings and their technologies. This includes policies favouring the installation of central heating, seen as an energy efficient way to heat a home. Over the last twenty years, dwellings and their heating technologies have become much more 'energy efficient', but the amount of energy used to heat the average home in the UK has not reduced - space heating continues to account for roughly 60% of home energy use. This study explores whether more rooms are heated in centrally heated homes nowadays than they were twenty years ago. If they are, the increased heating could help explain the conundrum of space heating energy consumption remaining stable despite buildings and heating technologies becoming more energy efficient.

In our recently conducted survey, we replicated the mode (face-to-face survey) and the heating-related questions of a survey conducted in England in 1984. The 1984 survey was of 171 single family households in owner-occupied houses with central heating located in six towns in the southeast of England. Their response rate was 68%. As well as replicating elements of the 1984 survey, our 2007 survey had additional aims that required a representative sample of English households. Consequently our sample was of 427 households with no restrictions on tenure, accommodation type or heating and drawn from all English regions - 54 postcode sectors. Our response rate was 44%. For the purposes of comparing behaviour between 1984 and 2007, we selected a sub-sample of our 2007 sample to match the sampling criteria of the 1984 survey. This sub-sample included 53 households in 14 postcode sectors.

We expected to find that rooms are less likely to have the central heating turned off in 2007 than they were in 1984. This could help explain why the energy used to heat the average home has remained constant despite improvements in the energy efficiency of the built form and heating technologies. Instead, we found no change in the likelihood of rooms having the central heating turned off. In 2007, as in 1984, very few central heating radiators are turned off. This suggests that central heating strongly scripts behaviours.

English central heating systems are configured such that, if the central heating is on, all the radiators are on by default. Banishing the heat requires actively over-riding the default. In homes without central heating, in contrast, summoning the heat requires the active engagement. English central heating systems appear to strongly script behaviour to heat all rooms in the home. This script is likely to result in bedrooms being heated as much as living rooms, and a decline in the use of doors separating living and sleeping zones. These new practices use more energy and, worse still, render some internal doors obsolete. These doors then 'disappear' from new and existing homes and energy inefficient practices become inscribed in 'open plan' homes.

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Domestication of New Technology in Households

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Energy is an important social resource on which we depend in our everyday lives, but climate changes need us to reduce our energy consumption and to use energy more efficiently. To achieve these users need to transform their behaviour and start reflecting on their energy use. Despite the fact that interesting studies concerning both energy use and energy efficient technology have been conducted, studies on how new technology is implemented in people's everyday lives are relatively rare. In this paper we will analyze how two energy related technologies have been introduced and implemented in eight different households in Sweden.

The first technology consists of solar collectors that are being combined with a bedrock storage system in a tenant's area in Stockholm. With this system, solar energy produces both hot water and space heating. The other technology is a prototype energy-visualizing product, the Power-Aware Cord, which is a redesigned power strip that glows with different intensities depending on the amount of electricity passing through it. This is done by dynamic glowing patterns produced by electro-luminescent wires molded into the transparent electrical cord.

The purpose with this paper is to analyze how households implement new technology. We will discuss this from an innovative perspective and in relation to the domestication process developed by Silverstone et al in order to understand the domestication of new technology in households.

To Discern and Graphically Represent Household Members Complex Patterns of Electric Appliance Use

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The aim of this paper is to suggest and discuss how the complex interplay between household members and their electric appliances can be discerned and graphically represented. Knowing an average householder's electricity use is insufficient, since individual variations might be big, fourteen households were included in a qualitative study using in-depth interviews and, to some extent, time-diaries. Households were chosen among 400 households in a quantitative study measuring electricity use in Sweden. The study addressed the behavioural aspects of the measurement study and the research questions were: Who uses different types of equipment, for what purposes, and how do they coordinate appliance use in everyday life? The main findings were that household members' appliance use at home, especially ICT devices, is individualized. More appliances per home make it possible for individual members to simultaneously use the same kind of equipment without disturbing each other. Many ICT appliances are always turned on because the lead time to start up is experienced as too long. Internal variations in work and school hours also make ICT-

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appliances serve as companionship when home alone and often different kinds of electric devices are used simultaneously. Accordingly different patterns of appliance use are distinguishable. It is argued that in order to save energy it is important to be able to make these patterns as clear as possible as well as to facilitate communication between social and technology scientists and between scientists and policy makers. A way to graphically represent the patterns of appliance use is suggested, as it is believed that graphic representation may contribute to the development of an easily comprehensible and common language. Better understanding of household appliance use may provide policy makers with insights about who to direct policy measures towards household members. If household members buying appliances are not the same as the ones using them, energy savings arguments must reach users not buyers otherwise users will not be aware of the energy consumption they generate.

Energy Use in Households an Activity Approach

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Energy use in households is an increasingly important issue in the context of handling climate change. Households count for about one third of the total energy use in Sweden. Households use energy for regulating indoor climate (heating/cooling air) for heating water and for the use of appliances helping them to fulfil important functions of everyday life, like having food and drink; a clean home; clean clothes and body; and information, communication and entertainment, is not decreasing. Even though the energy use for some kinds of appliances is much lower today than earlier generations of the products (freezer, fridge, washing machine for example), the households today own more appliances and some of the former "family common goods" appliances are now individualized. Increasingly each family member has for example a cell phone, computer, and television set of his/her own. In contrast, households usually do not invest in more than one sewing machine or fridge. The ownership of second homes (houses, caravans, boats) adds more appliances and even though they are not used all year around they of course also add energy use.

Most appliances need energy when in use and they are used when individuals need them for fulfilling their wants and intentions to live a good daily life (in which simple activities are involved, like preparing food, boiling water for tea, making toast, ironing a skirt for the day's work, taking a shower after the jogging tour etc). A study by the Swedish Energy Agency measures energy use on most appliances in 400 households. This will increase the knowledge about appliances specific energy use. But we do not now very much about peoples activity patterns, which is the fundament for using the appliances. If we gain more knowledge about how individuals in their households use appliances it would probably be easier to get into fruitful discussions about how to use energy more efficiently. Using an activity approach on households daily life we can deal with problems of that kind and get a deeper understanding of the use of energy in households.

The activity approach makes use of time diaries in which people write what they do, when, with whom etc and there are several large scale surveys performed in many countries. We have developed an approach that can utilize the activity patterns revealed from time diary

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surveys together with the information about energy use for various appliances to estimate energy use in the population in the course of the day.

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Teaching and Learning about Mathematical Objects in Australian Primary Schools: Rocks, Blocks and Computers

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"[We need] to understand the paradoxical notion that numbers are multiple, while still crediting the sense in which they are singular and definitive" (Verran, 2001: 95).

This paper grows out of experiences doing participant-observation research in several primary schools around Melbourne, Australia. Insights from anthropology, feminist philosophy, and performative sociology converge with STS to build the interdisciplinary methodology on which the paper is based.

Taking an STS approach made evident the close relations between materials used and mathematical objects created. Teachers used a great variety of materials: rocks, blocks, counting boards and white boards, test sheets, learning journals and computers, mathematical objects. As they applied these different materials particularly numbers were variously produced. Here, imagination became crucial: Acting in certain ways with certain materials, teachers were encouraging children to imagine numbers with different essences and applications: parts of subtly different epistemic cultures.

I argue in the paper for the centrality of imagination in teaching/learning mathematics. This is particularly obvious when we use a STS lens that recognises in-placed materiality and performativity. I show that materials and their particular deployment allow teachers to promote multiple, disparate numbers. Moreover, the paper demonstrates that the number knowledge that is so produced will form the basis for these students' future engagements with mathematical, technological and scientific practice. It is furthermore important to note that highlighting the impact of materials on children's imagination of what numbers are will enrich the STS project, providing an account of how numbers can indeed be simultaneously singular and multiple.

Mathematics Knowledge Production with Technology: Tool-Use and Identity-Work

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The entry of technological artifacts into modern life raises new questions not only about the relationships between people and machines, but also about how individuals change or transform life-trajectories . The artifact named 'computer' is changing our conceptions of mind and self. Tool-use and identity-work are amongst the key issues of concern for some researchers both in the field of STS and education (including mathematics education). However, still much work needs to be done concerning, a) the interplay amongst tool-use and identity-work, and b) the significance of theorizing this relation in the field of education.

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In order to address the above, the methodology employed in this study has abandoned a conception of mathematical knowledge and of technology-use as discovered through mainly the active cognitive efforts of an individual learner. Such a methodological stance can only serve to pathologise certain categories of teachers and children as being incapable of entering school mathematics or using efficiently technology tools. In contrast, technology and mathematics are seen as discursive constructs used by human beings to communicate about either abstract (imagined) or concrete, real life situations. This assumption means that mathematics and technology can no longer be seen as entities 'out there', primary to, and independent of human discourse, but they are rather a by-product of the individual's discursive growth. This view is strongly linked to the socio-cultural strand based on the assumption that 'there is no physical relation for any infant which is not always and already social' (Walkerdine, 1988, p. 16). It espouses Vygotsky's view of the development of scientific concepts as part of interaction with 'more knowledgeable others' and as mediated by 'cultural tools' (both conceptual and material tools). But it also goes beyond this view by locating the social actors and the cultural tools within discursive social practices. In doing so, it gives salience to values and to the social-value facet of mediation.

The social-value facet of mediation is also strongly linked with identity-work. Back in 1976, Luria argued that learning is a long process that involves not only competencies but also the formation and transformation of identities. And more recently, Walkerdine (1988) has pointed out that the mastery of mathematics involves the construction of subjective positions within the mathematical discourse. Based on previous research (see Chronaki, 2005, in publication), the present study, analyses the experience of teachers and children as they produce knowledge of how to teach and/or learn mathematics by means of technology based artifacts (e.g. robots, dynamic geometry software etc). Data collection and analysis is based on ethnographical case studies of teachers and children using technology to teach/learn about mathematical ideas. A small number of case studies will be analyzed in depth, focusing in particular episodes as they exemplify the complex relation amongst tool-use and identity-work.

Displaying the Museum: an Ethnography of Children's Learning Practices in the Museum

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The 'Science with all Senses' research project observes childrens' interactions with and within science and technology related exhibition displays in museums. On the panel we want to show our findings how science and technology are involved in educational knowledge practices. We will focus on a particular display at the ZOOM Childrens' Museum in Vienna: The "Miraculosum", a laboratory-like arrangement where children interact with scientific instruments and knowledge. We are interested in the production of implicit and explicit knowledge as produced within this display. Based on these considerations we want to explore the process of incorporation of knowledge, of "doing science" in the museum. We are interested how children in elementary school, aged between 6 and 10, with diverse social, cultural and gender backgrounds, and different repertoires of tacit knowledge interact with hands-on or interactive displays and what kind of knowledge practices are approved of and further developed. In the tradition of ethnographical research, the study is based on

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participant observation of children in the museum, facing various ways of "doing" or - as we decide to put it - of "displaying the museum". Besides that we analyse the materiality of the museums displays, to find out how they enable the acquirement of knowledge practices. The theoretic foundation of our research is located at the cross roads of cultural studies and social sciences. With reference to museological analyses we conceptualized display and displaying as central concepts of our observations. We think of them as the space, where visitors/children, encounter dispositives of knowledge, interpret what they encounter and perform a certain meaning. The theoretical impact of the Actor Network Theory helps us to understand the complexity of interactions between multiple actors in our research field, which include artefacts, codes, norms, organisation, things and humans. Based upon the theoretical guide lines of Bruno Latour and Madeleine Akrich we want to find out what the script of the display "forces" and the process of de-scription, while children are interacting with them.

With our research findings we want to contribute to theories concerning the relationship between science and society as well as learning and knowledge practises. We hope to deepen the understanding of the complexity of knowledge production in the interface of museums, school, science/technology and society.

The Ruler, the Chalk, the Textbook, the Fact and the Mind: Socio-Material Construction of Representational Knowledge in a Primary School Classroom

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Modern concepts of knowledge are closely related to notions of place. Rooted in Plato's dialogues rationalism is founded on a conception of knowledge as elicited from the mind by making the mind itself draw attention to that which it already processes. In Locke's empiricism, the mind is a tabula rasa (a blank slate) at birth and knowledge is inscribed - and thus placed - in the mind (in here) through observations of the world (out there). Like rationalists empiricists understand knowledge as placed in the mind, but the source of knowledge is beyond the mind, in the world (Scheffler 1999). Over the past decades knowledge has increasingly been theorized as distributed, and situated in practice; not as individual but placed in the 'lived-in world' (Lave 1988; Hutchins 1995). Knowledge is thus moved from the mind to the social sphere, which implies that knowledge is more than the content of the mind, and more than a set of technical knowledgeable skills. I however argue that the focus on the location of knowledge - 'in-the-world' and not 'in-the-mind' - drives out the question of the ontology of knowledge.

Following the ethnographic approach to the socio-material construction of knowledge (Knorr-Cetina 1999, Latour & Woolgar 1986, Pickering 1995) the paper reports from an ethnographic study in a primary school classroom. In a math lesson, the teacher reads out loud from the textbook about lengths of jumps. A pupil does not possess the sufficient knowledge of length to understand the textbook example and an experiment is established in the classroom to demonstrate the concept of length. A number of materials are involved, and as a result the fact about length of the jump discussed in the textbook is settled. Through a detailed description of how the humans and materials involved in this practice were carefully

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calibrated the paper concludes that a representational form of knowledge was constructed that implies a number of separate and delimited regions - a standard, a mind, a text - and their connections.

The analysis is thereby in accordance with understandings of knowledge as socio-materially distributed. It however moves from a focus on the location of knowledge to the ontology of knowledge by emphasising not just the distribution of knowledge but also its form. From relating knowledge to a notion of place, the paper suggests an spatial understanding of knowledge, whose question is not where knowledge is placed, but which spatial form knowledge takes. This understanding implies that different forms - or ontologies - of knowledge emerge with different socio-material constellation. The approach does however not only contribute a spatial understanding of knowledge it also brings in a quite different way of dealing with and integrating technology in school, beyond the efficiency paradigm.

Changing Patterns of Relations around Technology in the Classroom

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This paper analyse empirically the transformation of practises in a technology enhanced learning situation. I use Actor-Network Theory (ANT) inspired tools, Pattern of Relations and the spatial metaphors regional, network, fire and fluid, to analyse the changes. The paper draws upon ethnographic material I have collected, over a period of two months in 2006, in relation to my PhD project 'The Viability of Practises around Technologies in School'. The focus in the PhD is how technology is acting in the classroom, which contrasts the more general interest in the meaning and potentials of computer enhanced learning within the field of educational research.

The notion of 'pattern of relations' (Sørensen 2008) is used to describe the formation of relations as they appear when a fifth grade class is introduced to Lego Robolab and asked to work with the material in groups. Lego Robolab is an educational product, which gives the students the possibility of building objects with Lego bricks and combinations of engines and sensors, and to control their creation through a computer program. The analysis works with four spatial metaphors, as suggested by ANT/STS researchers (Law, Mol), to create a spatial sensitivity towards the kind of spaces wherein Robolab helps to perform different patterns of relations. The metaphors can also be described as typologies of relations.

The actors - lego bricks, teachers, pupils, manuals, researcher, cables, laptops and stationary computers - stay the same within the short time span the analysis investigates. But the relations between the actor's change, and in that, the situation transforms significantly. What becomes apparent is that maintaining and stabilising the relations between the different actors takes up a lot of effort. The pattern of relation suggested by the teacher and materialised in a manual, is constantly challenged by other ways of relating to the actors in the classroom. This changing status of actors results in a transformation of relational patterns, which analytically is sensed by the need to shift spatial metaphor to meet the emerging patterns.

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Databases Steering Health Policy, and/or the Other Way Around? A Case Study on Databases for New Medicines.

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Both health policy decision-makers and executors have signalled problems in the translation of policy into practice. Only five years ago policy scientists would plea to solve this 'gap' by 'building a bridge', leading to an increasing trend of rationing and writing up of the decision-making process. Transparency and clear decision criteria presuppose that one is certain about the data on which the decisions are based; they are measurable, fixed and therefore static. Problems with new medicines are the uncertainty of e.g. the (cost-) effectiveness at introduction and the dynamic nature of new medicines after market introduction. Decision-makers have problems dealing with this uncertainty and dynamic situation of new medicines as they are required to be transparent in their decision-making process and use clear decision criteria. In fact, laying down the process of decision-making on new medicines caused a contra reaction by the dynamic practice of pharmaceutical care resulting in inefficient and unequal policy execution. A current stream in policy science prefers not to speak of a 'gap' and 'building a bridge', but of an 'intermediate space' between policy and execution. In this space social entrepreneurs can be of help to translate policy in execution and vice versa. Note this should not be mistaken with the former discretionary spaces as the intermediate spaces fulfil a different type of control and accountability. In the case of health policy for new medicines, databases are able to function as translation between policy and execution as they are part of transformation schemes linking the complex reality of pharmaceutical care (policy) to scientific records (databases). Based on documentary and interview evidence as well as participative observation during meetings on the formation of a population based registry and two pilot studies for expensive medicine databases, the transformation schemes will be (de)constructed. Major critic by policy scientists would be that these databases have no relation with the complex world of pharmaceutical care. The performance of the new medicines in clinics cannot be simplified into databases "... as many performances are invisible, unintended or contradictory, performance cannot be easily measured" (Noordegraaf and Abma 2003). However Latour shows in the 'Pedofil of Boavista' (1995) that the transition from a complex network to a small couple of dissociated actors such as a medicine database is possible and that these remain representative of the complex network. Prerequisite is that the databases are linked by a sequence of intermediaries (EMR, drug prescription note, etc) to the complex network of medicines policy. Essential to these intermediaries is that they allow for travel in both directions. Databases therefore can be seen as instruments able to steer health policy and the other way around, policy is able to influence scientific records. Moreover, the case studies of these databases will prove the added value of STS to health policy. Not only policy sciences should inform decision-makers, also STS can inform decision-makers about the way policy will work in practice.

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When Public Health meets Profitable Business-Pharmaceutical Compulsory Patent Licensing Experience in Taiwan

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As innovation as a core competence of business in last two decades, corporate businesses use intellectual property protection, such as patent to avoid other competitors enter the market. In such way, the innovative companies can ensure to make enough profit, not only as return from early investment, but also in future research and development. The rationale for a patent system is to provide an advantage to whole society by rewarding the development of new inventions. Thus, the patent system has two basic purposes: to promote the advancement of technology and to protect the inventor. However, if there an emergent event came such as infectious disease outbreak, should we take compulsory patent licensing as a solution, even if it may infringe someone's patent right? It's that necessary to use government's intervention when public heath was threatened?

Recently, whether pharmaceutical patent needs to be compulsory licensed has brought more and more public health concern in the world due to the rampant AIDS in the developing countries as well as the anthrax patent after the US 911 Event.

This paper try to discuss relevant TRIPS agreements under the WTO framework, such as Doha Declaration on the TRIPS Agreement and Public Health, the Implementation of Paragraph 6 of The Doha Declaration on the TRIPS Agreement and Public Health, and the Protocol Amendment of the TRIPS Agreement. This paper tried to balance the interest among the patent issues among industry competition and public welfare enhancement. In addition, this paper will introduce current compulsory license case in Taiwan- Tami-Flu Case. After reviewing public interests and competition policy, this paper may provide possible suggestions on compulsory patent licensing in Taiwan to peer with international development.

Regulatory Science and Politics:
a Case Study of Emerging Biologic Technologies

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Regulation is one of the most salient and silent mediators between science and politics. Industry advocates and a portion of the public regard our present regulatory system as inefficient, charging that bureaucracy delays market access for useful food and drug products and that it thwarts research by making investment costs prohibitive. These stakeholders have asked for and been rewarded with fast-tracking to speed up the approval of emerging products, and greater harmonization of standards with international trade agreements. Trade and competitive advantage have political legs. Others argue that regulation has already become too flexible, that the cozy relationship fostered these past years between industry

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and government has rendered the regulatory system ineffective.

New standards of access to information at all stages of the drug review process were deemed necessary to enhance transparency and public confidence by the Canadian Science Advisory Board in 2000. A commitment from the Prime Minister to establish a strong and responsive public health system that can address emerging risks and adapt to modern technology was made. A commitment to a smart regulation strategy followed the next year to ensure faster access to safe drugs for Canadians. In response, Health Canada initiated the Therapeutic Access Strategy and announced a new objective to operate as a timely, transparent, innovative and sustainable regulator. Health Canada's commitment facilitated my being able to ethnographically following scientific regulatory activities and risk policy development at Health Canada's Biologics and Genetic Therapies Directorate (BGTD), the pre-market regulatory authority responsible for ensuring the safety, efficacy and quality of all biologics, biotherapeutics, and radiopharmaceuticals, including blood and blood products, tissues, organs, vaccines, and genetic therapies for human use in Canada since 2001. The scientific developments in molecular genetics and recombinant DNA technology have been captured along with how scientists, industry sponsors, clinicians and government regulators build explanations for the harms and benefits of emerging therapeutic products, how they gather and influence facts in convincing ways, how local knowledge initially derided by experts later becomes the central ingredient for negotiation to market, how political expediency bears down on scientific evidence, and how the innovative way experts produce, appropriate and market knowledge furthers their own interests. These developments have opened novel possibilities for the diagnosis, treatment and prevention of diseases but the rapidly advancing science, international harmonization strategies, greater public health expectations, and legislated default times for reviews have also put enormous pressure on institutional capacity. Human and non-human actor relationalities and materialities present issues of public involvement, corporate drivers, clinical judgement, political will and scientific evidence. These will be discussed in light of the democratic rhetoric of transparency and accountability in negotiation with the approval of novel biologic therapies whose harms and benefits remain uncertain.

Keywords: regulation; health; governance; innovation; expertise; risk

Buying into Biotech: Investor Expectations and the Financing of Small Therapeutics Firms

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Bringing a novel therapeutic product to market takes over a decade and typically costs tens of millions if not hundreds of millions of dollars. Successful products can be very lucrative, but the vast majority of therapeutic products fail clinical trials due to safety concerns or insufficient evidence of efficacy. The issue for the biotech industry is therefore how to turn expected financial returns into concrete returns. This paper highlights how firms negotiate the construction and maintenance of expectations of financial returns within the investor community.

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This is an important policy issues as the number of companies attempting to develop novel therapeutics has increased in recent years, in part reflecting a changing division of labour within the pharmaceutical industry (Hopkins, Martin et al 2007). While large pharmaceutical firms are suffering from a productivity problem, and many have gaps in their new product pipelines, the small biotechnology firms that hope to fill these gaps struggle to generate returns for their investors (particularly in Europe).

The paper draws on speech act theory (Searle, 2001), that has recently been extended in science and technology studies to explain the ways that science and technology interact (Nightingale, 2004). This work highlights the way in which technology is used to create the artificial conditions where scientific theories are true. Once these artificial conditions are created, scientific knowledge can be used to guide technical change by reducing the uncertainties involved in technical problem solving. The paper extends these ideas to the financial models of financial valuations that are used within the financial community. It explores the ways in which heterogeneous groups of managers, scientists, regulators and financiers create the conditions where their models correspond to a shared financial reality, and the ways in which the boundaries of those financial expectations are maintained. The theoretical ideas are illustrated with case studies of the financing of UK firms.

The paper highlights how firms' valuations are constructed. These negotiated valuations then become 'facts on the ground' that shape the prospects of these firms and feed into expectations about later rounds of investment. The valuations have the potential to become self-fulfilling prophecies, if they can encourage widespread investment. However, their value needs to be carefully constructed. For example generating too high a return at any particularly point in the funding cycle will make the next round of financing more difficult. Policy implications are discussed.

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Science and Technology in Portuguese Newspapers: Trends and Transitions

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This paper aims to discuss the public understanding of science and technology, namely, it aims to question the last 30 years of science and technology, in Portuguese newspapers. Taking Science and Technology published in national newspapers has representative and source of the whole media coverage of science and technology, this presentation goal it is to build a landscape of Portuguese science and technology media coverage, between 1976 and 2005.

It seems clear that for scientific activity to be understood, the communication of science plays a central role. The representation of science by the mass media possesses, thus autonomy before the scientific activity playing, relatively to this, different social functions. Starting with the approval of the first Portuguese democratic Constitution, this paper analyses science and technology newspaper coverage, in Portugal.

This has been a period of major changes in Portugal, namely in science and technology. In 1976, Portugal had almost no investments in science and technology and science and technology weren't an important issue. What has changed since then? Is science and technology noticeable now? Does science sells newspapers?

Based on, a quantitative and qualitative, analysis of nearly two thousand articles published in a major national Portuguese newspaper, this presentation develops a wide portrait of what has been the media coverage of science and technology, and discusses trends and transitions, between 1976 and 2005.

This discussion it is a chapter of a wider research that aims to discuss and characterize the presence of science and technology in the Portuguese newspapers, supported and sponsored by FCT - Portuguese Foundation for Science and Technology.

Entertainment Experts: the Construction of Scientific Expertise in Hollywood

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The ascent of the expert throughout the twentieth century has paralleled the commodification of knowledge in our society. The growing valuation of expertise has led to increasing collaborations between two communities whose objectives may at first seem to be at odds: the entertainment industry and the scientific community. The nature of these collaborations provides a unique opportunity to investigate a long-standing, but newly prominent, issue in science studies: what is the nature of scientific expertise? The concept of expertise is not as simple as a delineation between those who possess knowledge and those who do not. This

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paper contributes to current academic debates over the nature of experts and expertise by examining Collins and Evans' categories of "contributory expertise" and "interactional expertise" in an arena where scientists' expertise often conflicts with filmmakers' expertise. I analyze how scientists and filmmakers grapple with Collins and Evans' categories of "normal" and "golem" science. Filmmakers do not make these distinctions and for them there is only a monolithic "Science." Scientists, on the other hand, are well aware of the division between normal science and golem science even if they do not use this terminology. Scientific expertise, then, not only encompasses what we know. More importantly, it extends to what it is we know about "what we do not know." Using empirical evidence collected through interviews with science consultants this paper considers questions relating to the public conception of scientific expertise such as: How are individuals constituted as experts? What is the nature of the "expertise" required for a fictional text? How do individuals convey expertise? How is expertise contested in this context? How does the nature of expertise in this context differ from other arenas such as the role of expertise in public debates over science policy? Examples will come from older texts such as Destination Moon (1950) as well as more recent films including Mission to Mars (2000) and Sunshine (2007).

Food Irradiation in the Media: Beyond Balance?

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Since its initial development in the 1950s, food irradiation has generated vigorous, lasting controversy in several countries. In Canada, the controversy has heated up twice in the recent past, when federal regulations on food irradiation were revised in 1986 and 2002. Public consultations were held where collective actors expressed diverse views of the risks associated with this process, which we summarize as distinct social representations. In their coverage of these consultations, most media adopted a balanced position, presenting opposing parties' views. Looking deeper into their discourse, this paper examines the transmission of social representations of risk by the Canadian media in their coverage of the two public consultations on food irradiation. Through a comparative content-analysis of the media discourse (newspapers, magazines, Internet) with that of collective actors, we will position it in the representational landscape prevailing during the two consultations. Among various aspects of risk - health risks to consumers, economic risks or environment risks - which ones did they insist on? Which representations of these risks did they actually convey to their readers? How did they report on the conflict of representations that existed among collective actors in their coverage of the consultations? Did they go "beyond balance" in their coverage, either quantitatively, by overly insisting on certain risks, or qualitatively, by an exaggeration or a dramatization of the risks being discussed? And finally, were there any differences between the media coverage of the 1986 and 2002 consultations? We will answer these questions with analogies to other studies describing media coverage of food irradiation in the United States.

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Analysis of the Wole Picuture and the Dynamics of Japanese Newspaper Articles on Genetic Modification

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The rapid spread of technologies involving the application of Genetic Modification (GM) raised the need for considering this new technology in society. To consider social movement concerning GM, social actors such as policies, industry, economy, culture, and the mass media must be considered. The latter is critical in that the mass media often play an agenda-setting role in discussions concerning GM. In Japan, newspapers represent one of the major sources of information on GM. Thus an understanding of the past and current mass media is required. In the last few years, several articles have been devoted to the study of Japanese newspaper articles on GM. These studies used content analysis and revealed a general tendency in the media coverage of biotechnology in Japan: the medical applications of GM were viewed positively while applications in agriculture tended to elicit a negative response. These findings are in accord with the results of an analysis of European media coverage of biotechnology. However, these earlier studies failed to present the whole picture and the dynamics of Japanese media coverage on GM because the sample numbers were small compared to the total number of published articles on GM. Consequently, full-text analysis of article sets is not only essential in an analysis of the past and current status of Japanese newspaper coverage of GM, but is also useful for a consideration of the future direction of arguments on GM. We subjected the two Japanese newspapers with the largest circulation, the Asahi Shimbun and Yomiuri Shimbun, to an analysis of the full text of approximately 4000 articles on GM published over the past to perform an assessment of the evolution of reportage on GM. As the result, it was shown that there are two significant shifts with respect to the major topics addressed in articles on GM by Japanese newspapers.

Mediation and Anticipation: an Analysis of Pre-Pandemic Risk Management regarding Avian Influenza H5N1

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This paper discusses one specific type of 'acting with science, technology and medicine' namely that of anticipation. Inspired by a specific form of empirical philosophy, i.e. a sociology of associations (Latour, 2005), it seeks to develop a 'media-analysis' of anticipation by looking at the way in which specific mediation formats have been deployed to actualise a particular risk-sensibility, namely that H5N1 is the most likely candidate to produce the next severe global influenza pandemic. Methodologically, it deploys a mixture of semiotics, discourse analysis ands visual ethnography, supplemented with some expert interviews with those responsible for managing public health. The main aim, however, is not to uncover hidden meanings behind representations (i.e. as in traditional critical discourse analysis) but to trace specific transactions and translations that have granted significance to particular anticipations. In doing this, it is hoped that more links can be made between STS and Media Analysis, and more specifically the pivotal role played by mediation not as a representational

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practice but as a transformational one (Van Loon, 2007, Lynch and Woolgar, 1990). It is signification which connects the potentiality of multiple futures with a particular virtuality of risk-management. The paper seeks to explain the role of particular mediators that have transformed this realisation or selection of matters of concern into specific risk-management-objects that remain elusive (Law, 2004). The particular advantage of using H5N1 as a case study is that the anticipated pandemic has not (yet?) come to fruition, which gives us the advantage of 'hindsight' but without allowing us the false comfort of imagining that nothing was real (e.g. a so-called phantom risk), H5N1 remains a body multiple (Mol, 2002). Rather than criticising a politics of precautionary principles and phantom risks, this analysis of the mediation of H5N1 enables us to trace rather more creatively and heterogeneously the associations between anticipation and objectivity and thus provide us with a more empirically reflective means to conceptualise 'the virtual' (Shields, 2003, Woolgar, 2002).

1.1.8: Contested and Constructed Spaces: Battles over Territory, Identity, and Resources

When a City Becomes an Archipelago of Islands.
The Emergence of a Social Group in a New Territory of Tallinn.

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Tallinn, the capital of Estonia, is a growing identity - the symbol of New European East. In its early years, Tallinn was an important port of trade between Russia and the Scandinavian countries. During this period, the city gravitated around a medieval city center, expanding later to the surrounding suburbs. After the Second World War, when Estonia was absorbed by the Soviet Union (1945), the demand for housing increased. In the frame of the Russian occupation, the needs of the people changed and the modernist city appeared to be the logical justification to satisfy the demands for better amenities and standards of living. With the modernisation of the city, movement towards the periphery started increasing urban polarization. The new urban mega-structures were located around the old city centre and suburbs.

Although the first paradigms for Soviet mega-structures were minimal living conditions for all inhabitants and speedy building process in order to satisfy the ever-increasing demand for housing, it was only in the 1970's and 80's that those paradigms changed towards a better quality of living space. Estonia gained its independence from the Soviet Union in 1991. After their independence, changes in policies lead to Estonians leaving the Russian periphery and reclaiming the suburbia, which were partially abandoned during the Soviet period (Nomme, Kadriorg, etc.). Present day statistics show that 53% of the population of Tallinn still live in these Soviet mega-structures; most of them being Russian Speaking Population (RSP) and lower class Estonians.

At the same time, after independence the new State of Estonia granted citizenship only to those who had ancestors prior to Soviet occupation. For the RSP, who make around 30% of the total population of the country, it was compulsory to pass an Estonian language exam in order to be eligible for citizenship. Although a minority were able to obtain Estonian citizenship, most of the RSP were cut-off from this integration process: cultural resistance by the RSP to learn the Estonian language (Russian was the official language during the Soviet time) led to progressive marginalization of them from high-income jobs and voting privileges.

Beside this increasing discrepancy between Estonians and RSP, a third branch seems to be evolving in the Estonian society. This is the case of the Russian-Estonians (REs), who have Russian roots (family, language) but also poses the Estonian know how (language, social circles, job opportunities). The aim of this paper is to understand how this new social group overlaps with the existing urban frame of a small/young post-Soviet city. We will show that besides the insurgency of REs, it is also possible to recognize a process of fragmentation in the urban fabric (what we call "archipelago of islands") and the emergence of a new urban entity (what we call the "inverspace"). From this point of view, Tallinn appears to be an important case of study for emerging economies in European Union.

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States as Projects: the Material Realization of Spatially Segmented Orders

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Recent debates on the transformation of the state, global governance and critical geopolitics have shown that traditional notions of space and territory are inadequate to capture contemporary dynamics. Today's world of increased mobility and fluidity of communications, a world of trans-, sub-, supranational, regional, and in particular globally constituted spaces invalidate the assumption that political processes can be captured by focussing on sovereign states alone. What is needed is an understanding of spatial orders as enacted discursively and non-discursively in material and semantic arrangements where the assemblage of human action and technologies, media technologies and discourses, bodies and artifacts shows how very specific spatially distributed networks are established, reproduced, changed and dismantled. From this perspective, the nation state with its quasi-naturalized spatial, discursive and political boundaries has therefore always been one of these projects, quite stable during most of the 20th century and today contested by a variety of alternative projects.

This paper therefore pursues the question of the 'materiality of space' and argues two things: first, argues that associated conceptual challenges require a post-positivist framework that takes seriously the notions of 'practices' and 'communication', and it secondly compares and assesses three alternative frameworks on their conceptualization of the relationship between the material and non-material and its repercussions for an understanding of transformation of the state, politics, and materiality. It argues in three steps: The first part discusses prominent approaches in International Relations (IR) to assess both the transformation of the state and demonstrate that these approaches cannot address the changing significance of space for structuring world polity. We show in the second part that they are limited in their explanatory power due to a naturalistic understanding of the material conditions of 'doings' and 'sayings', of discursive and non-discursive practices. The third part therefore discusses and compares three alternatives in more detail. We discuss Foucault's notion of the dispositif, Luhmann's autopoietic systems theory, and Actor-Network-Theory (ANT) to illustrate how they redefine the nexus of discursive and non-discursive elements that enact social order. We then explore implications of these approaches for an understanding of the ways in which politics and the state have been coupled and are increasingly decoupled today.

Housing, Urban Planning and Citizenship in Réunion: National Projects of Development in a French Overseas Department, 1958-1988

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In 1962 the French lost Algeria, their most important colony, despite the full resources of the French state being used to prevent independence. This posed a fundamental question to the

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French Administration about the nature of France's relationship with its remaining overseas possessions and, indeed, whether such a relationship should exist at all. Worldwide, decolonization for the vast majority of the European Empires was the prevailing political orthodoxy and Michel Debré, the French Prime Minister, was so disillusioned by the defeat that he resigned his office. In 1963 Debré was elected as a deputy for a French island in the Indian Ocean called La Réunion which, in 1946, had voted to become a French "overseas Departement". Debré decided that Réunion Islanders' loyalty to France should be rewarded; in the Cold War context, this made Réunion fertile ground for an experiment: constructing a "little France in the Indian Ocean".

Through a study of shantytown clearance in the island's capital, my paper examines how and why France attempted to assimilate Réunion and its inhabitants into metropolitan France and how the Réunionnais responded to this policy. From 1958 the Prefect (the state's representative in Réunion) and later Debré himself attempted to recreate French towns and hence, by implication, French inhabitants, using urban planning and government housing as a key lever of that process. One of the first policies led by Michel Debré was to remodel the urban landscape in St Denis, the island's capital, by clearing its largest shantytown of Butor-Vauban. Debré planned to rehouse and relocate thousands of its mostly poor inhabitants in new grands ensembles, modeled on the same concrete tower blocks then seen as the solution to urban housing in contemporary metropolitan France.

The Algerian defeat might have discredited the colonial ideal of enduring political control of geographically distant possessions by the metropole. However, my hypothesis is that in Réunion, French government planners instead sought to maintain this control by radically changing the method of achieving it. By looking at government planning directives from distant Paris, municipal struggles over regulation and specific conflicts between slum landlords and poor tenants, my paper will demonstrate how Réunion Islanders understood and responded to the urbanization of the Butor-Vauban neighbourhood between 1958 and 1975. I will also draw parallels with how Islanders have invested this neighbourhood with meaning for the last 15 years: as the largest and most important area for housing regeneration in Réunion, Butor-Vauban was the centre of urban riots in the early 1990s and is still a politically charged community, for many Islanders continuing to symbolize the impact of French policies of spatial assimilation in Réunion.

Understanding Socio-Technical Dynamics in Contested Cities - Short Circuiting the Social Construction and Impact of Urban Artefacts

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The proposed contribution relates directly to the ongoing ESRC-funded project "The urban environment - Mirror and mediator of radicalisation". Its underlying premise is the assumption that radicalisation is not just a mental or a-material phenomenon: It takes place in streets, apartments, shops or parks and it is materially reflected in fences, buildings, flags and various territorial markers etc. Most STS scholars will agree on the importance of understanding the processes through which these artefacts are designed, stabilised and

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reproduced, in short socially constructed.

Likewise, it is widely acknowledged that all kinds of artefacts can influence, condition, mediate, in short can have a social impact upon people's perception, behaviours and daily practices. In cities witnessing radicalisation trends among their population this mechanism can mean that urban artefacts like those mentioned above might influence the decision which playground to prefer, where to hide in the event of trouble and the likeliness of meeting 'others'.

The relationship between the social and the material in contested cities thus is a recursive and mutually shaping one. We realise that this claim alone would be a truism at a 4S/EASST conference. In fact, countless authors have written about the social construction of artefacts; much fewer, however, have done so about urban artefacts - let alone in contested cities. Also the social impact of artefacts has received some attention; it seems however, with a declining trend over the last few years - maybe because of its perceived, but not necessary, proximity to technological determinism, behaviourism and social engineering. And only a handful of scholars are addressing these mechanisms for artefacts in contested cities.

The most striking feature of this scholarly landscape, however, is a very lonely spot from where both causal directions can be seen simultaneously. Despite frequent rhetorical emphasis on this task few actually pursue it. What we intend to demonstrate theoretically and with empirical material from our case study cities (Belfast, Beirut, Amsterdam, Berlin) is that such a stereoscopic approach is not only an interesting academic exercise but an indispensable for the understanding of almost any social-technical dynamics. The reason for this is because numerous artefacts - not only urban ones and not only in contested spaces - are designed, stabilised and reproduced (or not) exactly because of their desired (or undesired) social impact.

Conceptually speaking, our contribution aims to present some theoretical, methodological, methodical and practical issues of one attempt to follow the ball across the whole tennis court (to use Latour's felicitous metaphor) from the social construction side to the social impact side and back. Or, even more precisely: We try to short-circuit these two poles.

Re-Designing the Landscape to Allow for Intra- and Inter-Community Movement. A Case Study of the Urban Renewal Project for Les Tarterêts.

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How do people organize space and place? The social scientist often claims it has to do with culture since it has been perceived that culture strongly influences our behavior and values, which in turn are thought to shape our space or place [Yi-Fu Tuan, 1977]. Thus, ones culture and the look of the space or place one inhabits are seen as related. One concern that arises from posing the answer in this way arises from the fact that while people may share a culture they may also share traits that transcend cultural particularities even to the point of simply being part of human behavior in general. By attributing modes of spatial organization to cultural preferences and traits, we are thereby creating reductions in analysis of these

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spaces as well reducing the horizon for the creation of possible spaces. We cannot deny that culture plays a role in the formation of spaces and places but it needs to be acknowledged that it is not the only factor. Considering other possible factors of influence can thus allow for trans-spatial analysis, design and use. This leads me to pose another question: how can we create spaces (affording a sense of freedom of movement and openness), which will also allow for the intimacy and individuation of place? To address this question, I will perform a phenomenological, hermeneutic analysis of an urban case of segregation, Les Tarterts. Les Tarterts is a HLM (habitation loyer mod social housing) located 41 kilometers (25.4 miles) south of Paris in the city of Corbeil-Essonnes.

Almost fifty years after the first building was put in place, this housing project is undergoing an expansive urban renovation project that aims to restructure the environment to better fit the needs of its residents. The residents are mainly of North and Sub-Saharan African origin, about 40% of its inhabitants are under the age of 20 and there is an unemployment rate of 30% that is well above the national average. The problems facing those who live in this neighborhood come from its economic, spatial and social isolation from Corbeil-Essonnes and nearby suburbs as well as from Paris. The plans for the renovation project look to improve the internal structure of the neighborhood but little has been said of how it plans to connect the neighborhood with its surrounding area (the suburb of Corbeil-Essonnes). This, above all, should be of major concern for community and urban planners: to create a space that allows for intra- and inter-community movement thereby diminishing any sense of isolation that currently exists.

The Right to Return, the Right to Stay.
Israeli and Palestinians, Two People for the Same Land.

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For Israeli and Palestinian 'identity' space represent the core issue. It is first and foremost for both the imagined and the dreamt land. Political Zionism fulfills for "the people without land", the Hebrews of the Diaspora, the dream of a homeland. It is a dream fulfilled, however, by the political ambiguity that underpins the negation/removal of another people living there. At the same time Palestinians had the ties with their land severed. This uprooting became the focal point of their national identity and such an antithetical relation with the land has had deep implications for the elaboration of memory as well as for the elements with which narratives have been nourished: ambivalence, harsh, concrete reality, space, actions, images and objects (Nora,1984: XIX). Expulsion from their territory is the central problematic crux for Palestinian identity, since land is the focal point on which national identity is elaborated. When subjected to the workings of the mind, space elaborates "subjective truths". Real space is in continuous transformation, devastated by the force of war or the conflicts in everyday life. Israeli settlement policies have created highly unstable borders. Palestinian land can be lost to the settlers by means of force but is at the same time subject to various forms of resistance on the part of the Palestinian people. Space is central in the everlasting uncertainty of the conflict. In addition to the military acquisitions of the Israeli occupation, there is another non-military form of territorial acquisition, less visible, which is referred to by Israel geographers as "land grasping" (Ari and Bilu, 1997).

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In my paper I will focus my attention to 4 the methods employed to diffuse, create and reinforce contested space:

1. physical acquisition by manu militari which means legal extension of authority and power, imposition of restrictions and surveillance coercion;
2. symbolic acquisition through the sacralisation of the land, is the adoption of sacred model to legitimize land ownership, the Gush Emunin movement adopted a romantic worldview and Pantheistic Theology;
3. legitimizing acquisition it is strictly relate to the symbolic acquisition, changing space is associated with the transformation of toponomy, not only to mark the acquisition of land but also to cancel memory and any possible record as a possible source of legitimacy;
4. de facto acquisition, expansionistic settlement policies supported by government aid create conditions of irreversibility or intractable solutions for the State borders.

1.1.9: Ethics as Practice in Health and Medicine, I

Human Enhancement as Destabilizing Ethics

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Human enhancement makes the human body into an ethically, and therefore politically, relevant locus of human decision, or at least more so than it was without the idea of enhancement medicine. Even though human enhancement today largely belongs to the realm of fantasy and science-fiction, it does function in scholarly and popular debates as a trigger that opens up existing and taken-for-granted moral routines. These routines include the largely implicit distinction between public and private forms of ethics (often referred to as politics and life ethics, respectively). To understand ethics as a situated discourse in which normativity is situated, a certain (yet not necessarily full) relativism is inescapable; however, ethical issues arising in discussions on human enhancement show that at least to some extent relativism would be problematic: while some choices appear as individual questions of shaping our lives, many of them have a largely societal impact. Thus, enhancement medicine provides an intricate nexus between politics as a public form of normativity, and life-ethics as a private form of it. Moreover, this nexus is material in a peculiar way: at stake is the irreversible change of our bodies, which in many respects is unprecedented (as in many respects it is not). Being material in this specific way, the nexus presents itself as inevitable (that is, even if we ultimately disagree to human enhancement, we are at least obliged to have an opinion on it). Therefore, it forces us to rethink both our ethical positions, and our routines of dealing with those positions in a pluralist society.

Governing Hereditary Disease in the Age of Autonomy

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This paper critically examines the legal and ethical dilemma in the institutionalization of a prevention and treatment technology on hereditary non-polyposis colorectal cancer (HNPCC) in Finland. Current medical practice and legislation support the notion of non-directiveness in genetic counseling, patient autonomy and personal privacy. Clinical doctors in Finland, however, proposed that a research register of HNPCC carriers should be nationalized through a legal mandate, which would require all carriers to be identified on the basis of the mutation, but also provide a national healthcare and counseling infrastructure for preventive treatment. This paper argues that although such a register would undermine personal autonomy and privacy, there should be a strong incentive by the state to intervene from a preventive health perspective. Such a position would be contrary to current medical ethics and legal practice, but it would ensure that all patients receive equal access to information, screening and treatment, as well as help to reduce mortality rates.

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Ethical Timing

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Ethicists of technology usually imagine a fatal event -such as a disaster- to flow from a particular moment, in which a responsible agent takes the crucial decision that caused it. But in the context of technology research ethicists should also be concerned with the kind of future technologists help to shape by means of their technology. Ethicists who reflect on that future cannot focus on a single decision by technology researchers: the technology is shaped by many decisions, taken at several moments, by many agents.

As an ethicist I am involved in parallel research in the context of technology research into photoacoustic mammography (intended for the non-invasive diagnosis of breast cancer). In that context technological researchers continually take decisions with ethical relevance, for example about the material they use, their research priorities, the people with whom they speak (or don't speak) about the potential of their technology etc. In the paper I want to defend why these small daily decisions should be called 'ethical', and why the moments in which they are taken are ethical moments. The view I want to argue for is that they are ethically relevant because they co-shape human (social) well being.

The plurality of ethical moments also has an effect on the timing of the ethical work in technology research contexts. I will argue that ethics can only influence the research-process conducive to the design of a new medical technology, if it is shaped as a reflexive practice which continues to accompany the many ethical decision moments. Ethicists who understand their task in this way, continually ask researchers to reflect on the effects of their choices on human (social) life and well being, and seek to give those reflections a place in the researcher's working habits.

Tailoring the Individual to Serve the Collective?

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This paper analyses practices of recruiting psychiatric patients to a pharmacogenomics research centre in Denmark. Based on informal conversations, semi-structured interviews with pharmacogenomics researchers and analysis of various documents we explore the researchers' different strategies to shape patients as research subjects, the lived moral reasoning that is actualised in these strategies, and the social and spatial relationships that are created as patients are targeted as research subjects. We argue that such recruitment activities may be conceived as interpellation practices that 'hail' individual patients and ask them to place themselves in relationships to other citizens and state institutions by giving researchers access to blood samples, medical records, and sensitive life-and-illness information. In our analysis of these interpellation practices we explore how the researchers reflect on and 'act with' ethical norms originating in formal ethical standards as well as in their

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own moral judgements.

Writing letters and making telephone calls to patients represent the two main practices of interpellation in our case-study. We conceptualise these two practices as techniques of distance and techniques of presence respectively. Analysing the different materialities (letters, informed consent forms, cell phones), bioethical frameworks, spatial and emotional relations, and organisational routines actualised in writing to and calling patients, these techniques are not simply seen as contrasting ethical conducts actualising different versions of 'ethical knowledge', but as complementary and co-existing ways of constituting spatial and social state-citizen relationships. Through this analysis we discuss what happens when STS approaches come to 'act with' ethics as it unfolds in specific research practices.

Re-Thinking Ethical Review Practices

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In order to improve the legitimation of health-related research involving human beings, Research Ethics Committees (RECs) were established in the 1970's. However, current ethical review practices are under attack by various stakeholders. Current debates focus on dilemmas of protection of research subjects versus progress in research; inconsistencies in judgments between and within RECs; and the mission and scope of authority of RECs. Ethical and technocratic discourses are dominant in this field. The ethical discourse focuses on general principles, like paternalism, autonomy, and justice. The technocratic discourse focuses on increasing efficiency and transparency by education and regulations. As a result governmental bodies tend to enforce stricter regulations, which paradoxically reduce public and professional trust.

In this paper, the possible contribution of STS to the analysis of ethical review practices is discussed, starting with the social institutions in place for legitimizing research involving human beings, in particular RECs, followed by critiques and suggestions from stakeholders in ethical reviewing. Next, the presumptions on which current ethical review systems are based are deconstructed and current issues in ethical review practice are analyzed with the help of STS literature. STS might provide new insights in these processes and the specific interplay between scientists, RECs and society in this field.

From this analysis I claim that when we leave it to the field, legitimating health-related research with human beings will become more and more problematic. We should therefore re-consider our current institutions, like RECs. STS provides alternative, democratic models for the interaction between science and society in general and more specifically for dealing with uncertainties in decision-making processes. These models could strengthen both public and professional trust in research with human beings.

1.1.10: Institutional Contexts of Technology

Information Technologies and Economic Institutes

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All modern technologies are developed with the help of scientific research, however the progress in information technologies produce changes in base economic and social institutes.

These are main features of modern technologies evolution:

1. Global character of information technologies makes no barriers to instantaneous exchange of information, funds and technologies.
2. Information technologies provide skyrocketing innovations in many fields and reduce time for development and worldwide distribution of the new goods and services.
3. There is a classification of technologies on own technologies of firm and technology of general use. Rapid progress in information technologies transfer advanced technologies to public use very soon. Only permanent innovations give the advantage in competition.
4. The economic success in the increasing degree depends not on manufacture of things, but on manufacture of ideas. The added cost is created mainly by an innovation, both in processes and in products.
5. The effect from introduction of information technologies in many cases does not cause increase of labour productivity, but creates essentially new quality of communication, administrative and technological processes. This phenomenon has received the name of "paradox of productivity". This paradox arises in connection with that the most part of computers takes root in spheres of services, education and management. However these processes in very small degree give in to formalization. To automate the direct industrial operations is much easier. Therefore introduction of information technologies in many spheres generates effects which cannot be estimated in traditional terms of productivity.
6. Information technologies form absolutely new parity between development and manufacture (copying), training and service (including updating). The information product (for example, operational system) in development can cost very dearly, but in manufacture (copying) - practically anything. Copying of an information product does not demand expensive equipment and qualified workers. On the other hand, a greater role training to new products plays, and also their constant updating.
7. Unlike the usual goods the knowledge, being transferred, all the same remains at the owner, and it can sell it again and again.
8. Utility of information technologies increases with growth of number of users.
9. Information technologies, and in particular the Internet, allow to organize development of new technics under flexible schemes, using network logic, generating thus absolutely new institutional environment.
10. Development of information technologies occurs within the limits of obvious or implicit standards. These standards set long-term advantages to their developers. And these standards very often in common are developed by the companies-competitors.

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Opening the Black Box of the Institutional Context of Technology: Reconsidering Sociology and History in Technology Studies

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The social embeddedness of corporate R & D is pivotal to investigation of the social mechanism governing steady interaction between science, technology and society. However, previous literature on the history of corporate R & D organizations tends to ascribe everything to all embracing institutional context without the systematic examination of the flow of information, money, human resources, and materials. This paper elucidates dynamic relation of corporate R & D to the wider society beyond success or failure type account, by focusing on relevant mechanisms working both within and outside an emerging British R & D organization in a dual-use technology, the marine steam turbine. .

The paper calls a particular attention to the unexpectedly strong external dependency of the initial venture type organization specializing in the R & D of the marine turbine and sheds a fresh light on the social implications of the dependency. What is significant in this connection is that the external support coming from the military sector was given through informal human networks undetected in organizational and institutional decisions. Whereas the revolution in government in Britain proceeded at this formal organizational and institutional level since the second half of the nineteenth century has been highlighted, the subtler but important role of informal human networking seems to be dismissed and deserve for further scrutiny to open the black box of the institutional context.

It is because of the existence and importance of this informal level that the view of the science, technology and society interface in laissez-faire institutional settings becomes a rough approximation to reality and, therefore, for other cases as well, we need a wider perspective that embraces the external dependency of seemingly closed corporate R & D, which can only become visible with due attention to informal social relations embedded in the institutional or organizational milieu. In this sense, as far as we can see based on this pioneering case of the R & D, the social process of creating R & D was not a closed system but an open system where the initial agent of R & D and other external agents dynamically interacted through the combination of spin-on and de facto spin-off, which will be systematically scrutinized in the paper based on primary source materials.

Technological Platforms: Concepts and Practical Realizations

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During the last ten years Swiss universities and Federal Institutes of Technology have established a number of "facilities," "platforms," and "service labs" that specifically target research in micro- and nanotechnology. These units provide scientific and technological equipment and expertise (different forms of microscopy, specimen preparation, micro- and nanolithography, characterization, etc.), the corresponding personnel, and dedicated work environments

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(e.g. clean rooms). They offer their services to academic researchers as well as to industrial partners; in addition, they actively conduct their own research. How can these facilities be described, what motivates their recent ascent in the fields of micro- and nanotechnology, and what is their contribution to the configuration of these research areas? To address these central questions, we reconsider the notion of technological platform.

"Technological platform" has particular meanings in a range of areas. A platform is first of all a technological basis for computer, information and communication systems. From an economic point of view, capabilities are considered as technological platforms when they open up opportunities to participate in future markets. Organization studies view platforms as a means to engender new arrangements of resources, routines, and structures. From a science studies perspective, platforms have been discussed as material and discursive arrangements that coordinate action (Keating/Cambrosio 2003). In line with these latter suggestions, we will consider platforms as socio-technical arrangements that associate heterogeneous entities to enable scientific work. The analyzed platforms in Switzerland will be characterized with re-gard to their function and their structure. In order to draw out their specific features (should such characteristics exist) we propose a comparative approach that uses particle physics with its central collider infrastructure as a contrasting case. The question then also reads whether and how big science and micro/nano-science differ with respect to their platform organization. The paper is based on an earlier long-term ethnographic investigation of particle physics at CERN and a present study conducted in the field of micro- and nanotechnology in Swiss pub-licly funded research institutions.

Does ICT Uptake Transform Technological Regimes?
The Case of Horticulture in the Netherlands.

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Information and Communication Technologies (ICTs) are generic and enabling technologies. They are a pervasive technology, present everywhere, including households, businesses, science and government, each in its own specific way. The uptake of a generic technology such as ICTs changes user practices, institutions, and (social) networks, and vice versa. In other words, technological regimes are transformed. The transformation of a regime has effects on the economic and environmental performance and social relations and conditions within an economic sector which comprises the socio-technological regime.

The multi-level perspective (MLP) (Geels 2002) offers a theoretical framework to study the dynamics of technological regime transformation. The studies carried out using this perspective have been directed at the socio-technical regime surrounding a specific technology. Very few cases have been studied where a generic technology is taken up in a socio-technological regime, and if and how this has caused regime transformation. Regime shifts towards sustainability are a widely studied topic, whereas the effects of regime changes by generic technologies on sustaiabiltiy are underexposed, and seem to be interesting to do study. Uptake of ICTs in a socio-technical regime can be seen as a specific type of interaction between two separate regimes in line with how Raven, Geels, etc. The dynamics of this type of interaction are not clear yet, and need to be studied in more detail.

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The horticulture sector is a very innovative agricultural sector in the Netherlands, producing fruits, vegetables, flowers, and plants for many decades. The central element in the regime of the sector is the greenhouse. ICTs have been taken up for the purpose of climate control, management of processes of companies growing in size, and information flows between horticulturists, and the network of actors in the regime. Relations between horticulturists and their surroundings have changed in several ways due to the uptake of ICTs. These changes have had their effect on the sustainability performance and user practices of the horticulture sector in The Netherlands. The paper is organized as follows:

1. A theoretical framework is constructed, based on a multi-level perspective to describe and explain how a generic technology is taken up by a socio-technological regime
2. The way in which ICTs have been taken up by the horticulture regime will be described, and explained from a regime shift perspective
3. The relation between the the sustainability performance of the sector and the uptake of ICTs by the regime will be made,
4. Conslusions will be drawn how sustainability can be stimulated in the regime.

It will also be discussed whether the uptake of a generic technology reinforces existing values and guiding principles, or if it transforms an economic sector radically, and will lead to newly emerging values and guiding principles. The mechanisms found in the research serve as lessons for the implementation of ICTs to improve sustainability performance of other economic sectors.

Geels, F. W. (2002). "Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study." Research Policy 31(8-9): 1257-1274.

1.1.11: Setting the Agenda: Interactive Research for the Governance of Science and Technology

Involving Actors in Setting Up the Agenda for Social Sciences Research: the MEDUSE Project

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From 2006 to 2008, the CSI coordinated a European project called MEDUSE whose objective was to organize a dialogue between social scientists and main actors in the domain of health and medicine (professionals, patient organizations, decision and policy-makers), on three issues:

1. The dynamics of patient organizations in the European area
2. The emergence of new technologies and responsibilities for health care at home across diverse European systems and cultures
3. Cross-national and European perspectives on health safety agencies

These three topics were selected because of their relevance for health policies: they put matters of governance and citizenship to the front, due to new framings of knowledge production and its use in the domain of health and medicine. All three also relate to the increasing role played by non traditional actors (e.g. patient organizations, health agencies, networks for care at home).

Three conferences were organized, gathering social scientists, professionals, patients' representatives, decision and policy makers, both at national and European levels. These conferences were framed as to put academic and non-academic participants on an equal footing. Their aim was to allow exchanges on questions likely to be put on the scientific and political agenda; desirable knowledge for addressing these questions; modalities of partnership between social scientists and non-academic actors which would suit the best for producing this knowledge.

In this presentation, we will mostly concentrate on the first conference on dynamics of patient organizations. We will describe 1) the process of organizing the conference: contrary to what we imagined, a state of the art drawing on academic literature was not sufficent in order to prepare the conference and define precisely the topics on which the discussion should focus. Thus we decided to set up " focus groups " which have constituted a very rich experience both as concerns the information we gathered, but also in terms of the interactions it allowed between the participants ; 2) the conference itself which we called a participative conference ; most of the time was spent in groups of 15-20 people discussing together issues raised by a set of very short presentations mainly from actors and done in plenary sessions. We will analyse the kind of effects that are produced by such settings and conclude on the consequences in terms of research agenda settings.

1.1.11: Setting the Agenda: Interactive Research for the Governance of Science and
          Technology

Framing or Foreclosing?

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Attempts at future oriented (or 'upstream') engagement about emerging scientific and technological developments and their broad social and political implications must inevitably convey some vision of a technological future. The danger is that these framings may underplay the uncertainties that surround technical pathways and societal outcomes, and thereby:

i.   present imagined techno-futures as imminent; and
ii. convey a particular agenda about the social implications which need to be attended to.

This risk is particularly problematic given the body of Science and Technology Studies research which demonstrates the gulf between initial expectations of emerging techno-scientific fields and their ultimate technical and societal outcomes. Researchers need to demonstrate particular vigilance in assessing their own explicit and tacit commitments and role.

The paper will address how these pitfalls are addressed in interactive research projects currently under way in Innogen (the ESRC Centre for Social and Economic Research on Innovation in Genomics). Here the focus upon issues of clinical research governance and practice provides a more immediate focus for constructive and critical dialogue with 'lay publics'. Tensions and conflicting assessments are more frequently expressed when the potential future exploitation of scientific/medical information, perhaps by private sector players, comes to the fore.

Co-Creating Nano-Imaginaries. Some Lessons Learnt.

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"Nanotechnologies for tomorrow's society, NanoSoc", is a transdisciplinary research project that aims to provide nano-researchers with incentives to systematically reflect on the societal dimensions of nanotechnology development in three particular fields: smart environment, bio-on-chip and new materials. It initiates four successive participatory steps with various actors in nanotechnology: nano-researchers as well as stakeholders in government, industry and civil society, and citizens.

Our paper discusses the first participatory step: a Policy Delphi at which nano-researchers, societal experts, and primary involved citizens participated. The aim of this exercise was to co-construct nano-imaginaries, starting with 'personal' stories in the 1st round, continuing with comments on statements derived from the stories in the 2nd round, and ending with the collective construction of nano-imaginaries. The first and second Delphi-round happened anonymously. The third round consisted of a scenario-workshop of 1,5 day. Compared to the

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stories of the 1st round, the imaginaries of the 3rd round were more complete, i.e. the societal context in which future nano-technologies are deemed to be embedded is presented in a more coherent way. From the co-constructed nano-imaginaries, we hoped to learn something about elements in the present - visions and expectations, hopes and fears - which prepare for the future.

We made the following observations. We noticed some gaps - compared to the existing literature - in the kinds of nanotechnologies and issues that the Delphi-participants found worth mentioning. During the anonymous rounds, we could not observe systematic differences with regard to the nanotechnologies and issues mentioned by the three groups of participants. We noticed that, in the first round, participants were rather positive with regard to the new technological possibilities, while, in the course of the second and third round, their opinions grew more diverse, more ambiguous and more controversial. From these observations, we derived some reflections. Since NanoSoc is intended as an experiment in upstream engagement, the results urge us to reflect on a suitable composition of the group of participants and on a suitable input to provide the various participants with. The exercise also urges us to draw attention to the relevance of 'social context issues' (Sandler, 2007) and of 'dark scenarios'. Both the topics of social context issues and of dark scenarios seem to indicate differences between enactors' and comparative selectors' framing of the nano-debate.

Socio-Technical Scenarios as a Tool in Supporting Reflexive Co-Evolution in the Field of Community Genetics

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This paper discusses our experiences with an interactive scenario study focusing on community genetics as an agenda which aims at a more wide-ranging use of genetics and genomics in new prevention-oriented forms of public health. In our study we have translated this agenda in future scenarios which have been discussed with various actors who are or might become involved in the realization of this agenda in future practices of genetic and genomic medicine. Through this interactive process we have attempted to articulate the envisioned futures of community genetics in such a way that potential normative and policy dilemmas can be anticipated and be made subject of debate among professionals, policy makers and the broader public. Thus we involved in our study a variety of stakeholders in an interactive process which enabled us to learn from insights and experiences in the field and at the same time to contribute, on the basis of our own observations, analyses and constructions, to discussions and learning in the field.

The project started with a literature and interview study which helped us to articulate the agenda of community genetics and to relate this agenda to broader developments in the domain of public health. As a next step we translated our insights in a document highlighting particular trends and issues in the field. This document we used as a basis for discussion in a workshop with various stakeholders. On the basis of our data and the outcomes from this workshop discussion we have constructed three different future scenarios, showing how genetics and genomics might develop in three different domains: public health, commercial care and primary care. As a final step we have again invited a variety of stakeholders to

1.1.11: Setting the Agenda: Interactive Research for the Governance of Science and
         Technology

discuss these scenarios in three different workshops, focusing on particular tensions and dilemma's emerging in our scenario stories.

We consider our approach as an example of constructive technology assessment (CTA) supporting a process of reflexive co-evolution through socio-technical scenarios. That is, as social scientists we have attempted to make the process of co-evolution more reflexive by providing insights in socio-technical dynamics and broadening the perspectives of the various actors involved. In this presentation we will evaluate the impact of our intervention and the ways in which it enriched our own understanding of the issues at stake in shaping the future agenda of community genetics.

A is for Agenda: the DNA-Dialogues as an Example of Interactive ELSA Genomics

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Since its start in 2004 the Centre for Society and Genomics has become a focal point for ELSA genomics in the Netherlands. Over this period, its view on ELSA genomics has shifted from studying ethical, legal and social aspects of genomics towards shaping a societal agenda for genomics. That shift was accompanied by the development of interactive research and communication projects. The objective of interactive societal agenda-setting has also shaped our own ELSA research agenda. That process has occurred in many CSG research projects - an example is presented by the paper of Dirk Stemerding in this session - as well as in other activities. In this paper we illustrate how "doing ELSA genomics" has shaped our own research agenda by a partial analysis of the pilot study 'The DNA-Dialogues'.

The DNA-Dialogues started off in 2006 as a series of interactive meetings bringing together representatives of societal groups and online communities with one or more genomics experts for collective learning about genomics-related societal issues. Although the CSG initially took the role of matchmaker, it soon became clear that we had a far more active role to play. Some of the meetings that took place - the online discussions in particular - indeed showed the potential for exchange, yet also illustrated the lack of favourable conditions for learning. To improve the conditions, we needed to brief experts to make sure they would not lecture citizens; encourage citizens not only to ask for information but also to question the experts; and frame the issue to be discussed in such a way that both parties felt comfortable and knowledgeable. An important conclusion was that dialogue should not primarily be driven by an interest in engaging citizens, when the objective is societal learning and agenda-setting. Its organisation, study and evaluation should explicitly address the need to engage and equip experts for dialogue.

Because of the changing role of the mediator related to the objective of societal agenda-setting, The DNA-Dialogues have been redefined as an interventionist research project rather than an interactive communication project. Thus our experiences with facilitating societal interaction on genomics changed our own agenda for ELSA research. The main question on that agenda is how citizens and experts can collectively articulate genomics-related issues, learn to be affected by such issues and set the agenda for addressing them.

1.1.12: Reflecting on Expertise: the Co-Production of Expertise and the Environment

The Role of Viral Experts in Policy Making and Public Debate: a Biographical Approach

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Outline & methodology: Towards the end of the 1970s virology as a thriving field of research was widely regarded as extinct; with vaccines, antibiotics and increasing social hygiene, (viral) infectious diseases belonged to the past, many thought. To the surprise of many, AIDS emerged as a new problem and challenge for human virology. Furthermore, an aggressive viral outbreak among seals early 1980s in the North and Baltic seas put animal virology on the map again.

What this illustrates is that virology is a field of science whose fate is closely tied to events in public or veterinary health care. This dynamic not only becomes visible through the attention it receives in the media, policy or science, but also through the virologists themselves. They appear in the media as commentators, as policy advisors and as scientists searching for new viruses and the vaccines. With the series of outbreaks of the last decades, this resulted in the repeated appearance of virologists as public experts, thus becoming 'the experts in the field', both nationally and internationally.

But there are more dimensions involved in the making of visible scientists: that of knowledge (mediating between scientific and expert knowledge), that of power (using knowledge as a political tool) and that of the personal identity (reflecting on being an expert). How did viral experts relate to these dimensions, and what were the consequences for their status as an expert? We investigate the narratives and experiences of visible scientists using the biographical method. In in-depth interviews, experts are invited to reconstruct key events in their expert-career, focussed on the epistemology, power and learning as an expert. With the biographical method we elicit the narratives of expertise, accounting for experience in narrating biographically on the experts part. These narratives provide the basis for discussion and (re)construction of typologies of expertise.

In the paper we address the following topics: 1. the interaction between public events and the narratives of experts in virology. 2. The ways in which various experts dealt with knowledge, power and identity, and the effects this had. 3.The relation between the acting of visible scientists, and the typology of expertise as developed by Collins and Evans (2002; 2007).

Contribution to STS: This paper will contribute to the current debates on expertise on two levels. On the empirical level, the paper adds the biographical dimension of expertise, a dimension that is underdeveloped in studies of expertise. Experts are either referred to as a general and anonymous category, or as an institution. Giving these experts a face and name therefore is a worthwhile contribution, providing new insights.

On the analytical level, the paper uses the Collins and Evans (2002; 2007) typology in discussing the biographical studies of virologists. Based on the typology's main concepts of 'contributory' and 'interactional expertise', how can their acting as experts be assessed? Are they located in one specific area of the typology, or do they act as hybrids, moving up and about between categories? What additions, amendments or alternatives to this typology can be proposed?

1.1.12: Reflecting on Expertise: the Co-Production of Expertise and the Environment

Scientists' Social Responsibility (SSR) in Comparison with the Corporative Social Responsibility(CSR)

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This study aims to investigate historical changes and contemporary challenges on Scientists' Social Responsibility (SSR) in comparison with the Corporative Social Responsibility(CSR) of companies. Although before WWII, SSR had defined as to contribute to national prosperity, after WWII, SSR became to have meaning of the responsibility of misusage of science, like atomic bombs and atomic weapons. Nowadays, since the word of responsibility comes from "response" and "ability", "response to public inquiry" become one of the most important points of SSR. Based on these pre-survey of historical change, we can classify SSR into three major categories; A) Internal moral for disciplining the scientists' community (Not to fabricate data, etc.), B) Product reliability of science for society (effect of genetically modified engineering or reproductive medicine, etc.), and C) Response ability to public inquiry. Furthermore, the last one can be divided into five sub-categories, 1) Social literacy of scientists, 2) Accountability, 3) Responsibility for public understanding of science, 4) Responsibility of science used for decision making, 5) Responsibility of science used in Media.

In comparison of SSR with CSR, we can observe different conflicts. In CSR, responsibility of an individual scientist/engineer sometimes confronts with company's benefit, however, in SSR, responsibility of an individual scientist/engineer often match with benefit of scientific communities. On the contrary, in SSR, there are several cases in which we can observe conflict between Category A (Internal moral for disciplining the scientists' community), that is, responsibility to keep the quality of products and Category C (Response ability to public inquiry). For example, "responsibility to keep the quality of products" makes researchers to take accurate data, avoiding "Type 1 Error"; however, "response ability to public inquiry" makes researchers to take fast answer, avoiding "Type 2 Error". Type 2 Error in public inquiry means, "having done nothing in spite of the existence of problems, for example, the existence of significant effects on health by pollution sources". In most cases, these significant effects are proved long after the patients are first discovered. In this way, in SSR, although responsibility of an individual scientist/engineer do not conflict with benefit of scientific communities, each individual confront conflict between responsibility for disciplining the scientists' community and that for public.

Doing Research with Environmental Actors

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Environment is a well-chosen domain to observe the renewal and deepening of the relationships between sociologists and their fields or study "subjects". Whereas it is undeniably necessary to investigate what the sociologists' presence can do to action, we deem as just as important to investigate what actors can do to the sociological work and to

1.1.12: Reflecting on Expertise: the Co-Production of Expertise and the Environment

its results. The studies we conducted on the appearance of new modes of observing and managing the environment were commissioned and financed by nature managers and they favoured the appearance of quite narrow exchanges. During these exchanges, while the sociologist familiarizes himself with the action's contexts, interviewees and commissioners familiarize themselves with the sociological work and influence it to a certain extent. If we did not aim at impacting the decision making nor at doing action research, the circumstances of the commissions we received led us to submit our analyses to the actors interviewed, at various stages of the work, and to discuss our results with them first. We would therefore like to present and discuss here the idea of "doing sociology with the actors" rather than the idea of "acting with the actors as sociologists". In particular, we shall suggest that the interest of the lay persons' involvement in knowledge production, which has been highlighted by STS studies, i.e. in the medical profession, is also valid for sociology itself: to a certain extent, interviewees and commissioners can intervene in the sociological analysis, beyond the survey strictly speaking.

We shall first present the arguments commonly expressed to prevent interviewees and commissioners from getting involved in the analysis and redaction work: as far as we know, even a slight opening of the sociologist's "workshop" to his interlocutors, interviewees and commissioners, remains rare if not exceptional. The idea indeed prevails that the collected material should be analyzed without lay hindrances, in accordance with a well ingrained conception of the profession, particularly when it is scientific. We shall then outline the type of exchanges we established with our interviewees and commissioners. We shall explain the difficulties we encountered but also what we got from considering the interviewee not only as an actor and an informer but also as an author. Drawing from these experiences, we shall endeavour to underline the conditions under which a more participatory sociology than usual can be carried out.

Deconstructing and Reconstructing Participation in Environmental Governance

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Participation has become a mantra in the practice of and research on environmental governance. Participation was an element of US environmental policy from early on, and it has also become an integral part of European governance of e.g. water and biodiversity, both from the outset and as the result of the adoption of the Aarhus Convention. Participatory agenda has also been strong in the management of natural resources in developing countries, where the hope has been that participation addresses the lack of state capacity to implement public policies and to provide public services. Today practitioners and scholars alike expect participation to contribute to the goodness of decisions, actions and practices, as well as to their legitimacy. Yet little effort has been made to examine what participation "is" - that is, how it is constructed in governance practices and efforts to research these practices. Closer examination of participation is warranted in particular because there are signs that participatory agenda has started to loose some of its unquestionable status. This loss of status is reflected in new terms and expressions such as "participation fatigue" and "tyranny of participation". The aim of this paper is to map the key constructions of participation in European environmental governance practice and research, to understand

1.1.12: Reflecting on Expertise: the Co-Production of Expertise and the Environment

how varying and potentially conflicting understandings relate to expectations and experiences with regard to participation in environmental governance. The paper will first critically examine literature reporting empirical research on participation in environmental governance. The aim of this exercise is to map the ways in which scholarship constructs participation in environmental governance. Next we will analyse around 50 consultations with people representing a variety of governmental, non-governmental and academic organisations participating in environmental governance in Europe. The consultations took the form of short, semi-structured interviews and their were conducted a dozen member states of the European Union. We examine the consultations to identify the diversity of understandings of what participation is and ought to be. When contrasted, the analyses of the literature and consultations highlight that there are multiple meanings attached to participation. For some actors, it refers to involvement of relevant public sector organisations, while to others it involves far greater range of actors. The rationales attached to participation also vary from "informing the public" to legitimization and collaborative learning. When taken together, the observations suggest that participation is a multifaceted phenomenon which is complicated by the fact that it is often packaged and sold as participation of "the public," in a situation where this public is interpret in diverse ways. Different situations quite justifiably may call for different participatory arrangements, including varying degrees of participation by different groups. But the paper calls for more self-reflexive awareness of the different ways in which participation is defined and practised in contemporary environmental policy and research. Such reflection would also bring to the fore different, possibly conflicting political visions of participation, and allow for more open discussion on their relatives shortcomings, merits and implications.

1.1.13: Future Science Present Fiction

Scientific Promises as a Literary Genre

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Scientific promises abound, from the small (like prospects suggested at the end of a scientific article) to the large (a next industrial revolution thanks to nanotechnology, human enhancement achieved through converging technologies). They necessarily exaggerate, in the sense of going further than "the facts", but must avoid the risk of being blamed when things turn out differently. There are different strategies: embracing hype or being modest (and invisible). Whatever the strategy, the promise as presented must ask the reader/listener for the same "wilful suspension of disbelief" that a novelist asks of her readers. In other words, writing up scientific promises is a literary genre, with certain rules, and requiring craft skills.

Writing up and presenting scientific promises refers to the more general modernistic genre of "roads into the future" (cf. the quip about the best way to predict the future is to make it). In the case of scientific promises, there is also the uncertainty inherent in scientific research, which reduces the assurance that we can "make" the future.

A dialectics of promising is increasingly visible, as in a report in Time (Dec 3, 2007) on a breakthrough in stem-cell research by using adult cells rather than embryonic stem cells. "Stem cells generated by this method are ideal not just because they are free of political and moral baggage. They can also be coaxed into becoming any type of tissue, and then be transplanted back into the donor with little risk of rejection." After the thesis comes the anti-thesis: "Still, these cells are far from ready from medical use. (...) Both Yamanaka and Thomson admit that we still know too little about how the process works to exploit the methods full potential." A possible synthesis is visible in the rhetorical flourish with which the article ends: "Nevertheless, their discovery has moved stem-cell research back to an embryonic state of its own - in which anything, it seems, is possible."

The other key element of this genre is a Greimasian quest-pattern, but one where the hero is not specified other than that it is the promising science as such, working to achieve the goals. There is a long tradition of excusing promising science for not delivering, and pointing out the need for further research (cf. the Scientific Opportunity Syndrome). The hero can't fail, because the quest continues (often by shifting the goals).

With stem cells, nanotechnology and other NEST (new and emerging science and technology), there is now more explicit handling of the uncertainties. This has to do with the pressure for, and experience with the dialectics of, credibility and legitimacy of science in late-modern society.

The basics of the genre are still in place, as I will show through a number of examples. It is evolving, becoming less simplistically modernistic (even is there are still lots of modernistic pronouncements, like US Under-Secretary of Commerce Philip Bond arguing (in 2004) that it is unethical to stop progress in nanotechnology).

1.1.13: Future Science Present Fiction

How Trivial Could the Future Be?
The Everyday Life of Future Artefacts.

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The explorations of future scientific developments and of upcoming technological innovations through STS or prospective approaches often focus on the examples of large socio-technical systems. Huge domains like nanotechnologies, biotechnologies or information technologies and theirs possible convergence (NBIC) are framing the discussions about research policies, innovation processes, actors strategies, possible technological applications and societal issues. Future innovations are usually described more with the help of their supposed functionalities (new medical treatments, original means for communication, etc.) than by their potential use in tomorrow's everyday life. Our hypothesis is that this level of abstraction, which stresses the expected effects, hides other important issues more related to technology adoption. In other words, these approaches don't tell us much about how these upcoming developments will be related to the end-users.

Drawing from the tradition of sociology of use (Akrich 1995, Oudshoorn and Pinch, 2003) we'll look at how science fiction describes future technologies in their imagined context of consumption. For several years, Wired magazine is presenting each month a full-page picture of a device from the future. These pictures found under the section "Artifacts From the Future" aren't commercial prototypes but artificially created products staged in the context of their possible use. Produced by guest designers and printed without title and comment, these pictures offer a heterogeneous set which covers a large array of potential upcoming technologies. In this collection one can find, for example, the menu of a "Thai Chinese Safe Food Restaurant" which provide "sterile food since 2023" (Wired, 2002), or a box of a 2089 "Quick-Skin", a "self grafting bandages" which "heals wound with living tissues" (Wired, 2002) etc...

Our intended contribution will pay a specific attention to how the future is shaped in these pictures trough apparently trivial items and how science fiction stories in a nutshell are encapsulated in the context of a forthcoming everyday life. For example, we will examine how depicted user's manuals or warning labels allow the simultaneous expression of both expectations and fears about the imaginary products. On the base of this semiotic analysis, we would argue that the main originality of these pictures is the shift they offer in terms of narrative point of view. They are not only artistic representations of small fragments of the future, but also, and perhaps mainly, embodiments of this future through the eyes of users/consumers. Compared to classical approaches, the discourse on the future shifts in those pictures from the question "Will this technology be good for the society?" to the question "Do I whish to use this specific product?" In the last part of our intervention we will discuss this shift and study if this kind of user-centred pictures of the future could provide new communication means to foster public dialogues about science and technology. As an example, we will elaborate on the advantages and the limits of such a tool in prospective minded initiatives like participative technology assessments.

1.1.13: Future Science Present Fiction

Schizophrenic Literary Genres:
Science Fiction and the Writing of Nanotechnology Promises

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The literature occupied with the future and the place of man in the universe comprises the genres of utopia, science fiction, futurology. While scientific research is commonly not seen as involved in metaphysics and conjectures only based on theoretical ideas, there is actually a long tradition of technological utopias. Today, research in the different domains of nanotechnology attracts huge amounts of money. The trend is accompanied by the "writing of scientific promises" in policy research documents, newspapers, as well as scientific journals, and numerous popular books written by scientists, journalists, philosophers, novelists. Visions of the future include physical and cognitive enhancement, aging control, cyborgism, immortality. Bourg and Kaufmann (2007) gathered quotes of Roco and Bainbridge Converging Technologies, 2002, and quotes of Francis Bacon, New Atlantis, 1627; the parallels are striking; although separated by centuries, those texts look like reflected in a mirror.

Among the controversial expectations and images of future nanotechnology, discourses of "transhumanism" and "NBIC convergence" are not about whether these ideas are technologically feasible or not, and when. They are technoscientific imaginaries of the present, a literary genre in itself. Convergence and transhumanism together constitute one of the grand "narratives" of nanotechnology today. Their features resemble series of past Technotopia, and they belong to a vivid though located technoculture. They readily adopt the form of self-fulfilling prophecies, which hold the future as inescapably determined by technology. However, some ideas look so disconnected from current laboratory work, and so far from societal concerns, that they are likely bothering the governance of risk and innovation and may divert more pressing issue from public debate (cf. Nordmann 2007).

These discourses draw on a cultural repertoire which is also taken up in Science Fiction (SF). Thus, one can see resemblances, overlaps, and borrowings, directly and indirectly. As Milburn (2002) has shown, themes can appear as if they were picked up from SF, reified into "real" scientific promises. He also shows how the writing of nanotechnology promises needs to distance itself from SF. "Science fiction" is then utilized as a category to mean "not serious", "groundless", "fantasy". The strong rhetoric of denial is necessary exactly because of resemblance and overlap with SF. The writing of nanotechnology promises engenders a schizophrenic literary genre.

This is problematic. and not just because it is detrimental to the literature of SF. Reducing SF to groundless fantasy is neglecting how it articulates consideration of future place of man in the universe. As a result, literature of SF gets an even worse image than it used to have, already distorted by its reductionist use in the movie industry, and perpetuating its image of a pariah literary genre.

By distancing itself from SF, the schizophrenic literary genre is denying itself important inputs and opportunities for reflexivity.

1.1.13: Future Science Present Fiction

Explaining Expectations: Imagined Nanotechnological Futures as Esoteric and Exoteric Discourses

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Expectations of the transformative power of nanotechnology are very high. Popular science texts, science fiction narratives, the news and broadcast media and scientific communities construct speculative discourses describing how nanotechnology 'might', 'can', 'should' or 'will' transform, variously, science, technology and even society itself. This high level of expectations persists in society despite two mitigating factors. Firstly, the presence of significant 'counter' discourses describing the potential dangers of nanotechnology. Secondly, many people in industrial societies share experiences of repeatedly raising expectations only to have them dashed on the rocks of hard reality. Despite this, we invest heavily in future promises.

The sociology of expectations (Brown and Michael 2003; Brown 2003) provides a useful analytical starting point as it identifies a dynamics of expectations, a relationship between new hopes and emerging disappointments. Specifically this dynamic is comprised of, firstly, a story, a vision of the future and a means to get there and secondly an exaggerated promise of possibilities such that potential allies and supporters will be enrolled in the project. These emerging networks of possible technological advancement inevitably collapse, hype gives way to disillusionment and these communities of promise fall apart. In the case of nanotechnology we can clearly discern a story that articulates a vision of the future; the subsequent collapse of the community of promise is, perhaps, still pending, although this paper presents some evidence in support of this.

However, we need to move further than simply focusing on expectations, and consider how it is that expectations become shared between disparate parts of society. The sociology of science of Ludwik Fleck (Fleck 1979) provides a framework for this, through identifying the connections between esoteric and exoteric thought communities.

The emerging expectations that we hold of nanotechnology are a product of an interplay between two groups of discourses: exoteric discourses which circulate in exoteric thought communities, such as popular science, the media and science fiction describing imaginative futures where nanotechnology has dramatically altered (or will alter) the world, and esoteric discourses that circulate inside scientific communities involved in nanoscale research where researchers explain their work to themselves and others and consider future possibilities.

This paper will map the emergence of the story of the promise of nanotechnology, and will look at the connections between the esoteric and exoteric discourses of nanotechnology. En route we will see the articulation of a range of expectations, and the convergence of hopes for nanotechnological futures in formal, popular and fictional science discourses.

1.1.14: New Policy Directions

ICT and IS Implementation in Health: the Web of Governance

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Developed in the social-economic approach, this paper aims to discuss the need and utility of the adoption of Information and Communication Technologies in Health, particularly in the promotion of Good Governance by their utilization in the management of Public Health Institutions.

How the Information and Communication Technologies (ICT) and Information Systems (IS) can serve this specific sector in order to obtain positive results in health? What is the role played by the State and the Public Administration in a reform context? How this public institutions perceive ICT and IS in an organizational interoperability perspective? Who are evolved? In what way? How does occur this integration, adoption and change process? These are some of the questions that this paper pretend to discuss in order to find the answers.

This is the first result of a in progress process on the PhD project in Sociology about the decision, the choose, results and the implementation of ICT and IS in health sector.

Methodologically this paper is a consequence of the participation in the research "Health in Information Era", developed in CIES-ISCTE , coordinated by the Professor Gustavo Cardoso and the result of a observant participation experienced as apprentice in the ACSS - Central Administration of the Health Systems - developed in the context of the Course of Specialization in Hospital Administration at National School of Public Health. This experience allows to accede to strategic national guidelines related with ICT and IS implementation and adoption as well as observed directly the impact of the technological transition and organizational change.

This expose claims to emphasize the importance of Information and Communication Technologies and Information Systems as management tools in the health sector as well as assert their potential in the present application and future strategically and managed planning.

Intervening in Avian Flu Preparation
- the Role of (Feminist) STS Scholarship

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I will be discussing the role of theory and critique from a feminist STS perspective on current dilemmas in the STM realm. While STS scholars have engaged in critiques of the authority of STM institutions and discourses, we have at the same time found ourselves embedded in them - both mistrustful and dependent upon science, technology and medicine. I will be looking at a particular issue - avian flu - and will examine the discourses, representations,

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preparations, and other actions that constitute it as a threat, in order to elaborate on the role of (feminist) STS perspectives in STM policymaking and social governance. More specifically, I will look at the ways in which U.S. public health institutions operate through hetero-patriarchal modes in attempting to safeguard the public from the threat of avian flu. I will elaborate upon how this particular mode of health governance has the effect of setting the groundwork in avian flu preparedness for the continuation of existing discriminatory practices towards particular national-racial groups in the U.S. that have traditionally been associated with unhygiene. I will then return to my original question and examine how understanding these modes through feminist STS scholarship can influence better policy-making, influencing how more serious future avian flu responses may be conducted with respect to different national-racial groups in a more equitable manner.

The research for my paper will be completed through multi-sited archival research and textual analysis of the following: news media representations, government practices, biomedical journals, health policy institute and health institution publications. I will be collecting primary and secondary data on avian flu preparedness schemes and actions, with particular attention to factors of gender and racialization. I seek to make a contribution to the feminist STS literature concerned with gender, race, and nation as variables intersecting with STM practices. I believe that my study is particularly relevant as it focuses on a high-stakes STM practice (i.e., avian flu preparedness is about potentially preventing mass deaths) that both warrants STS intervention and, as it is a relatively recent phenomenon that continues to evolve, can still be intervened upon at this timely juncture.

The Regenerative Intervention

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Health care systems are in transition. Escalating costs, long waiting lists, physician shortages are common issues in many countries. There is no single appropriate way of governing and managing these systems challenged by demographics as well as by a technology paradigm shift driven by recent discoveries in biotechnology and nanotechnology. This paper deals with four standard health interventions - preventive, palliative, curative, routine - and shows that each is different as they do not target the same populations and do not share the same nature. At the same time, these functions are intermeshed and an overflow in one intervention immediately affects the three others. Each one, however, requires a distinct governing structure. A fifth intervention - the regenerative one - is introduced since, sooner or later, new discoveries in biotechnology will force dramatic change in the four other interventions. Decision-makers involved in the health reform must keep an eye on this new paradigm. The standard economic approach, with its conceptual toolbox, is not completely adequate to determine which governing structure - the market, the state or hybrid mechanisms - would be appropriate to manage these interventions. An incursion into evolutionary economics as well as into social capital theory can help to disentangle the fundamental differences and complementarities in order to design the most appropriate governing mechanism. National institutions are path-dependent and this feature must be taken into account.Finally, we will conclude with a discussion of the necessity to assess the health system as a whole, although each of its components has to be considered

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independently. Throughout the paper, we will sketch out some key worldwide comparisons in order to fuel the debate and indicate potential paths for reform.

Assembling Harm Reduction Policy in Taiwan

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In Taiwan, harm reduction refers to a series of public health measures, such as needle exchange programs and medical maintenance treatments, which aim to decelerate the spread of HIV and other blood-borne infections among injection drug users. It signifies the formation of a de-/re-territorialized assemblage that includes administrative infrastructure, scientific knowledge, epidemiological investigation, and most importantly, continuous cooperation of involved experts and bureaucrats. This assemblage is at once a challenging concept, an emergent praxis, a pragmatic type of governance and therefore, a space for problematization.

Although harm reduction is one of the many nation-wide drug control measures, it is usually implemented in a relatively low-profile, if not secretive, way. At first glance it may seem like an incongruent element in the governmental rationality, but explored on a deeper level, this policy may unveil an emerging logic undergirding the acts of governing. In the disputes among its advocates and dissidents of harm reduction in Taiwan, biomedical findings of opiate addiction and the desirable effects observed in public health statistics are often heralded as positive evidence against the apprehension concerning the potentially negative impacts on legality and/or morality. Which is better in terms of disease control remains elusive, but in the discourses that construct the urgency of harm reduction, this science-based, statistics-supported and pragmatically designed policy is usually posed as an option superior to the other abstinence-oriented alternatives. In the end, what is introduced as scientific becomes governmental.

But what shapes this assemblage of scientific governance over those dangerous individuals? What constitutes the government that adopts or rejects certain measures related to harm reduction? Furthermore, what legitimizes which fields of expertise in terms of this burgeoning public health policy? What do people do in the name of harm reduction?

A series of intensive interviews, archival reviews and observational notes have been conducted, which altogether shed some light on the above questions. By following the actors around, I will show that these findings point to a particular type of science-policy complex taking shape in a late advanced country like Taiwan, and this complex is entangled with the aspirations and longings of a postcolonial state like Taiwan. By delineating the configuration of this complex, I will argue that this policy is not merely transplanted en bloc or partially into Taiwan; such a policy is made doable only when the government, expertise, and problems are redefined, reformatted, and reterritorialized. That is why the science-policy complex of harm reduction is an assemblage in which government and science are co-constituted and co-evolved.

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Bio-Economies and Tissue Technologies: European Governance and Commercial Risk in Regenerative Medicine

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Tissue engineering is an emerging biomedical innovation surrounded by potentiality and risk. Professional risk discourses around this technology have focused on safety concerns including disease transfer and tumour formation, while debate exists about the therapeutic effectiveness and commercial viability of these therapies.

Based on documentary analysis and expert interviews, this paper discusses different constructions of risk according to main constituencies (scientists, clinicians and manufacturers), the way they prioritise and balance these risks, and how issues are framed as problematic or not. Complexity and uncertainty are the main drivers in this exercise, interpreted in terms of boundary drawing around contested risk domains. This is followed by a discussion of the translation of risk into regulatory policy, by focusing on two recent legislative initiatives by the European Commission: one to control the quality and safety aspects of human tissues and cells (Directive 2004/23/EC by DG SANCO) and the other to facilitate the marketing of tissue engineered products in the EU (Regulation (EC) No 1394/2007 on Advanced Therapy Medicinal Product by DG Enterprise). These two legislative initiatives aim to overcome the 'regulatory lag' in Europe, where tissue engineered applications are either unregulated or subject to a broad variety in national controls.

I position my analysis in debates about innovation in times of pressing bio-economies and struggling bio-societies. Firmly rooted in ambitions to make the EU a techno-scientific and bio-economic powerhouse, regulation of this domain is troubled by competing agendas of promoting trade versus protecting public health.

Addressing traditional STS topics including regulatory science and boundary work, this paper links sociology of expectations with themes of innovation and governance from a broader political economy perspective. More specific the tensions between European 'regulatory regimes' and commercial practices are discussed, where innovation trajectories for tissue technologies have, so far, failed to bring commercially successful products to the European market.

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Extending the Human Lifespan:
Achievements and Challenges of Genetic Research on Aging

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This paper presents data from 18 semi-structured interviews with genetic researchers working to understand the genetic mechanisms of aging. Interviews with the researchers revealed that the rationale for their work is based on undisputed evidence that over the last two centuries human beings have seen an increase in lifespan as a result of improved sanitation, better nutrition and biomedical discoveries and interventions. Thus, they argue that today, in developed countries, the greatest risk factor for all of the leading causes of death is old age. They maintain that their goal of using genetic research to ultimately create anti-aging interventions would be the next logical step in the progress of improving health and extending lifespan. In discussing their work to manipulate the aging processes, researchers talked about two challenges they face: 1) the 'traditional' way that aging is perceived in society, and 2) the potential ethical and social implications of altering the aging process. Scientists argue that scientific progress made in the field of aging is treated differently than other biomedical research because of our societal (mis)understanding of the aging process itself, and as such are calling for a paradigm shift in the public's understanding. Moreover, interviewees discussed how they have engaged both academic and public audiences in dialogue about the (public's) concerns over the ethical and social implications of their "anti-aging" research. From our data, we have developed a basic typology of such concerns including: Health Span versus Lifespan; Tampering with 'Nature'; Resource Allocation and Social Justice. Upon discussing each of these concerns, and how researchers typically respond to them, we conclude by asserting that there is a need for candid communication between scientists, the public and policy makers in order to better understand public concerns regarding genetic research on aging. There is a need to anticipate prospective social consequences of this research, both intended and unintended, given its accomplishments to date. This paper adds to the body of sociological literature that casts a critical gaze on the production of technology by drawing attention to the social, ethical and moral concerns of the public related to the advancement of genetic research in aging.

Crafting Genetic Citizens

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At the cusp of the 21st century the National Human Genome Research Institute (NHGRI) of the National Institutes of Health (NIH) was actively funding diverse efforts to educate United States citizens about genomics through the same mechanism it utilizes for funding research projects. Before long Institute leadership determined that this granting mechanism perhaps was not the most effective for facilitating educational efforts. The aims of the various educational efforts were highly diverse and the Institute had little control over what was taught or the outcomes that resulted. In 2006 the Institute opted to fund a single program that

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aims to conduct a "national conversation" about genomics in the United States. Based on on-going ethnographic fieldwork exploring contemporary efforts to produce the institutional structures and material means for contemporary scientific knowledge production, this paper examines this initiative, now underway, to educate United States citizens about contemporary genomic knowledge, research, and technologies. The NHGRI project involves a pilot program that is conducting a series of "town meetings" about genomics in diverse communities across the United States. Although framed in terms of education, the effort is undergirded by an explicit concern to determine how best to facilitate widespread participation in large cohort, long-term studies on genes and the environment. The project also aims to gather feedback on whether and how the United States might establish a federal biobank. Based on participant-observation at these town hall meetings as well as interviews with both those presenting and those attending the meetings, this paper will analyze the production of a contemporary ethos of citizenship based on participation in bio-medical research. This paper contributes to the emerging literature in Science and Technology Studies on biological and genetic citizenship and to the literature on tissue and bio-banking.

Patient Advocacy Organizations in Medical Genetics Research

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This presentation will present results from an ongoing study into the interactions between patient advocacy organizations (PAOs) representing those afflicted by rare genetic disorders and scientists working in the field of medical genetics. How health-based social movements and groups of non-scientists affect knowledge construction processes and practices among scientific "insiders" has become a topic of intense STS interest. Most STS research has considered detailed case studies, but the field of medical genetics contains many different sets of disease-based PAO/scientist interactions thus enabling comparisons among cases. These sets of interactions vary widely from, for example, those where patient advocates supply scientists with money, tissues, and information but, apart from encouraging them to study their disease, make few demands; to interactions where PAOs actively organize the scientific research field over time; to those where PAOs become intimate partners and collaborators in the research process. Just as the form and degree of patient advocate influence on research varies, so too do outcomes. Though "cures" for genetic disorders have not been delivered nor are they forthcoming, interactions have generated varying outcomes in terms of research productivity, intellectual property rights (i.e., control of data and gene patents), the stability and norms of research communities, and trust between advocates and scientists. Using interviews with PAO leaders and scientists in different sets of interactions and a database of genetic disorder PAOs (which includes information on organizational attributes and activities) I aim to understand why organization/scientist interactions take different forms and what implications they have. Preliminary results shed light on the factors that enable PAOs to have substantial influence on (or control over) the research process. It appears that differences between PAOs in this capacity have little to do with factors suggested by the STS and sociological literature such as the exercise of moral authority, the crafting of experiential expertise, robust practices of biosociality/genetic citizenship, or (beyond a certain threshold) organizational resources. Instead key factors seem to be the disorganization of the research field when a PAO forms (which enables advocates to organize scientists) and whether PAOs can convince scientists that certain demanding

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organizational tasks (e.g., patient recruitment, tissue banking, data management) are not "scientific" matters and can therefore take them over. Certain "cultural" factors may be important as well, especially whether a PAO is somewhat (but not overly) critical of scientific authority and whether they are able to curb norms of competitiveness among scientists. This project aspires to contribute to both theoretical and policy discussions about the "governance" of scientific and medical research.

Meaning of "Don't Know" Response in the Questionnaire Survey on Public Perception of Biotechnology in Japan and Europe

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The purpose of this study is to examine the meaning of "Don't know" (DK) answers in the questionnaire survey on public perception of biotechnology in Japan and Europe. In general, public understanding of science and technology has been largely framed under a dichotomy between the pros and the cons. Behind the dichotomy lies a tacit assumption that general public has clear understanding of and attitudes toward science and technology. However, it seems natural for lay people to rather respond with "don't know" when asked about the most advanced science and technology, such as biotechnology. Therefore, the analysis of DK answers has a great importance for understanding of public perception of science. In addition, examination of DK has a methodological implication for questionnaire surveys in which DK answers have been often regarded as missing value and deleted in the process of data analysis.

A questionnaire survey on public perception of biotechnology was conducted in June 2004 in Japan, which contains common questionnaire items with the Eurobarometer 2002. 541 respondents living in Tokyo metropolitan area, from 20 to 60 years old, were obtained through the mail survey. To explore the patterns and its meaning of appearance of DK response, we analyzed how DK response and other response associated with each other using multiple correspondence analysis (Hayashi's quantification III). The result shows that two types of DK answer, Alienated DK and Ambivalent DK, were found corresponding to the questions type. Alienated DK appeared in the question concerning general values, which can be regarded as Difficulty of choice. On the contrary, Ambivalent DK appeared in the question of personal use or preference, which can be regarded as Difficulty of understanding.

Study on Korean People's Reaction to Hwang Scandal

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This study focuses on Korean people's reaction to Hwang Woo-Suk's scientific scandal. Hwang's scandal was a complex social phenomenon that includes a) unethical collection of human eggs, b) fabrication of scientific results, c) unprecedented public reaction to support

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Hwang despite the disclosure of the unethical conducts. I analyze how Korea's institutional and cultural practices, coupled with governmental strategy, provided backgrounds for the scientific misconducts and the public's blind dramatisation of science.

The Korean government and mass media concentrated on 'patriarchal mobilisation', but they failed to provide comprehensive risk-benefit assessment and sober ethical reflections on stem cell technology. The national prospect of the rising stem cell research was therefore reduced to 'blind pathos', or dramatised science. On the other hand, the institutional and cultural incompetence in the scientific field, for both spontaneous collaboration and expert authority, led scientists to heavily rely on external influences such as politics and media. A few individual scientists like Hwang achieved initial success by manipulating the blind prospect initiated by the mobilisation strategy.

Hwang's anxious rush to the quasi-scientific recognition eventually failed because he was innately a marginalised actor in Korean society and he didn't try to build up the system of rationality and trust in his laboratory. The majority of Koreans right after the disclosure of his scientific misconducts nevertheless supported him because the scientific discourse was already internalised as a drama that merely functions to represent people's existential anxieties and desires, devoid of rational judgments. Thus Hwang's personal scandal escalated to a national frenzy that cannot find precedents from simple fabrication issues around the world.

Through the collective reaction Korean people expressed their latent frustrations toward existing institutional and cultural embeddings in Korean society while cheering Hwang as an unfortunate hero who is destined to fall because of the 'unjust' social structure. In their allegoric discourse, however, some chronic problems concerning the exploitation of weaker subjects, i.e., women and junior researchers, and the inefficiency in the labour-intensive laboratory practice were ignored. Conversely, they manifested their own version of solution to the structure by sticking to the authoritarian ways along with the embedded concepts of moral relativity, patriarchal familism, and economy-oriented nationalism. From the subconscious layer people found eventful opportunity to symbolically accuse the existing structure of Korea. But they did so in a very selective manner, with their embedded logic and belief-system that are fundamentally retroactive to scientific reason.

1.1.16: Constructing Health and Livelihoods Locally: a Global Perspective

Islam Based Health Promotion in Lamu, Kenya; a Successful Formula?

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Traditionally HIV and AIDS rates have always been quite low in Kenya's Muslim population in comparison with its non-Muslim population. However while disease rates are going down in most non-Muslim communities, it is rising slowly but gradually in the Muslim communities in coastal regions such as Lamu, in particular among adolescent males and females.

In 2005 a programme was launched by the Kenyan Red Cross/Red Crescent to tackle this increase of HIV and AIDS in Lamu region.

Since Islamic teachings traditionally include a variety of teachings pertaining to health risks, disease prevention, sexuality, personal hygiene, etc. and since providing their people with guidance as to how to lead a healthy, fruitful life, is considered a major task of Islamic leaders, the programme's objective was to mobilise local Islamic expertise pertaining to HIV/AIDS and to integrate it in a Health Promotion intervention.

First, during intensive ethnographic fieldwork periods a problem analysis was made in collaboration with local Muslim scholars, local health experts and local Muslim youth. Secondly, in an ongoing dialogue with local and national Muslim leaders, Q'ran and other texts were screened in search of teachings and principles that could be worked into Friday sermons or that could be used in other religious teaching contexts. One of the results was that ambiguities with regard to sexual morality and condom use (by unmarried adolescents) could be dealt with.

In this paper we will present the results of the fieldwork and the collaboration and use it as a starting point for reflection on the interaction between different (i.e "local" and "bio-medical") knowledges, institutions, practices and expertise, and on the lessons to be drawn from the experience.

Effects of HIV/AIDS on Rural Agriculture Production and the Livelihoods that Depend on it: a Comparative Study of Kabale and Rakai Districts from Uganda

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The decline in rural agricultural production as a result of HIV/AIDS is one of the major causes of food insecurity, low incomes, welfare and decline in natural resource management in the rural farming communities of Uganda. This paper is based on a survey study of the effects of HIV/AIDS on rural agricultural production and the livelihoods that depend on it. Through the groundbreaking work of Latour and Woolgar (1979) there is detailed insight in how science (the laboratory of Louis Pasteur) is able to control and transform a virus. So far, science has

not been successful in translating the Human Immunodeficiency Virus and the destructive disease it causes into a controlled epidemic and curable disease. However, Uganda is the first country in Sub-Saharan Africa with a decline in prevalence rate in the early 1990s. Urban and most rural surveillance sites in Uganda indicate an overall leveling off of prevalence during the current decade (UNAIDS, 2007). The decline and stabilizing prevalence rates in Uganda are considered to be a combination of internal dynamics of the viral epidemic and behavioral change. Clearly, it is not only through the activities of scientists that the Human Immunodeficiency Virus is limited in its devastating impact.

The paper will describe some of the communities coping mechanisms both at the farm, household, community and national levels. The study underlying this paper applied a survey methodology, carried out in 2003, with a sample of 180 respondents out of whom 50% were women. The sustainable livelihood framework, farming systems research approach (Barnett and Blackie, 1992) formed the theoretical and analytical framework of the study. The study findings show that AIDS had serious effects on agricultural production and livelihoods based on it. Mortality and morbidity related to AIDS has affected agricultural labour. In addition, migration, being unable to employ hired labour, women overburdened with domestic activities, activities that have to compete with agricultural labour, bias against agricultural activities by the young generation and the resultant poverty due to poor returns from agricultural production have also compounded labour losses due to AIDS. Effects of HIV/AIDS on agricultural production in the studied communities included reduction in the acreage of land under cultivation, delay in farming activities, reduced ability to control crop pests and diseases, shift from labour-intensive to less labour-intensive crops or from cash-oriented to subsistence production; reduction in the range of crops grown and livestock production, and loss of agricultural knowledge and management skills. There was also a shift from agricultural based livelihoods to non-farm or off-farm activities. The outcomes reveal some cases of successful innovations in HIV/AIDS/affected households. It is argued that such successful innovations or coping mechanisms in AIDS-affected households require further analysis and support at the same time.

HIV-AIDS in Cartagena-Colombia:
Dealing with Competing Knowledges

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In Cartagena-Colombia, 90% of the reported HIV cases are acquired by heterosexual contact. Traditionally, HIV prevention programmes reproduce a discourse that emphasises individual behavioural change. This discourse is based on health promotion and health education models grounded in social psychological theories (Green & Kreuter, 2005). Alternative approaches, however, call for a profound analysis of the ways in which the social and political economic context shapes the, often poor, outcomes of social psychological prevention programmes. Recent studies in these fields focus on the interaction between local culture and local institutions (social representations of body, health, illness, risk, gender, kinship, local economic structure and organization) and national-global political and economic processes (f.i Parker et al., 2000; Schoepf, 2001).

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Starting from the concept of 'empowerment', this paper aims to explore the ongoing tension between emic and etic analysis in social psychological as well as in more recent political economy approaches. It will explore questions such as "What value to attach to the "local" problem definitions, including emic analyses of the problem's context?" and "How does or should the emic analysis interact with the etic problem analysis of health professionals and other experts?"

In this paper we will discuss possibilities to overcome those frictions. Inspired by the work of the Latin American Collective Health Movement (f.i Almeida & Silva, 1999; Breilh, 2003) we initiated a study in which we explored the relationship between expert and the local knowledge in the analysis of HIV/AIDS phenomenon in Cartagena-Colombia. Our study started with a "dialogical ethnography" among men and women living in Cartagena.

In this paper we will present the first results of the fieldwork and discuss the question whether our approach sheds light on the interaction between expert and local knowledge and institutions.

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Understanding Health and Development:
Perspectives and Challenges

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Social and economic factors affect people's health. Studies in the developed and developing world show that linkages between health issues, social networks and income generating activities are particularly complex among the poor. There is evidence that health promotion has limited effects among the poorest in society. Studies on deprived groups in relation to anti-smoking programmes or disease prevention in Western Europe show similar results as studies on the responses of East African poor in relation to HIV/AIDS awareness campaigns (Lawlor et al, 2003; Rugalema, 1999; Horstman, 2005; Krumeich, 2001).

These studies make clear that a better understanding of the interaction between health factors and social-economic factors is needed, in particular when it comes to (health and livelihood) intervention programmes and responses of deprived social groups to these programmes.

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In our paper we will explore the possibilities and the relevance of investigating these complexities through an STS perspective.

Touching on various sociological insights, as articulated by Norbert Elias, Michel Foucault, Mary Douglas, and Bruno Latour the paper addresses the following issues:

1. Normative codes are practical as well as political by nature;
2. Professional practices such as modern, context oriented HP and LH interventions tend to reshape the settings into which they are introduced while, vice versa, these settings may put limits to these intervention practices, forcing them to adapt.
3. Ideas about what is good or bad (for your health), introduced through professional intervention are 'reshaped' once introduced into local practice; professional practices and their underlying values, will be forced to "translate' as consequence of conditions imposed upon them by local actors or institutions.
4. Newly introduced values might become integrated in local practice, for example through processes of medicalisation, standardisation or proto-professionalization, thus shaping local institutions, actors and knowledge.
5. These processes may lead to new in- or exclusion patterns. Especially in disease-afflicted contexts there are always changes with regard to experiences of bodily and emotional states (childbirth, illness, sexuality) as well as changes with respect to feelings of shame or pride, social status, stigmatization, and other processes of social in- or exclusion.
6. Technologies (material conditions) may play an important role in these processes. There are technologies affecting the continuum of health, nutrition, food security and sources of income, such as the availability of medication, seeds to grow crops or infrastructural provision. Nnew communication and information technologies (mobile telephone, internet, television, transport) influence the way deprived communities respond to health and development interventions. Mutual exchange of information and experiences between immigrants in the developed world and their relatives in the developing world is likely to add to the reshaping processes of health and development interventions and influence.

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The Data Bias of Interdisciplinary Cooperation in the Sciences

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During the last ten years or so, a sense of urgency has developed with respect to the enormously increased availability of 'data' in various natural sciences. A number of comments have been made pertaining to the loss of status of theory in the sciences. In 2005, the American Association for the Advancement of Science organised a symposium on the 'crisis' felt in many natural sciences caused by their being 'inundated' by data. One proposed solution is to develop more computer programs to more easily handle and retrieve data. The irony of this solution (which is not invalid in itself), is that it proposes as a remedy one of the very causes of the 'inundation crisis'. The development of the computer, in conjuction with automated (computerized) measurement techniques, delivered more data than scientists can handle in several sciences, ranging from laboratory chemistry to geography. The latter is one of the sciences currently benefitting from digital imaging by remote sensing from space, which produces enormous amounts of data. Moreover, current science policy works in such a way that it encourages scientific projects with a focus on the production of data.

Collaboration in Ecology: Information Management Strategies and Changing Data Practices

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Recent cyberinfrastructure initiatives in ecology promise profound transformations of scientific collaboration due to new tools and techniques including data collection systems and large-scale databases. Our presentation will focus on changes and challenges to local collaborative data practices including manual data collection together with data organizing, using and sharing. Based on an ethnographic study of the Long-Term Ecological Research Network, a large ecological research community in the US, we highlight two transitions in work practices relating to the collaboration of ecological scientists and information managers. The first transition occurs when scientific data work moves from a 'dyad model', i.e. an ecological scientist working with a data analyst in a one-to-one configuration, to a 'data management model', i.e. a group of ecological scientists working with a single data manager in a many-to-one configuration. A second transition, occurring in the context of contemporary scientific expectations and technological developments, refers to the change from a 'data management model' to an 'information management model' where both ecological scientists and an information management team face key challenges and potential new roles. Drawing from a recent initiative in oceanography, we present the Ocean Informatics project as one example of the multiple arrangements possible for an information management model. As a local knowledge environment focusing on both scientific needs and information management strategies, the Ocean Informatics project represents an alternative scenario that contrasts with larger-scale, centralized cyberinfrastructure environments.

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Knowledge Sharing Infrastructures: Silver Bullet or Complication?

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In our contemporary "knowledge-society", the introduction of IT-based infrastructures is often perceived as a means to support knowledge sharing and cooperation between scientists, in biology as well as in other fields. On both national level and international levels numerous, large scale knowledge sharing infrastructures are funded, which promise to stimulate the production and sharing of knowledge. In these programs, infrastructures are mostly seen as merely technological objects. We, however, claim that these infrastructures should be conceptualized as socio-technical ensembles. These ensembles contain not only the technological object, but also it's content, support structures and most importantly, the involved actors. It is the composition of these components and their mutual relationships that forms an infrastructure. The infrastructure comes into being even before it materializes in hard- and software. If actors are themselves part of an emerging infrastructure, it follows that an infrastructure can not replace cooperation between the actors, but can only support this cooperation. In the field of biology, the actors involved in these infrastructures are very heterogeneous in nature. Each of them has their own view on the infrastructure, their own expectations, and their own ideas about which problems the infrastructure should solve and what kind of solutions would be appropriate. For an infrastructure to successfully develop, these images must converge into compatibility.

But how does this convergence work? What factors determine if actors start cooperating in a single infrastructure? We claim that even though formal organizations through which the actors are represented bring their own concerns into the picture, these do not tell the whole story. To understand the motivations and backgrounds of the actors in the infrastructures, we applied the concept of the community of practice to the groups of actors involved in the study. This allows us to better understand how and why actors take a position, and how they can - or can't - be enrolled to participate in an infrastructure. It is in this social dimension that the significance of factors such as mutual understanding, trust and community benefits becomes apparent. Using a case-study approach, we researched the introduction of several large scale knowledge infrastructures in the field of biodiversity in the Netherlands as well as in the United Kingdom. This field is very rich indeed and consist of many communities of actors, ranging from volunteer birdwatchers, to scientists and commercial consultancy firms, and to different layers and departments of government.

Disciplinary and Personal Motivations for Interdisciplinary Collaboration

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Collaboration between ecologists and social scientists of various types is an increasingly salient feature of ecological research. In recent years, ongoing collaborations among members of these groups have arisen in a variety of settings. Further, in some cases the

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resulting intellectual products have wielded significant impacts on the discipline of ecology, helping to change perceptions of what are considered legitimate objects of research. All of this begs the question: What are the motivating factors driving interaction among members of these disciplines? Research in the sociology and philosophy of science examining interaction between members of different disciplines offer competing hypotheses about the disciplinary motivations driving interaction, and fail to address the personal motivations of individual researchers (Ben-David and Collins 1966; Mullins 1972; Bechtel 1986, 1992). This research works to mitigate these deficiencies by using interview data from members of over a dozen interdisciplinary research groups in three organizations to explore the disciplinary and personal motives driving these collaborations. It is found that motives for collaboration differ at the disciplinary and individual levels of analysis, differ between disciplines, and are to a lesser extent shaped by career stage.

Transdisciplinary Processes in the
Integrated Management of Contaminated Sites

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Megasites are large and complex contaminated pieces of land. Currently some 20,000 of these sites exist in Europe, which means risk for ecosystems and human health. The remediation of these sites is necessary to minimize these risks, but as most scientific remediation projects in the past have dealt with only one facet of the complex problem, until now no applicable and holistic solution has been found.

The concept of the remediation project 'SAFIRA II - Revitalisation of Contaminated Land and Groundwater at Megasites' aims to deliver an answer to well-known shortcomings of disciplinarily organized projects if these deal with real world problems. In SAFIRA II the cooperation of natural and social scientists is meant to bring together different types of knowledge and expertise. Additionally the integration of heterogeneous stakeholders via participatory processes shall ensure the practical relevance of technological innovations. One of the main goals of SAFIRA II is to develop a new management concept for megasites.

This paper will analyze SAFIRA II, focussing on different forms of collaboration between different scientific and non-scientific actors from varying disciplinary backgrounds. The aim is to reconstruct the processes on how scientific expertise is integrated and transferred into technical innovations to create a generic management system.

1.1.18: Acting with Science Globally: Technological Change Development and Inequality in the Knowledge Economy, I

Analysing Technological Change, Development and Inequality in the Knowledge Economy

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Economic and innovation policies have been dominated for some 15 years by narratives of the 'knowledge economy', 'knowledge society' and 'globalisation'. Technological developments combined with economic, social and political changes are restructuring the global economy and this affects nations, regions and the world at large in intricate and interdependent ways. The expectation is that these changes will lead to overall progress and development across the globe, but the question remains to what extent the technological changes will actually benefit those most in need of development and whether it will reduce or increase global inequalities.

Our paper draws on the work currently underway in the EU funded ResIST project. The goal of this project is improve our understanding of the contribution of science & technology to the creation and maintenance of inequality within and between societies; and to recommend on the development of more inclusive S&T policies that balance growth with reduced inequality and improved accountability to the poor. Our project assumes that technological change and science can be harnessed to fight social inequalities and to promote opportunities for development but only if they are combined and embedded in specific ways. The aim is to explore various forms of alignment and the organization of trajectories of technological development to explore how this may be achieved.

The paper will review some of the current work in STS which bears on these issues of technological change, development and inequality. Subsequently it will present some key conceptual and empirical issues in the ResIST framework as well as possible policy implications.

"Europe Needs More Scientists" : Migration, the Global War for Talent and the Individual Scientist

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The chosen theme for the 4S/EASST conference aims to capture aspects of an inter-relationship between science and technology and law, policy and organisation. This paper seeks to explore an issue that is high up on the policy agenda of the EU and its Member States; the perceived need to attract individuals with scientific skills to live and work in the EU. The EUs Lisbon Agenda of becoming the worlds most competitive and dynamic knowledge economy by 2010 made imperative an investment in science skills. The title of the 2004 EC conference Europe Needs More Scientists demonstrates the centrality of human resources to achieving this ambitious policy objective. Within the context of a shift towards knowledge based economies the spatial location of individuals with scientific skills plays a central role in economic policies and planning. Mahroum argues that as migration is

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becoming an inseparable segment of national technology and economic development policies and notes that competition for highly skilled labour will continue to be fierce (2001: 27). The decisions that individual scientists make about where to live and work therefore have significance in terms of economic growth and development. Migration decision making should be considered in the context of both broader social processes and demands as well as the context of the individual and their biography (King, 2002). Immigration and migration laws and policies play an important part in shaping the opportunities that scientists have to access physical and human resources globally. A recent article in Nature magazine for example describes visas as a significant weapon in the battle to secure top researchers (Smaglik, 2008: 483). However it is important to note that the opportunities that are open to individual researchers to move to work in other countries continue to be unevenly distributed. Williams et. al. (2004) argue the selective easing of immigration does not automatically lead to transfers of significant additions to human capital. Knowledge does not simply translate into action. Rather, the potential for action is dependent on position, in terms of class, gender and ethnicity (Williams et. al., 2004: 43). This paper seeks to bring together analysis of key laws and policies that shape the migration of scientists into and within the EU with understandings of migration and career decision making drawn from in-depth interviews with migrant scientists.

Can Sub-Saharan Africa Halve Poverty by 2015?

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One of he main aims of the United Nations Millennium Declaration is to halve poverty by 2015. To accomplish this goal UNCTAD adopted a programme of action for the least developed countries that calls for a GDP growth rate of at least 7 per cent per annum and increase the ratio of investment to GDP to 25 per cent per annum. But how realistic is this goal? Does Sub-Saharan Africa have the social and technological capabilities to generate rapid growth? What consequences does this goal have for generating inequality in the region? This essay considers the problem of uneven technological accumulation and the requisites for sustainable rapid growth. It also assesses the level and distribution of social and technological capabilities by using both direct and indirect indicators and the importance they played in generating rapid growth in Asia. The paper will use the example of the ICT sector to illustrate how the use of the technology in Sub-Saharan Africa relates to the development of technology in Europe and the role it may play in generating inequality in Africa.

This essay considers the problem of uneven technological accumulation and the requisites for sustainable rapid growth. It also assesses the level and distribution of social and technological capabilities by using both direct and indirect indicators and the importance they played in generating rapid growth in Asia. The paper will use the example of the ICT sector to illustrate how the use of the technology in Sub-Saharan Africa relates to the development of technology in Europe and the role it may play in generating inequality in Africa.

1.1.18: Acting with Science Globally: Technological Change Development and Inequality in the Knowledge Economy, I

Accountability through Participation:
Emerging Configurations of Knowledge and Active Citizenship

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Recent work has brought to the fore new conceptions of accountability, largely based on citizen initiatives which allow citizens to engage directly, at different points, with the design, implementation and outcome of public policies, research programs and technologies. In a different way from formal frames of accountability based on the principle of double delegation (Callon et al, 2001), these initiatives are often local and involve collective mobilization and participation of citizens in different types of fora, deliberative spaces and collaborative research and action.

This presentation will focus on participation and alternatives systems of accountability, in situations related to emergent configurations of knowledge associated with the governance of cities and of the health system in Southern Europe and Latin America. Our starting point is the identification and characterization of procedures which allow public policies to be made publicly accountable for their effects on inequalities. More specifically, we will address public policies "constitutively" involving the mobilization of scientific and/or technological resources or of specific kinds of expertise, as is the case of environment, health or urban planning policies. Urban government and decisions concerning the definition and implementation of urban policies, debates and decisions of distribution of municipal budgets, collective mobilization and alliances with experts and officials to address health and environmental issues provide exemplary instances of the potential as well as the limitations of action aimed at addressing inequalities and promoting redistribution in ways that are publicly accountable.

We draw on a broad conception of knowledge and technology, which includes emerging configurations of expert and experience-based knowledges and practices.

Towards Multi-Objective Policy for Science, Technology and Innovation (STI)

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By combining the objective of creating competitive knowledge-based economy with the objectives of sustainable development and social cohesion, the European Lisbon agenda provided the outline of an agenda for the development of a multi-objective STI policy. This would be a novel type of STI policy in which the economic objectives of growth and competitiveness are aligned with directed by social/distributional objectives as embodied in the 'European social model'. In practice, however, little in the elaboration of the Lisbon agenda points in the direction of such a novel integrated framework for multi-objective framework, relying as it does heavily on a narrow range of conventional economic and R&D indicators, objectives and other discursive practices, as developed, in particular, under the auspices of the OECD. Given the important role that indicators and benchmarks play in the

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         the Knowledge Economy, I

framing of STI policy, the politics of indicator development and use is one key domain for
reproducing the quasi-total hegemony of economic objectives and for framing out
distributional/social objectives. The often referred to aim of the Lisbon Agenda, of making the
European Union the "most dynamic and competitive knowledge-based economy in the world"
is an example of the narrowing down of objectives, and of the non-attendance to global
inequalities.

A number of issues suggest, however, that the relationship between social and economic
factors and objectives is both a key explanatory variable and a main governance issue in
contemporary STI policy (e.g., explaining the economic and STI policy success of some
Nordic countries in terms of 'the Nordic model', and developing the conception of 3rd
generation, 'horizontal' innovation policy, respectively). Increasing emphasis on the potential
impact of science and technology on development has also increased awareness of the
constraints of extant STI policy frameworks, and of the necessity to develop policy
frameworks which are explicitly needs-based and predicated on distributional objectives.

This paper aims to contribute to the further articulation of the outline of such a novel, multi-
objective STI policy framework. It will first provide a brief historical analysis from key policy
documents of main paradigms of post WW II STI policy, in terms of their different
articulations of the relationship between social and economic objectives in R&D and STI
policy. This is used as a background to a brief critical overview and review of some
conceptions and frames in present European and global debates on STI policy. Particular
attention will be provided to framings of 'inequalities' in different national and international
policy documents. The paper builds in part on intermediate results from an ongoing, EUC
funded research project on "Researching inequalities through science and technology"
(ResIST).

1.1.19: STS on Art and the Art of STS, I

Technonastalgia: How Old Gear Lives on in New Music

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The analog electronic music synthesizer was developed by engineers Robert Moog and Don Buchla in the period 1964 - 1968 (Pinch and Trocco, 2002). These early instruments were very expensive and mainly used by individually wealthy composers or academic studios. They were not performance instruments and not exclusively keyboard instruments - they had a range of controllers, including knobs, patch wires. monophonic keyboards (one note at a time), and ribbon controllers. Such synthesizers were used more to produce new sounds and timbres than emulate conventional acoustic instruments.

However, in the 1970s, with instruments such as the Minimoog and ARP 2600, portable keyboard syntheiszers became cheaper and available through retail music stores. They started to be used by many musicians in many differnet genres of music. Emulation of acoustic instruments also became easier. In 1983 Yamaha developed the first commercially successful digital synthesizer, the DX7. This instrument was affordable to most musicians and with its polyophonic keyboard and built in menu of sounds it could easily emulate acoustic instruments. Since the 1980s digital synthesizers have become ubiquitous and companie ssuch as Casio sells many millions electronic keyboard devices every year. Despite the digital revolution however, today several musicians continue to turn to analog sysntheisezrs. There is an analog revival in progress with old instruments commanding high prices and software companies producing digital emulations of old analog synthesizers.

The role of old technologies in the development of new technologies is a topic researched in the history of technology. Often older technologies and the practices associated with them pave the way for the newer development. A clear example is the motor car - the early form of which was similar to the horse and buggy. It is much rarer to find cases where the older technology is valued in its own right and even takes the place of the new. In this paper we will ask why contemporary musicians have turned to these old analog synthesizers and their sounds in making their music.

We will also examine the turn to a variety of other pieces of old "gear" including guitar amplifiers. Drawing upon interviews with musicians in new York and Philadelphia, we will show that old pieces of gear offer sounds and ways of making them that these users find especially valuable. The essay will be framed by concerns in the sociology of technology, but we will also discuss work in the sociology of nostalgia. We will argue that we need to extend the traditional sociological notion of nostalgia to include material practices which are built around fabled, evocative or "notalgia-rich" pieces of technology. We will introduce the term "technostaglia" - defined as a way of being nostalgic via technology - to try and make sense of the activities we document.

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STS on Sound Art on STS:
Intended Listeners and Researching Technology

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Many sound artists try to make people aware of listening by creating works that also reflect on the way the surrounding world sounds. Often, these works also have a critical aim. They try to change people's ordinary listening habits and to draw their attention to the sonic quality of the world they inhabit. Although STS scholars have not focused greatly on sound and listening - the recent surge of sound studies literature exempted - they still share a stance with these sound artists. Some STS scholars have an explicit empowerment aim, while others more implicitly focus on aspects (of scientific and technological practices) that are, they feel, too often overlooked. Besides this similarity of Sound Art and STS, both are also particularly interested in technology. Many sound artists explore technologies to create adventurous applications. By doing so, they reveal implicit intended usages as well as drawing attention to the role of technologies for instance in performances. While STS scholars do not analyze technologies in order to create works of art, they are similarly concerned with revealing their constructive role as well as making explicit implicated users.

In this paper I want to investigate this dual interest of Sound Art and STS in raising awareness, often about technology. What happens when the tools of the one are used "on" the other? What happens to STS when it is turned upon a practice which shares, to some extent, some of its aims, habits, characteristics? I will focus on two very different projects: Moniek Darge's music boxes are very low-tech and understated and did not draw large crowds, while Edwin van der Heide's Pneumatic Sound Field is an imposing, sophisticatedly high-tech installation drawing quite some people. I have researched these projects ethnographically from an STS perspective. Via an empirical description of my research, I will reflexively focus on my investigation of the two sound artists' projects. I will pay attention in particular to the shifts in who is conceptualized as the recipient of these projects. Who is the intended listener and how does this change in the course of examining the projects? What role do the tools used within these projects play and how do they reshape the intended recipient? And what happens to the aim behind the projects of STS and sound art when they are confronted with one another.

Epistemic Contestation or Market Constraint?
Knowledge, Legitimate Discources and
Domestication Paths in High-End Musical Practices.

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The paper focuses on the process of institutionalization, stabilization and subversion of knowledge and practices in the musical audiophile culture. Contrary to the idea that users have a high degree of freedom in reinterpreting technologies' meanings and practices, I will argue that contested interpretations in the Hi-End culture actually appear to be deeply rooted

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in commercial and marketing "legitimate discourses".

Indeed, while in the last few years users studies in the STS field have especially stressed the way in which people generate different and alternative interpretations of technologies, in this presentation I will explore a different question: the strong embeddedness of users' interpretations of technologies into "legitimate discourses" generated and stabilized by market actors and institutions. Therefore, the case of Hi-End listening technologies is used in order to understand how the stabilization of technological practices is constrained by interpretative frames elaborated in the market field by producers, mediators and sellers of technologies.

Data presented come from a research concerning Hi-End equipments, which is based on 17 in-depth qualitative interviews with audiophiles, Hi-End journalists and sellers, and on ethnographic observations in audiophiles' houses and Hi-End shops. The paper will focus on three main aspects. Firstly, it will be shown how users interpretations in the Hi-End culture are rooted into two main market "legitimate discourses". Secondly, conditions that allow users to take distance from these "legitimate discourses" are considered, arguing that the production of alternative discourses around technologies is made possible by the possession of an high technical knowledge, which is in fact not normally shared by average audiophiles. Thirdly, it is claimed that, even though audiophiles passively accept market "legitimate discourses", their situated practices are the result of a negotiation occurring between market discourses and users' material and social environments. In so doing, the users' agency is relocated at the level of individual "domestications paths", which are embedded in users social and familiar contexts.

The paper close with a theoretical remark, arguing that contemporary uses studies in the STS field need to pay more attention to the role of market actors in producing "legitimate discourses" in order to explain the stabilization of users technological practices.

What Does It Mean to Make a Copy?
The Building of a new Schnittger-Organ as a Study in Authenticity.

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The revival of early music is a well-known phenomenon of twentieth-century cultural and musical life. Interest in 'authentic' performances on period instruments has grown substantially during the second half of the century. A corresponding and flourishing development in instrument building can also be seen, making it possible to order string, wind, and keyboard instruments from different time periods. European early music has been reinterpreted and recorded in historically informed performances and become an essential part of music culture. These developments are characterised both by scientific interest in historic sources and practices, as by a discourse on the artistic ideal of recreating musical sounds and languages as they may have been heard and understood by listeners ages ago.

In my paper I focus on the North German Organ Research Project at Göteborg University. This project aimed at building a copy of the famous 1699 Schittger organ in the Lübeck Dom, that was destroyed during a bombing raid in 1942, and of which only some photographs

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remain. The aim of the project was to gain the knowledge and experience necessary to reconstruct the 'old sound' of the Schnittger organ. For example, scholars in the project were able to reconstruct a method of sand casting and organ pipe construction according to seventeenth-century practice. At the same time, computer simulations and full-scale model experiments were done to understand the movement of the wind in the wind supply system, from the bellows to the pipe foot. Getting to know how Schnittger made his pipes and constructed his wind system was necessary to reconstruct the balance between the fundamental pitch of the pipes and overtones, a balance described by organ experts as one between 'musical' sound and 'noise'. In finding this balance, matters of scientific scholarship and artistic craftsmanship are constantly at stake.

The description of the organ research project raises questions that are interesting from an STS-perspective on art: how are notions of 'authenticity' renegotiated in the process of building a copy of a historic organ? How is the claim that the new organ produces the 'old sound' of the Schnittger original backed up, both by scientific and artistic arguments? How are these styles of reasoning - scientific and artistic - shaped in the relearning of old practices, e.g. the casting of organ pipe metals, and the use of modern technologies such as computer simulation and model experiments?

1.1.20: From Interface to In-Your-Face: Numbers Aligned at Boundaries

Cost Benefit Analysis Applied - Numbers as Interface between Science, the State and Local Complexity

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In infrastructural long term planning Cost Benefit Analysis (CBA) is applied to value a variety of possible investment alternatives. The aim is that the resulting calculations should underlie how priorities are made between proposed new roads and rail roads during a given period of approximately ten years. This valuation is expressed in the overall transport policy objective, approved by the Swedish parliament, and it is therefore a central guideline for the planning of new infrastructure. CBA is a scientific method for estimating the effects of certain changes (for example the building of a new road), in terms of costs and benefits for all individuals in society. These effects are estimated and expressed monetary. CBA is rooted in economic science and more specifically in welfare theory.

This paper is part of an ongoing study regarding meaning and significance of knowledge in Swedish infrastructure planning. The empirical foundation of the paper consists of documents, interview transcripts and field notes. My primary research interests are the significance of quantification for scientific claims on 'objectivity' and - indirectly - for state political legitimacy. Moreover, I am interested in the encounter with the local planning process in terms of its intrinsic complexity, subjectivity and embeddedness in time and space. In this paper, Cost Benefit calculations are discussed and elaborated on as representations, boundary objects and obligatory passage points.

The applied CBA method can be regarded as a boundary object between science and the state. This reflects an exchange between a scientific and a state political rationality. Nevertheless, there is also a third rationality when the method is to be applied to the local planning process. The local situation is characterized by heterogeneity, complexity, specific issues and concrete problems. These characteristics form a contrast to scientific as well as to state political rationalities. Moreover, it can be related to the fact that local planners and decision makers often view calculations as problematic and difficult to use.

Counting Crimes: Numbers as Interface between the Police and the Public

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Annual reports serve both performative and persuasive purposes, and function increasingly as PR instruments, not only for private businesses, but also for public services such as the police. In my ongoing research on the role of crime statistics in contemporary policing, I have analyzed annual reports from the largest police district in Norway (Oslo) from 1950 to present. I have given particular attention to how the crime numbers have been presented and interpreted, what place crime numbers have in the annual reports, and how rising or falling crime is explained. Reading nearly 60 years of annual reports, I am struck by the changes in

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not only reporting, but also in interpreting the numbers.

One way of understanding the changing presentation and understanding of the crime rate in the annual reports, is to see the crime numbers as interface, being co-produced by both the police and their surrounding "public". Crime statistics are both a source of knowledge and a tool of governance, and in the annual reports this becomes very visible.

Crime numbers are not only being used, in various ways, to describe police activity, they are also essential in criminal justice politics. As withother statistics, crime data are inextricably bound up with notions of the relationships between governments and governed. Where crime statistics once seemed to reflect a relationship in which the police were not seen as responsible for crime levels, only for dealing with crime as it inevitably occurred, in recent years we can see that crime statistics are increasingly used simultaneously as a measure of the problem (crime), and as a measure of the result of police work. In 'the audit society', where performance management and target setting are becoming central tools of governance inside the criminal justice sector, crime numbers get new roles.

Numbers as Privacy?
Statistics as Interface between the Personal and the Political.

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Those of us who were leftist, feminist activists back in the 60's and 70's learned to work from the premise that "the personal is political". Politics then, as now, concerned the distribution of resources: wealth, power, rights, and so on - the makings of some degree of control over ones life situation, and of ones perspectives on the world within and beyond oneself. Ones life experience, as we saw it then, reflected that situation and those perspectives. Ones life experiences were therefore a basis for political mobilization. Thus, experiences that might at first glance seem purely personal were part of a political dynamic, both as outcomes and (potentially) as drivers for change.

By the 90's, the politics of personal had shifted. Personalizing politics was not so much about mobilizing oppressed groups who, through sharing personal experiences, came to see themselves as sharing political interests. Increasingly, it came to be about a machinery of political calculation, "personalizing" public services by measuring them out according to selected traits of target populations. At the same time, the planning, staffing, and budgeting of services was "personalized" by converting statistics on the traits of the populations served into inputs for a budget calculus. This means that information about citizens' personal experiences now enters the political sphere less through mobilization or push from below and more through bureaucratic demand and pull from above.

Information gatherers portray these statistics routines as protecting service users' privacy through an anonymization process: By turning personal information into depersonalized numbers and massing those numbers together, the personal becomes political while remaining private. Service users, however, experience the statistics routines as invasive of their privacy - in part precisely, and ironically, because of the depersonalization into mere

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numbers; in part because massing those numbers together is inadequate as an anonymization technique.

Empirically, this paper is based on interviews with various levels of "users" (from those registered on up to central authorities) of a Norwegian statistics system called IPLOS. IPLOS (an acronym for Individually-based Care and Support Statistics) is a mandatory registration system for the care needs of all who apply for municipal health and/or social services. IPLOS registers detailed information about applicants' and continuing service users' degrees of autonomy/dependence in a broad range of activities of daily living (ADL) - dressing, eating, defecating, and so on. It is at once both intimately probing and (by conversion into an index of scales from 1-5) depersonalizing. The experience of IPLOS registration has mobilized widespread resistance among Norway's disabled population. We ask what the struggle over IPLOS data tells us about how the personal and the political weave across the shifting, porous boundary between the private and the public.

1.1.21: Mapping Socio-Technical Networks

Mapping Heterogeneous Dynamic Networks: Methodological Potentials of Narrative, Social Network Analysis and System Dynamics

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The paper explores different methods to analyse heterogeneous socio-technical networks and explain processes of change.

In contemporary STS the interlinkages and interplay between technical and symbolic artefacts and human actors are mostly examined by ethnographic methods. The results of such studies are normally presented in a narrative thick description including the interlinking practices and participating entities (be it objects, concepts, or human actors) observed in the field. However, only in rare cases one can find a structured and transparent processing of the acquired data that analyses (and visualizes) observed elements and their interactions or interaction processes and resulting patterns. Information regarding interlinkages between remote entities or practices often remains unseen and research results are hardly reproducible.

On the other hand in recent years methods for analysing interrelations have been developed most notably in research related to social network analysis (SNA) and fields like system dynamics (SD). In the first case of SNA the existence (and sometimes strength) of linkages between elements is measured and becomes quantitatively coded and mathematically analysed to map the structure of the resulting network (in numerical terms or graphical visualization). In this way propositions are drawn regarding power or potentials for cooperation associated with certain positions within the overall structure. Most SNA-studies, however, focus on homogenous actor-actor relations ignoring heterogeneous constellations central to STS.

In the second case of SD attempts are made to specify linkages between elements in terms of relations of influence. This includes relations between heterogeneous entities. This allows for a dynamic analysis of change in network patterns, in particular, how change in one element affects the network as a hole, through which kinds of processes networks take shape and transform and what are their dynamic qualities, such as flexibility or resilience. In both cases, however, gains in terms of structured data processing and transparency are paid for by losing out on detail and qualitative thickness of the narrative

In this paper we take the example of aircraft development as a starting point to explore the potential for applying SNA and SD methods to measure and analyse heterogeneous linkages and interactions that are narratively reported in STS studies . This shall be a first step to open up standard STS methodology for more formal and quantitative methods of analysis. But it shall also make clear where limits and trade-offs are given. We focus our discussion of the specific potential of alternative research methods on three basic dimensions: data collection, analysis and interpretation. In conclusion we argue that each method has specific strengths and weaknesses. It is thus a matter of appropriateness rather than superiority which method to apply to a certain research problem. The potential for SNA and SD to map dynamic socio-technical networks, however, remains largely untapped.

1.1.21: Mapping Socio-Technical Networks

The Cognitive Geography of Nanotechnologies: Location and Knowledge Flows of Nano-Research in the Map of Science

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How interdisciplinary is nanoscience and nanotehcnology research? Although the policy discourse has emphasized that it is substantively integrative (Roco and Bainbridge, 2002), some researchers have suggested that it is really a loose amalgam of relatively traditional pockets of physics, chemistry, that interrelate only weakly (Schummer, 2004; Meyer, 2007).

In order to test the extent of knowledge integration in nanoscience, we have studied networks of scientific publications for specific nanotechnology topics (quantum dots, molecular motors), looking into their cognitive heterogeneity over time from two perspectives. First, we investigated the distribution of predefined disciplinary categories in the network, taking in consideration not only the number and balance of the categories, as in traditional diversity measures (Shannon, Simpson), but also how different these categories are (Porter et al. 2007). This was visualized by overlaying the distribution of disciplines on a map of science where disciplines are arranged according to similarity (Leydesdorff and Rafols, 2008). Our observations suggest that in specific nanoscience topics, most research arises in cognate disciplines (e.g. physics and materials science) rather than in distant combinations (physics and biology).

Second, we investigated and visualized the structural coherence of the publication networks. Preliminary results suggest that research on a given topic starts with a compact network which becomes progressively fragmented, in which only its 'core' sub-network plays an integrative role. Alongside these visualizations we have computed indicators of disciplinary integration (Porter et al. 2008) and network coherence (Rafols and Meyer, 2008).

The combination of these two perspectives (disciplinary distributions in the global science map versus publication network coherence) allows one to track the dynamics of knowledge integration in nanoscience. Preliminary observations suggest that while nanoscience as a whole can be very multidisciplinary, this disciplinary diversity is achieved through traditional knowledge diffusion/translation processes, with fully-fledged integrative research occurring only at specific points of the cognitive networks.

Analysing the Regional Innovation Network of Renewable Energy Technologies in Styria: a Combination of Perspectives from STS and Social Network Analysis

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This paper will draw both on approaches to the analysis of technological innovation systems rooted in the STS literature and on the study of innovation processes from the perspective of Social Network Analysis (SNA) and show how these approaches can be combined to

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achieve a comprehensive mapping and analysis of a technological innovation system. This combination of methods will be illustrated by a case study on the innovation network of renewable energy technologies in the province of Styria, Austria.

In the STS literature on technological innovation systems 'networks of agents interacting in a specific technology area' (Carlsson and Stankiewicz 1991) are frequently taken as constitutive elements of the system under study. In particular, this network view has been taken up by the 'systems of innovation' and 'functions approach' to technological innovation. Among other things, the functionality or disfunctionality of the underlying innovation network has been pointed out as an issue deserving closer attention (e.g. weak and strong network failures, Johnson and Jacobsson 2001). However, the networks typically are not mapped out and analysed in any detail. Within the discipline of Social Network Analysis it is precisely this detailed representation and analysis of network structures that stands at the core of any investigation. Apart from producing descriptive maps of actors, various indicators can be developed and applied that help to assess the performance of a particular network structure (e.g. diversity).

In the case study presented in this paper, methods from Social Network Analysis are combined with qualitative investigations to obtain a rich description and analysis of the innovation network of renewable energy technologies in Styria. A representation of the innovation network is produced that relies both on quantitative data (e.g. databases on cooperative research projects) and on information from qualitative interviews introducing additional relational data (e.g. informal ties) as well as information concerning the strategic importance of various types of network ties. In addition to that, relevant framework conditions and strategic goals for the innovation network are identified, conceptually based on the STS innovation systems approach and empirically grounded in data from interviews and from a stakeholder workshop. The network representation can then be discussed in the context of these framework conditions and goals.

Conclusions from the case study are drawn, both in terms of the specific findings concerning the innovation field of renewable energy technologies in Styria and in terms of the potential this methodological approach may have for the study of innovation systems in STS.

The Emergent e-Book Innovation Network and the Print-On-Paper Sociotechnical Regime

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The sociotechnical system of print-on-paper for the dissemination of textual information prevails despite widespread concerns about its sustainability. Information technology has often been identified as one of the generic technologies that has the potential to address the unsustainability of the incumbent regime. Yet innovations such as the 'electronic book' - understood as a diversity of IT applications providing an alternative text display to printed paper - have remained marginal. According to sociotechnical transition theory the electronic book can be seen as a niche in relation to the print-on-paper regime. Based on a recently completed UK ESRC project we analyse this niche as an emergent innovation network.

1.1.21: Mapping Socio-Technical Networks

The electronic book is mapped as a sociotechnical network including organisations, users and technologies which often transgress a distinct niche regime divide. Patterns of niche-regime interaction are explored and assessed as to whether they represent a sociotechnical transition in progress. Social network analysis methods informed by network approaches to innovation theory are used to visually represent and analyse the niche. The analysis reveals different patterns of network formation of innovation journeys within the niche which offer markedly different durability potential. On the basis of this analysis the prospects for promoting sustainable innovation are discussed.

The theory and method adopted in this study draws upon the sts and innovation studies traditions in actor network theory and sociotechnical systems. It employs a novel application of UCInet based social network analysis to address concepts of network building, durability and translation. This is undertaken in a systematic empirically based approach drawing upon event based and nominalist techniques from network sociology.

Post-Fordist DNA, Agile Cell. From Gene Action Discourse to Network Metaphors in the New Biology?

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Twenty years after the beginning of the Human Genome Project, biology seems to have experienced a radical shift in its paradigms and metaphors. In the age of the "central dogma" of molecular biology, the gene, a discrete string of DNA coding for the mass production of a standard protein, occupied the position of the CEO in the taylorized shop-floor, a position of command and control of hierarchically organised factory-like processes within the cell.

In recent years, especially in systems biology, cellular functioning has growingly been reconceptualized as a distributed activity within complex adaptative networks. Complex networks with no commanding molecule are viewed as the major source of biological specificity, change and causality, and unravelling these networks' architecture, performance and robustness has become a hot topic. Keywords in biology's new "network action discourse" are "flexibility", "robustness", "modularity", "agility" and light (i.e.non-proteic, RNA-mediated) regulatory layers.

Based on the analysis on a wide corpus of recent publications in molecular genetics, embryology, cell biology systems biology and the "science of networks", the communication will explore this new discourse of biology with the tools of Science and Technology Studies, Cultural Studies as well as the recent sociology of worth of Luc Boltanski (Boltanski L & Thévenot L., 2006. On Justification. The Economies of Worth, Princeton, Princeton University Press; Boltanski L. & Chiapello E., 2006. The New Spirit of Capitalism, London & NewYork, Verso). A particular focus will be put on the strong homologies between biology's new network discourse and the "connexionist world of worth" in late capitalism's neomanagement discourses.

1.1.22: Finding and Following Epistemic Communities

Lets Get Organised:
Gender, Practice, Knowledge and Organisation in Science Studies

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This paper explores how we might conceive of epistemic communities as simultaneously practical, organisational and discursive entities. Qualitative interview and participant observation data generated by the UK part of the EU FP6 project KNOWING (Knowledge, Gender and Institutions: An East-West Comparative Study) will be analysed in relation to theoretical questions of whether and how organisation matters in science studies. Over the past 30 years there has been a significant turn towards practice (and discourse) and away from institutions (and cognitition) in sociological frameworks for understanding what science is and what it does. This has underpinned divisions within the literature on the problem of the under-representation of women within science careers. Policy-oriented research, particularly within education studies, has emphasised structural barriers and the gendered organisation/cultures of science. Feminist epistemology has critically foregrounded masculine/rational ways of knowing. Although Hess (2002) argues that the 'second generation' of lab studies of scientific practice have increasingly incorporated attention to gender issues, there remains a lack of dialogue between these very different conceptions of the problem of 'women and science'. Close analysis of short extracts from data generated with participants in two biology laboratories in a British research university will be used to suggest that a (re)integration of studies of lab practice with organisational analysis is necessary to understand the multi-dimensional nature of research work and its implications for gender. We focus on showing how the physical setting of research work (the lab) and its temporal organisation (the research career) are co-constructed through material practices and activities; institutional discourses and structures; and individual and collective narratives of continuity.

Language at Work. How is Membership of Epistemic Community Linguistically Constructed in Natural and Social Sciences?

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In our paper we will analyse the relationships between knowledge, institutions and gender in natural and social sciences. This paper is based on our work in a research project called "KNOWING" that is carried out in five different European countries and funded by the 6th Framework Programme of the EU. The central research questions in our project consider epistemic communities of knowledge formation, their virtual epistemic structure and structuration, the process of becoming a member of epistemic community, and, especially, stability and changes in the communities.

To become affiliated to, for example, a scientific community mainly comes about through specific institutional structures, but certain epistemic communities play special role in this process. To put it simply, you become a member of a scientific community by doing research

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in a "right" way and in the context of "right" institutions. The very concrete work here consists, of course, of reading, doing research, talking and writing, and on the basis of her own research interests and problems, a researcher defines those epistemic communities, whose temporary or more permanent membership is reasonable to her. At the same time, the epistemic community constructs its own normative conceptions of "right" research questions and "right" ways of doing science. In other words, not only research questions of the same kind connect researchers into an epistemic community, but they are also committed to, more or less strictly defined, ideas about subject matter and methodology (Nelson 1993).

All in all, epistemic communities are more virtual and diffuse than steady and stabile in nature. From the point of view of social epistemology this means that epistemic communities cannot be characterised in any contentual or exact manner a priori. Instead, one epistemic community is predominantly marked out from others by the nature of its research problems.

But how does one become a member of an epistemic community in natural and social sciences? How does a natural or social scientist talk of her research subject? What kind of part does a specific kind of language play in making a person into a competent member of a scientific community? These are examples of the questions we will discuss in our paper.

Following Epistemic Communities in Interdisciplinary Contexts - the Example of Research in Physical Organic Chemistry

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With an increasing interest of researchers from the social sciences and humanities in the ways in which knowledge production practices are organized and transmitted some have employed the concept of epistemic communities or cultures, others have used the concept of knowledge networks. This paper seeks to contribute to the debate of what can be gained by using the concept of epistemic community and how its analytical potential can be developed. The notion has been used by (feminist) philosophers to highlight the constitutive role of contexts of inquiry and social relationships in knowledge production, referring to a set of methodological choices, commitments, or standards; exploring epistemic communities is considered important for accountability, particularly with respect to the ways in which gender plays out epistemically. In political science the concept similarly refers to a network of knowledge-based experts who share normative and methodological commitments, but refers particularly to professionals and other groups who influence state-decision making. Policy makers and research funding bodies for their part assume and construct distinct (sub)disciplinary research communities that are eligible for funding. To date the concept of epistemic community has not been taken up widely in the STS literature. STS practitioners have referred to communities of practice in distinct scientific specializations where members have a shared past, common means to enroll new members and to maintain boundaries; others have highlighted the socio-technical networks out of which epistemic communities arise, and have proposed the notion of epistemic cultures as an analytical concept to tease out the technical, social and symbolic dimensions of contemporary expert systems.

This paper draws on these insights. Taking the example of research in physical organic chemistry at a research institution in the Czech Republic it empirically explores some of the

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(often contradictory) ways in which epistemic communities are enacted, maintained and given meaning. Following the temporal and spatial constitutions of epistemic communities in cases such as putting together a pan-European network of excellence and developing a user community for the beam line of a Central European synchrotron facility, the paper particularly focuses on (i) the role of materiality and machines in the construction of epistemic communities; (ii) the role of geopolitical location; (iii) the role of discipline and interdisciplinarity and last but not least (iv) at the role of emotions and a gendered politics of belonging particularly amongst junior researchers and those considered 'foreigners'. The research is based on participant observation, discourse analysis and in-depth interviews conducted in the framework of the project KNOWING.

Close Relatives or Distant Friends?
Comparing Epistemic Communities in Theory and Practice.

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It is common now to argue that there are multiple kinds of sciences, that epistemic communities come in many shapes. Contemporary science is fragmented in terms of its 'different architectures of empirical approaches, specific constructions of the referent, particular ontologies of instruments, and different social machines', Knorr-Cetina writes (1999). However, those studies that actually do compare different communities are rare. How, then, should we compare epistemic communities and what, exactly, do we actually compare? This paper aims to shed some light on this issue by first reviewing the kinds of comparisons that have been done in STS on this topic and, second, by analysing and comparing empirical data on different epistemic communities.

Scientific communities have been compared across a variety of different locations: Eastern and Western Europe, North and South, Europe and the US, various disciplines (such as molecular biology and high energy physics). Besides comparisons across geography and disciplines, communities have also been compared across time - how they emerge and become more 'mature'. What do these 'ways of comparing' enable us to say about the multiplicity of science?

In the second part of our paper, we will compare empirical data on different epistemic communities (gathered through in-depth interviews and document analysis). Our data stems from two different countries - the United Kingdom and the Czech Republic - and four different disciplines - nanotechnology, synthetic biology, organic chemistry and biochemistry. We will be interested in exploring the actual differences between epistemic communities in terms of both 'connectivities' and 'robustness'. Not taking the word 'community' as a given, solid, definite, or fixed entity, our focus will be on the kinds of links (epistemic, social, material) performed as well as their relative strength. We will be interested in what it takes to 'feel' like belonging to an epistemic community - is this, for instance, only referred to in terms of knowledge production, or also as something else? How is the robustness and the materiality of epistemic communities articulated by scientists (i.e. to what extent do the communities scientists invoke exist in real-life and/or to what extent they are imagined)? And, importantly, what different 'modes of ordering' (Law 1994) underpin the existence and formation of

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different epistemic communities?

By comparing epistemic communities, both theoretically and empirically, we hope to reveal in what way various sciences might actually differ. We hope to contribute to the STS literature by offering a more thorough typology of different 'ways of comparing' and by actually comparing epistemic communities by means of comparing the robustness, the multiplicity and the materiality of the connectivities that underpin these communities.

Peripheral Participation in Epistemic Communities: Exploring Boundaries of Legitimacy

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Past and ongoing studies of scientific communities have generated rich analyses of the institutional contexts and everyday practices of conducting scientific work. With a few exceptions however, this work ignores the contexts in which scientists, and the constitution of the collective, are initially made. How do persons become a member of a scientific community of practice? And how does the community shape membership and give value to certain forms and practices of belonging? In other words, how do epistemic communities reproduce? The genesis of community life - as manifest in sites of scientific training - is the focus of this paper. In particular, the notion of legitimacy in participation in a community will be expanded.

Lave & Wenger aimed to conceptualise learning not as an individualised or merely cognitive accomplishment, but rather as a trajectory from peripheral to full participation in a community of practice. Alongside Traweek's descriptions of enculturation, for example through the telling of stories (or "males tales"), these theories of apprenticeship and 'skills acquisition' are yet to be fully explored in the context of scientific communities. The formation of a community of knowers, and the mutual formation of knowing identities, are therefore in need of further elaboration.

In what ways can the scientific novitiate be said to constitute an epistemic community? What possibilities for participation are provided? And in what ways are these structured? What identities are made available? And how are some identities excluded? Questions of boundary-making, the construction of subject/object relations; and the mobilisation of origin stories all arise. To address these questions, I will draw on completed empirical work within earth science communities in the UK. Ethnographic work, alongside interviews and analysis of texts, provide the main sources of data to inform and exemplify the analysis and discussion.

Notions of peripherality and legitimacy expand the idea of epistemic community and allow us to consider how possibilities for scientific change, as well as ongoing stability, are simultaneously maintained by communities.

1.2.1: Performing Legitimacy and Efficiency - Accountability (Infra)Structures as Reinvention of Democracy? II

Developing Systemic Innovation in Regional Ophthalmology Services - New Technologies, New Relationship between Private and Public Sector, New Model for Organizing Hospital Services

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The technologies for dealing with diseases of the eye are rapidly changing. At the same time the ageing of the population increases the need for corrective measures needed by ageing eyes. Eye surgery that earlier was expensive, applied only to quite restricted number of cases and diseases and demanded rather long admission to hospital is evolved into rapid, largely out-patient or day-surgery operations done in mass scale with new laser and ICT. At the same time the opportunities to treat disease conditions that earlier were almost untreatable challenge the specialized ophthalmology units. The relationship between opticians and MDs specialized in ophthalmology is changing as is also the relationship between outpatient and hospital based ophthalmology. The development in technological opportunities challenge the old social and organizational system of providing ophthalmology services. The traditional Finnish public-private mix in this area, where hospitals were public and outpatient care was private is being challenged. The flow of MDs in this field from the public to the private sector is threatening the hospitals with a lack of expert manpower. We study, how the perception of the challenge is evolving, how a new pattern of relating private and public, outpatient and hospital functions and new type of high technology hospital centre with a kind of satellite units in other hospitals is developed within five cooperating hospital regions in Finland. We look it mainly from the perspective of solving the challenges from the perspective of the core hospital, but realize that the systemic innovations in the hospital are strongly related to the systemic developments in other parts of the regional arena. Thus, the transition process we are following takes place at multiple levels and subsystems as well as in linkages between them. Accordingly, the study analyses the dynamics of an innovation in an interaction between different local and regional, public and private, hospital and outpatient, medical and non-medical actors. The data of our study includes interviews and documents of different actors, participant observation in the development project organization of the core actor and in the meetings of the actors dealing with organizational answers to the challenges. As our entry perspective to this world of systemic innovation practice we apply the discussion on the development of middle range theories in the analysis of STS (ST&HV vol 32. No 6; Geels 2007).

Democracy Goes Global (or Does It?) Internet Governance and the Practical Politics of Scale

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What happens when policymakers from around the world get together to discuss ways in which an estimated one billion Internet users should be governed and another billion granted access? How do they ensure that the policy choices they come up with are legitimate, democratic, and applicable to any individual, anywhere in the world? What particular work

1.2.1: Performing Legitimacy and Efficiency - Accountability (Infra)Structures as Reinvention
        of Democracy? II

goes into enabling the effective oversight of a technology that escapes traditional
mechanisms of territorial settlement? This paper looks at the doing of a global Internet
governance regime. Building on recent arguments in Science and Technology Studies (STS),
it investigates the discursive practices through which a global tribe of politicians,
businessmen, and human rights activists establishes a moral order around everyday Internet
use. The main argument this paper puts forward is that a global policy becomes effective as
soon as it is successfully transited from plurality to multiplicity. In particular, the article
investigates the ontological politics that underpin the doing of a global order of governance
that is flexible enough to cater for all individual preferences and circumstances of Internet
use, but robust enough to maintain its coherence across those various possibilities- to
remain "global" that is. The objective of this paper is to introduce a dose of analytic
scepticism in current approaches to the study of global governance. Instead of looking at it
as an ordered process of cross-institutional dialogue and public deliberation, the paper
explores the merits of a perspective that focuses on the messy, mundane, and contingent
aspects of governance practice.

New Authoritarianism in the Global Bioeconomy:
the New Governance Debate in China and Implications for the
Comparative Study of Science Governance

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In recent years, the Chinese Communist Party has also begun to debate how to make its
bureaucracy and system of governance more legitimate, efficient, transparent, accountable,
and even more democratic and participatory. This challenges in many ways existing science
governance models and the debate about a legitimacy crisis, in the way that the field of STS
in the past has mainly addressed these questions only in relation to liberal democracy.

Instead, the paper proposes that the emergence of a new governance debate in China ,
hand in hand with reforms of its political, legal and economic system, has implications for the
urgently needed study of science governance also in authoritarian political cultures, and this
is particularly in the face of the emergence of authoritarian bioeconomies in Asia (e.g. China
and Singapore). The paper will give an overview of the new governance debate and political
reforms in China , which increasingly employs not only the rhetoric but also the instruments
of democratic and liberal governance. It will discuss how this may structure an 'invention' of
democracy and liberalism in authoritarianism, by drawing on governmentality studies and a
very recent debate among political scientists about the dual nature of democracy and
authoritarianism. The paper thus follows a new wave of scholarly attention, in that it departs
from the assumption that new authoritarianism may not only comply with liberalism, as has
been proven for instance by neoliberal economic policies in Pinochet's Chile and liberal
economic reforms in China since the late 1970's, but that new authoritarianism may also be
able to become more democratic.

The paper proposes that authoritarian political culture and the new debate about the dual
nature of democracy and authoritarianism are new, challenging and urgent fields of inquiry
also for STS, particularly for comparative approaches.

1.2.1: Performing Legitimacy and Efficiency - Accountability (Infra)Structures as Reinvention of Democracy? II

The Method, Full Monty and the Process of Mutual Learning? Inter- and Transdisciplinarity in a Practice of Policy Priority Setting Based on Environment and Health Data in Belgium.

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One of the key challenges in environment and health research is the measurement and interpretation of this complex relation. One of the key challenges in environment and health policy making is the translation of environment and health data to policy measures. In this contribution we describe a process in which these two challenges are integrated: the interpretation of human biomonitoring results for policymaking. We present work of the Flemish Centre for Health and Environment, working directly for the Flemish government. From 2001 to 2006 the Centre investigated the relation between environmental pollution and human health by measuring pollutants and health effects in (over 4000) Flemish inhabitants. A major challenge concerns the translation of these human biomonitoring data to policy priorities and measures. Medical, environmental and social scientific experts and policymakers cooperatively developed an action-plan for interpretation and policy uptake with regard to the human biomonitoring results. In the beginning the discussions in the action-plan steering group mainly focussed on environmental and medical scientific interpretation of the monitoring data. Consultation of scientific experts as well as the literature was considered sufficient to produce the necessary knowledge and answers. While trying to build bridges towards policy interpretation the limitations of an exclusively scientific endeavour became clear. Setting policy priorities when also other than (medical and environmental) scientific factors had to be taken into account proved to be problematic. The social scientists introduced other relevant assessment criteria (e.g. social preferences, feasibility of policy measures) and proposed the formation of a stakeholder jury that would judge relevant data and knowledge from a broader perspective in order to give advice to the government. The government will make a decision informed by both expert and jury advice. Furthermore the need for development of a procedure 'from data-interpretation to decision making' proved to be useful. In 2007 the action plan was used in practice in order to give advice on priority setting for the ministers of environment and health, based on the human biomonitoring results. We used a multi criteria analysis method for structuring information and discussion. We will especially focus on how the method was designed, used and adapted in the inter- and transdisciplinary practice.

1.2.2: STS and the Study of Politics, II

Risk Research between Scientific Research and Political Agency

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The societal governance of risks posed by emerging technologies, such as the possible ecological risks of agrobiotechnology or the possible health risks of mobile communication technology, is based upon diverse consultatory, deliberative and decision making processes. These refer to scientific data produced within risk research, to different kinds of (expert and lay) opinions expressed publicly, as well as to various risk management approaches and existing tools of risk regulation. The planned presentation aims at concentrating on the specific interplay of science and policy. It starts from three main observations:

1. Scientific fields of research are characterised by distinct epistemic cultures, including the production of specific kinds of certainty and the control of specific aspects of truth claims (while others are neglected). Basic research scientists are experts for the production and evaluation of scientific knowledge in the specific context of their fields' epistemic settings.
2. When contributing to societal risk assessment programmes, scientists often transcend these contexts of expertise. The normal, field related, scientific expertise is extrapolated to extra-field, trans-scientific questions.
3. Political actors refer to scientific expertise and scientific experts in a selective way. Not all experts are always heard and not all disciplines are always included in the deliberative and decision making process.

In this way, to pursue a certain policy is rendered possible while at the same time basing one's arguments in and through factual grounds. In the scientific realm it is also possible to be at the same time objective and political, in a certain - but probably different - sense of these terms. The combination of the three aspects - plural epistemologies, imperfect translations and selective reference - within multidisciplinary, trans-scientific risk assessment programmes is drawn upon to explain the emergence of science-based controversies about 'objective' risks. These controversies are particularly interesting because they contribute to a politicization of the science-based debate. Moreover, the threefold observational scheme is applied to investigate the interaction between the world of facts and the world of interests, between the production of knowledge and the pursuit of political agendas. The empirical analysis draws upon recent research programmes on the risk and safety of agrobiotechnology and mobile communication technology in Germany. Within this local, politicised context the different epistemic approaches are strategically taken up to strengthen individual positions. Different risk management approaches (precaution based vs. evidence based), boundaries between science and non-science (evidence vs. non-evidence), and rankings of weak and strong evidence (soft science vs. hard science) are challenged throughout the debate. Stalemate situations arise. The boundary between 'the scientific' and 'the political' is called into question as is the functionality and quality assurance of both societal subsystems. Further conceptual refinement concerning both 'the scientific' and 'the political' - as addressed in this session - might help to distinguish between different meanings and aspects of both terms, and might finally help to sharpen the analytical picture and to contribute to a more constructive deliberative situation.

1.2.2: STS and the Study of Politics, II

Explaining Deficiencies in Boundary Management in the Global Desertification Regime

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The boundary organization model provides an excellent portrait of the ideal arrangements for securing effective science-policy communication. However, it possesses various limitations, including having a restricted view of boundary arrangements and institutions, minimizing differences within the science and policy domains, neglecting other stakeholders, and being limited in its treatment of power. It is also unable to explain why some of the ideal features of boundary organizations are not always realized in practice, as the Conference of the Parties of the UN Convention to Combat Desertification has long implicitly acknowledged is the case with the global desertification regime. This paper proposes a new Knowledge-Action Framework which can explain this and can overcome recognized deficiencies in the boundary organization model. It expands the scope of the institutionalized spaces of boundary organizations to encompass the exercise of power in the political space of multi-level governance, and explicitly treats the construction of knowledge by a wide range of stakeholders and scientific disciplines and the institutions devised to implement policy based on this knowledge. The framework is applied to shed light on the reasons for science-policy communication deficiencies in the global desertification regime, which include the fact that only some of the institutions needed to match the ideal features of boundary organizations have been installed by the parties to the regime. The framework is consistent with the continuing evolution in the STS literature, highlights the importance of applicability at international level and compatibility with new governance structures, and also provides insights into why reliable knowledge is so difficult to obtain on 'post-normal' phenomena such as desertification.

Race, Climate, and Economics: What Place for Science Studies?

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Taking a comparative and historical perspective we pose ourselves the empirical question what role science and politics have played in some prominent cases. Our selection of cases includes two cases from the early 20th century (race science and Keynesianism) and two cases from the late 20th century (ozone layer protection and climate change). We then try to conceptualize the findings.

Empirically, race science and Keynesian economics were policy relevant theories and bodies of research from the 1920s onwards. Race science had been established as a reputable academic discipline in many western countries and came to be used as a tool and legitimation basis for the Holocaust. Keynes proposed an economic policy to help solving problems of the crisis ridden British economy. These fell initially on deaf ears but became dominant after World War II. Ozone politics was advanced by a small group of advocate scientists in the 1970s who succeeded to alert the word public about an imminent global

1.2.2: STS and the Study of Politics, II

ecological catastrophe. Basic institutional features of the science/policy interaction were repeated in the case of climate change (after 1988), so far with varying results. While the political success in ozone politics is widely celebrated, climate change politics seems to be in a mess.

Theoretically, we pose the question what role knowledge played in the development of related policies, and what role politics played in the development of knowledge, drawing on hypotheses relating to a) professional consensus (Haas 1992; Gormley 2007), b) political instrumentalisation of science (Collingridge & Reeves 1980) and c) hybridization (Latour 1987).

1.2.3: Modern Doctors

Deciding on the Reasonableness of Interlocutors in the Modern Medical Encounter: the Case of Patient Incompetence

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The ethical maxim that doctors will strive to do what is best for the patient has been one of the strongest and most enduring commitments of medical culture to date. In modern North American medicine, this ethical commitment has come to mean that doctors need to accept the participation of patients in the making of decisions concerning their health. This participation is protected by health care consent legislation that ensures patients are given the opportunity to decide, based on information given by their doctors and on their own values and preferences, whether a certain course of treatment is appropriate for them ("no treatment without consent", says the law in Ontario).

Today, this partnership between doctors and patients is presented as progress (which it certainly is) since it is the product of much struggle over the last few decades that sought to eliminate the paternalism with which doctors excluded patients from decision making. The ethos of today's medicine seems to establish the ideal that the doctor-patient relationship should not be a monologue performed by physicians. Instead, it should be a conversation in which the patient is a valid interlocutor -someone to speak with and not at. Like any other conversation, however, the exchanges taking place between doctors and patients under the auspices of this ethical mandate are subject, as shown by ethnomethodology and conversation analysis, to rules governing the terms of involvement of the interlocutors. The patients' new role comes with rights, but also obligations -fundamentally, that of being seen as 'reasonable' by their medical interlocutor.

In Canada and the United States, the ultimate standard (beyond doctors' complaints of patient non-compliance) used to determine patient reasonability is the legally enforceable notion of 'patient incompetence'. This is a label used when doctors have reason to believe that patients are unable to understand information that is relevant to making health care decisions and the consequences of making or not making a given decision. A patient deemed incompetent is assigned a surrogate decision maker, which secures in medicine's view the reasonable character of the exchange between patient and doctor.

This paper reveals the process of institutionalization of the standard of interlocutor reasonableness in medical exchanges in Ontario by analyzing the three laws governing the issue of consent (Health Care Consent Act, Substitute Decisions Act and Mental Health Act) as well as the legislative debates leading up to their adoption. The paper also concentrates on the analysis of recent Consent and Capacity Board cases, which reviews findings of incompetence at the request of patients. While acknowledging the good in the contemporary move to include the patient as an agent in the medical encounter, this paper's main task is to rediscover the patient-interlocutor as a fundamentally social actor who needs to face up to the constraints imposed by the relationship in which she has fought hard to be included - since being a participant also involves the risk of exclusion.

1.2.3: Modern Doctors

An Empirical Examiniation of
Physician-Led Accountability for Performance Measurement:
the Wisconsin Collaborative for Healthcare Quality

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Despite publication, practice guidelines, continuing education, payment incentives, and regulation, intended to bring medical practice into closer alignment with medical science, the U.S. Institute of Medicine (IOM) reported in 2003 that there were serious deficiencies in the quality of care in America including the failure to systematically incorporate new science and best practices. Difficulties underlying the "quality chasm" identified by the IOM derive in part from divergent perspectives of those informed by evidence achieved scientifically and those whose reference point is clinical care. The National Institutes of Health's (NIH) recent resource deployment to the development of a "translational science" is a recent recognition of the failure of strategies to date.

There are two basic models for addressing gaps between evidence-derived standards and practice. Most strategies that have been used in the USA rely on "extrinsic" regulatory and market approaches. Currently prominent examples are 'pay-for-performance' and 'consumer driven health care' where attempts are made to measure and reward (or punish) adherence to best practices. They have received a largely negative reaction with clinical practitioners describing them as intrusive and burdensome, inaccurate and unhelpful to practice improvement. An alternative model seeks reform from within using professional leadership and collaborative strategies to energize and assist professional reform. This paper looks at one example: the Wisconsin Collaborative for Healthcare Quality (WCHQ). Operating as a professional collaboration, under physician leadership, it has achieved a number of goals that have heretofore proven elusive including voluntary reporting of performance data and accountability for change. Founded in 2003 by chief executives of several large multi-specialty medical practices and their partner hospitals. WCHQ currently reports data for over 50% of Wisconsin primary care physicians.

The case study relies on personal interviews conducted by the author with persons involved with WCHQ including 31 with the chief executives who head the organizations that form WCHQ's membership. Interviews were audio-taped, coded, and analyzed using the techniques of grounded theory to identify essential elements and present them as a coherent theory. Important elements that are described include the state wide coordination of multi-tier collaborative networks composed of professional peers including executives, quality-measurement professionals, clinical physicians and others. These participate in both the development of performance measures and the identification of change strategies. Collaboratively developed measures incorporate local diversity, provide local benchmarking, and encourage collaborative identification of actionable solutions to observed deficiencies. Local autonomy is preserved as regards selection and implementation of solutions. Overall, the model achieves a corporate (state) level of medical accountability for performance transparency and professional leadership in change.

1.2.3: Modern Doctors

Accreditation Systems meet Clinical Practice

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Standards and classifications as part of accreditation systems seem to be a future means for governance in health care. Accreditation systems representing a TQM-model rationality are aimed at changing the culture in the hospitals, making everybody 'think of good quality' in their practice, including clinical practice. Studying introduction to hospitals of an accreditation system in a STS-perspective can lead to considering the system as a mediator of knowledge of good quality, a (powerful) constructor of order and a more or less visible boundary object and working infrastructure.

This paper adresses the outcome of a praxiographic study in clinical practice in seven danish hospital wards. Change in clinical practice due to implementation of an accreditation system aimed at improving quality in health care is investigated through field studies with an enactment approach. The outcome of this praxiographi is reported and analysed in an infrareflexive way of understanding the interaction between reseracher and actors in the field. Implementation of the accreditation system in hospitals is discussed as a meeting or an enlargement of rhizome networks between two spheres, the medical professions and the standards for good quality. The paper will demonstrate the development of the model used for construction of the description of practice, and it will include a number of snap shot stories, aimed at illustrating clinical practice and the outcome of development of an analytical view as practice considering materiality as an always present component.

It is argued that an accreditation system is equivalent with standard and classification systems, where the dominating characteristica among others are knowledge, order or ordering and infrastructure. These features are, due to grounded theory inspired developed dominating features in the empirical field, chosen as analytic devices for the construction of the stories from the field - stories focusing on the development of new connections in the rhizome network of activities being the clinical practice, when professional systems meet accreditation systems. The keywords are organizing, rhizome networks and multiplicity, and differences in ordering as key points in organizational studies of change.

Contribution to the STS literature is within the fields of Organizational analysis, and Pragmatism. The study refers to discussions in STS-communities interested in subjects on representation of practice with a rhizome network approach.

Agency, Measurement and Governance

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Performance, it is claimed, can not be easily controlled by measurements as many performances are invisible, unintended or contradictory. In this paper we critically research the strategies for dealing with measurement in complex environments. While most studies

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about performance measurements focus on the management of public service organizations, referring to literature of public administration, we will focus more on the measurement itself, using the literature from (STS) science and technology studies.

The structure of this paper is as follows. In section 2 we discuss the contribution of STS to understand the use of performance data. In section 3 we introduce our case -the use of prescription data to measure performance- in the context of new forms of governance and the 'transformed' relations between the state and insurers, GP's and pharmacist in the Netherlands. In section 4 we analyze the development and use of prescription data. In section 5 we will conclude about how simple measurements could enable monitoring, steering and learning in complex networks.

In the Netherlands, which is developing slowly to a more market oriented system, the insurer became an important sponsor - to stimulate quality improvements and efficiency. The new role of insurers is accompanied with a growth of auditing practices. Insurance companies encourage general practitioners to analyze prescription data and to set certain targets.

The STS perspective is helpful to understand the use of performance data. First, it explains the need for simple inscriptions. Measures, we demonstrate, are powerful because most relations in the network of pharmaceuticals are excluded. Only the relation between the physician, the protocols and the pharmaceutical are included.

Secondly, a STS-approach gives another perspective on representing. The main quality of a measurement is not to be objective, but the possibility of going from one type of measurement to the other. Our research showed that going back to your 'original' data, e.g. patient dossiers, is a very important step in the use of databases in FTO groups. It links the targets that were set in the local GP-group to decisions in the clinic.

To conclude, performance can be controlled by simple measurements. We do not need indicators that reflect the complexity and variety of measured subjects. Instead we need the possibility to travel from the setting that is controlled (the local GP-group) to the setting where decisions are made (the individual GP with a specific patient prescribing a drug in a specific situation). If we want to involve the stakeholders in the process of measurement, which is often suggested, we don't only have to take attention to forward processes (the construction process of making numbers), but also to backward processes (the interpretation of numbers and looking back to the documents or data on which the number is based).

1.2.4: Perspectives on Hydrogen: What to Expect?

Arenas of Expectations for Hydrogen Technologies

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The technological expectations framework (Van Lente 1993, Borup et al 2006) aims at clarifying the role of expectations as driver of technological development. In the development of hydrogen technologies, however, the situation seems to be more complicated as expectations of one component cannot be set apart from expectations of other components and the hydrogen system as a whole. Furthermore, expectations from elsewhere come into play as well. In order to achieve a mandate for their work, involved actors have to deal with all of these different, sometimes conflicting, expectations already 'out there'. In order to address this 'battle of expectations' we will explore in this paper - theoretically and empirically - the notion of arenas of expectations. These arenas can be defined as the social, cultural and cognitive loci in which competing expectations and promises are articulated, assessed and rated. The notion extends the analysis of Garud and Ahlstrom (1997)of the negotiations between 'enactors' of a technological option and 'selectors' who need to choose between different options. Examples of arenas of expectations are scientific journals, conferences, foresight and vision reports and the wider media.

In a case study of metal hydrides research (a means of storing hydrogen in solid materials) we show how scientists involved have to maintain expectations in four different arenas. Our findings are based on a 6 month study of documents, interviews and participant observation. We will discuss how expectations of competing technological options and routes are brought forward by their proponents. We will also analyse how in arenas others frame and assess the claims, and how this modifies the expectations and promises. This continuous process of feeding and assessing expectations in arenas results in a number of robust expectations, held by almost all actors without much contestation, and a number of more diverging expectations that are shared by far less actors. While robust expectations grant their proponents a mandate for further work, other routes for technological development become harder to negotiate as well. In a final section we will argue that the concept of arenas is especially useful to address:

a. different levels at which expectations are at work;
b. the negotiations, also in terms of expectations, between enactors and selectors;
c. the historical accumulation of expectations and their assessment.

A Technological Innovation Systems Approach to the Development of Hydrogen and Fuell Cell Technology

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Despite its wide use among researchers, the innovation systems approach is often criticised for being theoretically underdeveloped. This article aims to contribute to the conceptual and methodical basis of the innovation systems approach. It does so by applying it to the

1.2.4: Perspectives on Hydrogen: What to Expect?

development of hydrogen and fuel cell technology (HFC) in the Netherlands. We particularly expand on the technological innovation systems and system functions literature by employing a method of 'event history analysis'. This alteration makes it possible to evaluate dynamics, especially relevant when studying a 'fluid' technology such as HFC.

The technological innovation systems (TIS) approach was developed by among others Carlsson, Stankiewicz, Jacobsson and Bergek. According to this literature a TIS is a social network, constituted by actors and institutions, that is to be constructed around a specific technology. The basic idea is that emerging technologies have to pass through a so-called formative stage before they can be subjected to a market environment. During the formative stage many processes unfold that, positively or negatively, influence technology diffusion. The build-up, or break-down, of these processes is conceptualised as the fulfilment of a set of seven system functions. Examples are entrepreneurial activities, knowledge development, market formation, and resource mobilisation.

Our main contribution is the application of an 'event history analysis' that combines narrative building with a mapping of key events based on bibliometric data. By mapping events, interactions between system functions and their development over time can be analysed systematically.

Interaction between system functions may result in the unfolding of a virtuous circle, a pattern of cumulative causation, that will in the ideal case result in the TIS to expand its influence, thereby propelling the emerging technology towards a stage of market diffusion.

As an illustration of this approach, we construct a narrative picturing the development of the HFC TIS in the Netherlands as it evolved from 1980 to 2006. We point out how this HFC TIS succeeded in fulfilling these system functions over time. Based on the identification of key events we identify three forms of cumulative causation: two government driven and one driven by entrepreneurs and proto-markets. Related to this we indicate technological and institutional drivers and barriers of cumulative causation. The influence of national government policies, but also that of entrepreneurial strategies on these dynamics will be highlighted, resulting in valuable lessons for the future. We end with a discussion of the added value of our approach.

Forever Yours?
Strategic Dilemmas of Norwegian Hydrogen Research.

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Proponents of a hydrogen economy portray hydrogen as one of the most promising energy carriers for the future. Still, even those most enthusiastic regarding the hydrogen path recognise that there is still much to be done to move from possibility to reality. Scientists play important parts in this translation from idea to a future hydrogen energy network.

Norwegian hydrogen research is faced with the strategic dilemma of allying with the new renewable energy research community or aligning with the economically important oil and gas sector. Depending on what they choose, researchers can either contribute to building a

1.2.4: Perspectives on Hydrogen: What to Expect?

vision of a sustainable hydrogen future or give credibility to the seemingly more realistic vision of fossil fuel solutions with carbon capture and storage. The consequences of the possible choices - and that avoiding the choice still is a choice of sorts - were highlighted with the process leading to a unified research strategy for renewable energy in Norway, a strategy in which hydrogen is assigned a very minor role. At the same time hydrogen research and development is not achieving funding in accordance with the ambitions set. This raises the question of what now for Norwegian hydrogen research - should expectations be adjusted, or is it simply a question of finding the right allies? How committed are the researchers to hydrogen as a field - will they keep trying to get funding for hydrogen projects or will some simply move on to other subjects?

In this paper I am trying to address the dilemma and the different choices made based on interviews with Norwegian hydrogen researchers, policy makers and other Norwegian hydrogen actors, and through looking at the newly finished renewable energy research strategy process. Drawing on actor-network theory I argue that these challenges should be understood not just as acts of attachments and re-assembly, but also as de-assembly. If hydrogen and new renewable technologies are to succeed, they need to be considered to work but also actually replacing existing petro-based machineries.

New Perspectives on Fuel Cell Vehicles and Decentralised Electricity

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The so-called hydrogen society, hydrogen as the future energy carrier and using fuel cells for a range of applications to produce heat and electricity are widely debated and studied. It is expected that using hydrogen and the hydrogen society may contribute considerable to sustainability, but requires a radical transformation of society, technology and economy through what is being called transitions and system innovations towards sustainability. Hydrogen is for instance an important topic in both the transition towards sustainable energy supply, as well as to the transition to sustainable mobility. However, these transitions are hardly considered together, whereas this could lead to considerable synergy and efficiency, as well as increased potential for achieving sustainability goals. Bringing the issues of both sustainable mobility and sustainable electricity and heating together through visions, socio-technical scenarios, backcasting and looking into expectations is the main focus of this paper. Briefly, the present utilization of car powertrains is on average only about 5%. In effect 95% of the time this high-tech product is standing idle at a parking lot. This highly inefficient use of capital investments offers of large potential for improvement in several ways. The idea to use hybrid and electric fuel-cell vehicles (FCV) as distributed power generators coupled to the electricity grid and possibly to a hydrogen grid as well, offers some very interesting advantages.

Two visions were developed that were input to backcasting analysis and generation of sociotechnical scenarios. In the first vision, the FCV's are used to buffer surplus power from large scale renewable energy sources (when available in the future) by storage in batteries and using a reversible fuel cell that will charge the hydrogen storage devices on board the FCV's. In the second vision, the FCV's will fully supply the electricity demand (in the

1.2.4: Perspectives on Hydrogen: What to Expect?

Netherlands) making central power plants obsolete. A fraction of the FCV's can be connected to a hydrogen grid for continuous supply of hydrogen. Both visions have been elaborated, were used for a backcasting analysis to get an idea of how technology should change as well as ofsocietal implications dealing with expectations and opinions.

1.2.5: Materialities of Learning, II

Developing an Educational Information Infrastructure:
the Technopedagogy of Learning Objects

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In distance education there has been increasing efforts to find a common standardized information infrastructure for the exchange of educational material. The aim is to allow the reuse of educational material between different systems, educational institutions, and courses, and to lower the course development costs by allowing the development of significant economies of scale. This paper uses qualitative document analysis to scrutinize the values and logics inscribed into educational information infrastructure standards; how values of reusability and economies of scale as well as ideals of technical modularization shape the development of educational infrastructure, and consequently pedagogic practice.

The point of departure for this paper is that all infrastructure is political (Callon, 1991; Star & Ruhleder, 1996; Hanseth & Monteiro, 1996; Bowker, 1998; Bowker & Star, 1999; Galis, 2006) and a crucial aspect of educational practice; infrastructures bring to the educational situation pedagogic ideals and values, just like the configuration of the classroom architecture or the ordering of seats in a classroom reflect an idea of 'The Good Learning Environment' (Walkerdine, 1984; Rose, 1989). To stress this co-productive relationship between technology and pedagogic practice the paper draws on the concept of technopedagogy (Lee, 2008).

An overriding concern is to problematize how the efforts to lower course development costs through economies of scale has led to the development of a standardized infrastructure in distance education, and how the technical influences of object oriented programming has created an atomistic epistemology and pedagogy. Furthermore, the paper asks if the developing information infrastructure for educational software runs the risk of homogenizing educational practice through standardization, and consequently, to propagate a westernized, instrumental view of education as well as an atomistic view of knowledge closely connected to production and job training. The paper shows how technologies for reusability become technologies of teaching.

Educational Technology & the Shaping of a
New Pedagogical Regime

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In the heyday of educational technology in Sweden during the 1960s and 70s, there were efforts to construct educational systems that at the same time were to rationalize teaching and bring better pedagogy. Two experimental but full-scale systems were constructed. One consisted of pre-produced lessons mediated via television sets in the classrooms for a technical university. The other consisted of courses in mathematics for grade 7-9, where

1.2.5: Materialities of Learning, II

pupils worked individually in large classes with up to 60 pupils

There were pedagogical as well as economical motives for the educational systems, and belief in technological solutions for pedagogical problems was evident. The two experiments were embedded in a discourse on educational technology, inspired by Skinner and behaviourism, which impregnated university and school authorities. The introduction into Sweden of educational technology comprised both an attempt to industrialize and to individualize.

In this movement a magazine was established, Undervisningsteknologi (Educational Technology). As a leader and propagator for educational technology, we will use this magazine to mirror the co-production of technology with education in educational technology. We treat these experiments and this magazine as components of an attempt to establish a new pedagogical regime as means of building the future, and we will analyse this as the shaping of a technopedagogical system (Cf. Lee, 2008). In addition, we will see how the picture of the student is constructed to fit in with this regime. This means bringing the question of pedagogy into the same analysis as technical artefacts (television, IT) and a socio-technical system (educational technology).

The method used is a close reading and analysis of all editions of the magazine, which was published 1966-69 and 1974-77. We will search for components in this technopedagogical system; students, actors, institutions, technology, artefacts and statements. Instead of studying the practice in classrooms, we are studying the discursive tracks of the practice and of the attempts to reconstruct pedagogical practice. The analysis thus will focus on how different components of the systems are described: Which roles and functions are assigned to technology? Which are the expectations relating to rationalisation and to pedagogy.

We will sum up with a discussion on how beliefs from this time correspond with present-day web based education and tendencies of industrialization and individualization at the same time. The question is whether educational technology at this time in Sweden was about to be established as a new pedagogical regime. And whether pedagogical and technological components of this regime can be found in present-day pedagogical debate.

The Golem Goes to School: Praising Science with Uncertainty and Criticism

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This paper is prompted by projects 'acting with' science inasmuch as they aim to assimilate STS education into traditional school-science lessons (e.g. the work of Robin Millar). I aim to challenge assumptions that STS education cannot work alongside scientific training, especially Collins' (2000) contention that STS may help the 'Public', but damages the would-be scientist. Projects combining science with STS in schools face a verity of operational and cultural challenges (see, for example Osborne et al, 2002), but appearing paradoxical need not be one of them.

1.2.5: Materialities of Learning, II

This paper considers a set of science products for children from the UK: one commercial (the Horrible Science books, toys and magazines), one literary (Russell Stannard's Uncle Albert stories), and one pedagogical (Joan Solomon's Science Web Reader textbooks). These texts vary greatly in their expressed relationships with the scientific community and assume different class and educational relationships with their readers. Horrible Science adopts the voice of an anarchic child (as Buckingham, 1995, describes, 'adults in drag'), and is overtly an outsider from both school settings and the scientific community. Stannard, in comparison, is a professional scientist, taking a more traditional 'friendly paternalist' tone of children's literature. The Web Reader texts books, produced largely for classroom use, are written by a variety of educationalists, all devotees of STS education for young people. From these examples, I argue that behind explicitly STS discourse can sit quite 'scientistic' attitudes, and vice versa. For example, the idea that today's science might be wrong is in several of these texts, a tool for inspiring young people to think they can have an active, creative role in science of the future. Uncertainty is mobilised as a means for recruiting young people into scientific careers. With Horrible Science in particular, we see an explicitly irreverent attitude towards heroes of the scientific community. However, I argue this irreverence is largely rhetorical. Contrary to Solomon's (2002) suggestion that a focus on the lives of scientists contextualizes knowledge and so makes it easier for students to raise their own opinions in response, Horrible Science's depiction of smelly, spotty, anti-social, arrogant and, above all, expressly 'stupid' scientists actually underlines a notion of distinct and special genius to be revered at kept at arm's length.

In conclusion, this paper argues against 'science vs STS' structures when thinking about ideas held by people outside these communities, especially when it comes to children. Following Locke's (1999) 'from deficit to dilemma' approach, and emphasising that children are an uncertainly-futured group in respects to professional communities; neither scientist nor 'Other'. The assimilation of STS into school-science demands a reflexive approach to 'acting with' science; one which notes empire-building on the part of sociologists and historians as much as it spots hegemony of the scientific community. It further challenges us to reconsider what we hope for in public-led communication and if (or how) stories from the social studies of science can help us achieve such aims.

1.2.6: Regulatory Dynamics of Therapeutic Technologies in the European Union, II

Regulation of Innovative Pharmaceuticals in EU and US

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This paper provides a comparative analysis of how innovative pharmaceuticals are regulated in the EU and the US since the early 1990s - specifically since the 1992 Prescription Drug Users Fees Act (PDUFA) in the US and since the establishment of the European Medicines Evaluation Agency and the supranational EU regulation in 1995 in Europe.

The first part of the paper considers how the two regulatory systems treat the concept of 'innovative pharmaceuticals' and raises concerns about the clarity and meaning of innovations in these contexts. The second turns to some of the regulatory dynamics that have followed from understandings of innovative pharmaceuticals on both sides of the Atlantic. In particular, the adoption of particular types of accelerated approval mechanisms will be examined.

There is a drive to produce and approve drugs quickly in the European marketplace. Such processes are frequently influenced by international and even global considerations. The conditions under which innovative pharmaceuticals are adopted, together with their implications for patients, public health and the pharmaceutical industry will be scrutinised in the discussion. For example, the use of surrogate measures of drug efficacy and the increasing role of post-market confirmatory efficacy studies will be discussed as examples of the dynamic shift in the relationship between the scientific knowledge-base and regulatory standards. Often regulation and innovation are discussed in terms of the impact of regulation on innovation, but in a reversal of this formulation here the conceptualisation of innovation and the expectations about innovation are re-shaping regulatory systems. The paper shows how this analysis applies in the case of the US and EU regulatory regimes.

Ethical Concerns, Public Health Risks and the Need for Innovation: the Politics of EU Regulation of Blood and Blood Products

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The creation of a new Community competence under Article 152(4)(a) EC to adopt measures in relation to human substances, organs and blood and blood products has resulted in a series of policy and regulatory initiatives in recent years in each of the areas.

This paper focuses on a case study of such initiatives in relation to blood and blood products. The initial catalyst for the creation of Article 152(4)(a) EC was the political fall-out from HIV blood contamination scandals in various Member States. Although wary of ceding competence in health-related areas, Member States saw the added value of EU action in the area, which would also serve to restore political credibility and public trust in the wake of such scandals. Regulatory initiatives in the area have proved to be fraught with conflict amongst stakeholders and EU institutions, however, as ethical and risk-based concerns

about the donation of blood as a 'gift' have confronted the reality of widespread commercial operations of multinational pharmaceutical companies responding to consumer demand for blood products throughout the EU. In the face of such conflict, EU decision-makers were forced to seek political compromises that attempted to assuage such concerns whilst at the same time allowed such companies to respond to market demand, as well as innovate in circumstances where Member States had neither the political will nor the financial resources to do so. The need to achieve political compromise at EU level, however, has resulted in the adoption of regulatory initiatives in the area that fall short of adequately addressing either ethical concerns or likely future health risks. This has been compounded by the fact that the legal competence to take action is too limited in scope to address the complexity created by the interface between ethics, risk and innovation, a problem which is becoming increasingly apparent in more recent policy and regulatory initiatives in the complementary areas of tissues/cells and organs.

Resisting Regulatory Pharmaceuticalisation:
Pathways for Tissue Engineered Technologies Across the
Drug and Device Regimes of the EU

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Regulatory regime-building is a politically negotiated part of the innovation process of new technologies. It can define the parameters and rules of engagement in new technological zones and support technological innovation, as well as setting standards, introducing controls and creating accountabilities. Human tissues and cells as donatable, productive materials, and tissue engineering (TE), as an innovative mode of producing therapies, have been the object of attempts at regulatory regime-building in Europe since the late 1990s. As a quasi-sector, TE has been beset by multiple uncertainties and instability since its inauguration. The latest regulatory development, the Regulation on Advanced Therapy Medicinal Products, expands the legal scope of the pharmaceutical jurisdiction to cover tissue engineering as 'unconventional medicine'. Alongside this a number of regulatory institutional and evidential innovations have been devised. Parallel revisions to the EU Medical Device Directives were salient in the regime-building process.

This paper outlines the regulatory pathway taken by TE to date, and shows how the eventual pharmaceutical designation hides contentious debates such as those about the substantive definition of TE, its modes of production, tissue bank/hospital/industry relationships, the position of the medical device sector and its products, and the appropriate type and institutional form of regulatory controls for authorising products to enter the market and their subsequent surveillance in practice. It is shown that the material 'characteristics of the product' has been the site for many inter-sectoral and inter-stakeholder conflicts in the shaping of new regulation. In spite of the aim of providing 'legal certainty', it is shown that the new regime itself has strategically built-in scope for future 'technical' developments in the sector, and that many stakeholders will continue to contest the regulatory environment in this field. The paper will comment on the implications for the construction of variously framed risks and benefits in relation to assessment of safety, efficacy and industrial competitiveness.

1.2.6: Regulatory Dynamics of Therapeutic Technologies in the European Union, II

Regulation and Functional Food Innovations

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There is a growing interest in the benefits of functional foods promoting health and reducing the risk of illness, within the food industry, amongst health care professionals and in society.

The European Commission (2000) defines a food functional 'if it is satisfactorily demonstrated to effect beneficially one or more target functions in the body, beyond adequate nutritional effects, in a way that is relevant to either an improved state of health and well-being and/or reduction of risk of disease.' EU regulation governing emerging functional food innovations is not always clear and uniform at present, which may impede or even block the innovation process. This paper assesses the current regulatory framework of functional foods at the European level and its impact on the functional food innovation process, and gives starting points for the improvement of the food regulatory process.

The paper combines concepts from the field of STIS and regulatory studies to provide a better understanding of regulatory dynamics of emerging technological innovations. The innovation process of functional foods increasingly is perceived as a collective effort of a variety of public and private actors within the context of a (food) innovation system (IS), being a network of institutions in public and private sectors, whose activities and interconnections initiate, import and diffuse new technologies. There is overarching legislation applying to all kinds of foods. This paper focuses specifically on the government in its role as regulator. At EU level, the European Food Safety Authority (EFSA) is in charge of food regulation, and is not only concerned with the assessment of food safety but increasingly in assessing health claims. Disease-specific functional claims on foods are now allowed if scientifically proven. The following research question is addressed: How does current EU regulation impact functional food innovation processes and how may regulation be adapted in order to improve these innovations from an economic as well as societal perspective?

The paper discusses case studies, focussing amongst others on the Novel Food Regulation, (applicable e.g. to Becel ProActiv, Benecol,Yakult), and identifies problems regarding current regulation and health claims. It is argued that food manufacturers would have to behave like drug manufacturers, as there is much more alignment between pharmaceutical research and regulation in terms of clinical trials, good manufacturing practice etc. The revision of food regulation is not just a health governance issue but also links up with ethical and market regulation issues.

1.2.7: Public Engagement with Science, II

Mediated Publics:
Acting in the 'Event Spaces' of the Stem Cell Debate

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The stem cell debate has been widely publicised by the media and involves a number of dominant voices: scientists, politicians, pro-life groups, religious bodies and patient groups. More fleetingly, diverse publics are referenced, usually as a homogeneous 'public', 'people' and occasionally as both named and anonymous individuals. However, publics are noted for their general absence from reportage of the debate, and consequently their rare presence in the media is both deliberate and hence significant. It raises questions such as: Who utilises publics and in what shape and form? When are constructed publics enlisted as actors in the stem cell debate? In which 'event spaces' of the debate are the public referenced? What purpose does this mobilisation serve in both the debate itself and how the media portrays it? How do virtual publics act upon and shape the geography of the news text itself?

Utilising media sources, this paper examines the extraction, manipulation and mobilisation of publics, repositioned as virtual objects in the 'event spaces' of the stem cell debate. Spatially, I compare examples from the UK, USA, New Zealand and South Korea, where 'the public', 'people' and 'residents' have been virtually reconstituted and utilised in Parliament, consultations, online fan groups, public spaces, medical treatment centres, 'the street' (via the vox pop) and media texts. Temporally, this analysis covers the time period from August 2000 to the beginning of 2006. Media coverage comes from 3 exemplary phases within the stem cell debate, which Kitzinger (2008) classified as: visionary promises, breakthroughs and landmarks, and setbacks and realignment.

Trusting Science

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In my paper I will explore the ways in which conceptualisations of trust from sociological theory might be used within STS. I will do this by first discussing the traditional way in which trust and knowledge have been divorced from one another (mainly within philosophy of science) and then by outlining how this traditional approach has been overturned by the sociology of scientific knowledge (for example in A Social History of Truth by Steven Shapin).

The bulk of my paper will be devoted to analysing the way in which sociological theory and its focus on 'interpersonal trust' as well as 'trust in abstract systems' might be used to expand our understanding and theorising of trust within science. These two types of trust have been discussed by Niklas Luhman in his various works (e.g. Trust and Power), by Barbara Misztal (Trust in Modern Societies), as well as by Anthony Giddens (Consequences of Modernity). The applicability of these concepts to science studies, as well as the theoretical insight they might provide, will be assessed.

1.2.7: Public Engagement with Science, II

However, there are also objections to paying attention to trust within science. It is said that increasing reliance on numbers and quantification, the peer review process and the possibility of replication in science make trust redundant within science. The conference paper will not only rebuff these claims but will also aim to explore how sociological thinking can aid the conceptualisation of trust within science.

Scientific Journal Publishing as Costly Signaling

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Many scientific researchers, university librarians, and academic policymakers have joined campaigns in recent years to reduce the costs of accessing scientific literature. Organizations such as the Scholarly Publishing and Academic Resources Coalition and the Public Library of Science have applied pressure on commercial publishers of scientific journals to lower subscription prices, establishing nonprofit journals and electronic archives that make scientific literature available at no charge. Campaigners have justified these initiatives by appeal to a simple model of scientific communication: the costs of disseminating findings among researchers should be kept to a minimum, since communication costs divert resources from primary research and constitute a drag on scientific progress.

I argue that this model is inadequate for an understanding of journal subscription prices. As research in science studies as far back as the 1970s established, scientific publishing has the function not only of disseminating findings, but also of providing a measure of the quality of researchers that can be used in allocating rewards. Drawing on costly signaling theory in evolutionary biology and economics, I argue that high journal subscription prices can be understood as a mechanism by which scientific publishing performs the latter function. By exerting pressure on library budgets, high journal subscription prices foster competition among journals: libraries are likely to subscribe only to the journals deemed most valuable. The availability of a costly journal in a library's collection thus serves as a tangible indicator of quality. Articles in such journals are therefore also indicators that their authors are high-quality researchers. If all journals were free, by contrast, differences in quality between them would be less apparent, as libraries would be able to subscribe to them all. This analysis of scientific publishing as costly signaling complicates our view of journal subscription prices: whereas I do not advocate that libraries should accept unreasonable prices, it is important to acknowledge that high communication costs play a functional role in the reward system of science.

The methodology is theoretical model building. This paper contributes to the STS literature by advancing a new model of scientific communication drawing on theories of costly signaling in evolutionary biology (animal communication) and economics (conspicuous consumption). It has policy relevance in adding qualifications to some current arguments that high journal subscription prices hinder scientific progress.

1.2.7: Public Engagement with Science, II

Agency, Everyday Life and Digitalised Television

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Television broadcasting was digitalised in two waves in Finland in August 2007 and March 2008. The change from analogous technology to digital one has stirred a fierce debate and opposition amongst the Finns. The top-down way of managing the change was not approved and also the endless technical problems with the devices necessary to watch the digital broadcasts have aroused irritation.

The digitalisation of the television in an interesting example of how an old technology that has been domesticated long ago " ran wild" again. When a technology is domesticated it intertwines with people's everyday life practices. At the same time those practices adapt and became part of the technology in question. In this negotiative process technology is intertwined with people's agency.

The concept of agency enables to capture people's ways of actions and experiences both in relation to societal and cultural as well as the level of everyday life (e.g. McNay 2003). I see the concept as a tool for understanding the practices with which people produce themselves (what people actually do to be who they are) in the context of surrounding culture and society. Furthermore, it gives room to the creative signifying practices and meanings people produce in those actions. (E.g. McNeil 2007.)

The research behind the presentation is based on autoethnography, which offers an excellent tool for connecting personal to cultural and social. The aim is to understand the general by researching the private and the individual. This is possible as person's life is not only unique, but also generaliseable: the personal is always connected to societal and cultural. (Ellis & Bochner 2000.)

In my presentation I will consider the questions aroused by the digitalisation of television. I will ponder my own experiences in relation to the concepts of domestication and agency, and ask: Why the digitalisation of the television has been so problematic in Finland? What happens when an old technology is suddenly turned into something different? How the change effects on one's everyday practices and agency?

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McNay, Lois (2003): Agency, Anticipation and Indeterminacy in Feminist Theory. Feminist Theory 2/2003.
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1.2.8: Learning in Health Care

Regime from the Inside-Out:
Learning in an Early Radical Innovation Project

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The last 15 years have seen STS- and evolutionary economics-originated innovation management approaches that are especially focused on helping sustainable and/or radical innovations to overcome the obduracy of the real-world sociotechnical contexts. Both STS-originated PROTEE and strategic niche management try to induce support that would better enable the radical project to succeed. The locus and means of learning are different in the two approaches: PROTEE coaches the innovators to cope within the "real-world" from the start, whereas strategic niche management arranges a larger network experiment, a niche, that jointly learns about the factors concerning transition in more overarching regime. Despite the differences, the approaches share a goal of better understanding the reasons of misfit, friction and opposition between the innovation and its context-to-be.

Our case study throws more light into the learning about this friction in the early stages of a radical innovation project. We show how the effects of the obdurate characteristics of the prevailing regime can be far from clear for the innovators, and only become obvious ex post. We propose that this is likely to be the case especially in regimes that are problematized to a lesser extent than the often analyzed regime of personal transport. Our case study in clinical diagnostics shows how the innovators gradually learn what the 'odd' reception of their new technical solutions means and learn to articulate the solutions as discontinuities with extant technological systems. Thereafter the new kind of couplings to organizational, market, scientific and institutional dimensions can slowly be constructed.

Our case analysis spans the forty year development of the TeleChemistry innovation from a tool of radioactive sample measurement into an internet-based clinical testing service concept that is claimed to be location-independent, faster, less costly and offering more reliable quality than the prevailing practise of clinical laboratories. The study combines document analysis of the personal archives of the main inventor, interviews of the participants of the innovation network and some individuals interacting with it, and participatory observation.

We argue that in the early stages of radical innovation the potential extent of learning concerning the relationship between the invention and its (techno-econo-institutional) contexts are intimately tied with and limited by the accumulating technical learning on both the inventive solution and its relationship to extant system architectures. Serious future-prospecting about the social dimensions of the innovation only becomes possible after the architecture of the innovation is advanced enough to sketch out prototypes, even as the make up of these prototypes would already benefit from anticipating the future context. Reaching this point may take several years after the first radical invention and, paradoxically, requires also significant learning about the future contexts.

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Learning Regulatory Science: the Example of the Integration of Good Laboratory Practices in French Biotechnology Firms

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While regulatory science is the object of an abundant literature, the concrete implementation of regulatory frameworks has yet to be extensively examined. However, this process of implementation can by no means be taken for granted. Company employees and directors have to learn how to master rules and norms with which they are initially unfamiliar, notably in the biotechnology sector, which, in terms of human resources, is substantially dependent on the academic world.

In order to analyse this learning process, we have examined the integration of Good Laboratory Practices (GLP) in SMEs active in the biotechnology industry. Such GLPs provide a framework for pre-clinical studies, the first phase in the production of new drugs. GLPs are based on principles elaborated by the OECD, principles that "provide a quality guarantee covering the organisation of non-clinical safety studies associated with health and the environment and the conditions in which such studies are planned, carried out, monitored, recorded, archived and diffused" (OECD, 1997, p. 14). Today, the respect of such norms is increasingly important for French biotechnology Sees, notably due to the pressure exerted by major drug companies. The learning phase of these norms is a period of negotiation and arbitration in which are revealed, notably, all kinds of tensions opposing academic and regulatory science, particularly in terms of issues surrounding the question of the autonomy of science as a practice. But it is also a period in which all the strategies that make it possible to reconcile divergent practices and interests are defined and organised. The aim of our study is to throw light on such strategies.

This study is primarily based on a series of semi-directive interviews, some of which were conducted with representatives of biotechnology firms or pharmaceutical companies. All the companies are located in the Paris region. We also interviewed representatives of some organisations involved in the field of biotechnology and biopharmacy in different ways, in particular the LEEM (Les Entreprises du Médicament), an association the members of which include the main French pharmaceutical companies (together responsible for 98.7% of the French medical market), and Medicen competitiveness cluster, which includes public and private biomedical and biotechnological R&D bodies involved in multi-partner projects.

Acting with Enterprise Resource Planning System - Unbracketing the Practicalities of the 'Package'

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Enterprise Resource Planning (ERP) system is a standard software package that has its developmental roots in manufacturing software and thus in the industry of manufacturing. As a contemporary commercial product, ERP systems are targeted at multiple industries and

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must be configured before they can be used. ERP purports to support all business functions of an enterprise, e.g. procurement, material management, logistics, financial accounting, asset management, controlling, strategic planning and quality management and especially ERP's ability to enable integration between the business' functional areas is a specific strength of ERP's. The main managerial argument for implementing an ERP system is control and counting which implicitly fits well in industries that survive on the demands of the market.

Healthcare is a relatively new actor in the ERP vendors' portfolio of supported industries and in recent years hospitals around the world have begun implementing ERP systems. Control and counting rely on vertical dataflows in the organisation, i.e. data produced in the functional units of an organisation are aggregated and used at a higher level - the managerial level. This might induce a tension if applied to clinical practice, where data produced in each speciality is documented in order to achieve horizontal coordination of patient trajectories.

Danish hospitals largely remain untouched by the ERP hype but the vendors have opened their eyes for a potential market and are increasingly getting into strategic partnerships that provide access to this new market. Therefore, these vendors are putting relatively huge effort in describing the corporative elements of healthcare provider organisations as an argument for why ERP's also fit to hospitals. A hospital is just another enterprise, they say.

This paper presents a study of an ERP vendors' organisation and how they have implemented their specific ERP system - an ERP package - at two European hospitals. The author has also conducted ethnographic fieldwork of clinical work in a neurosurgical department in a Danish University Hospital. The concern of this paper is to discuss how viewing healthcare as a corporization might stimulate rearrangements in the heterogeneous networks that make up the organisation of clinical practice. Also, the paper discussion what new relations emerge with the introduction of ERP as an actor and what aspects of healthcare become foregrounded - and which become backgrounded?

Acting with, as referred to in the title, points at the role ascribed to the author as an actor that relates ERP to Danish hospitals - how one enacts such a role will be the concluding remarks of the paper.

Organizing Knowing in Interdisciplinary MRI Practice
- on the Hybrid Configuration of Technology's Domestication

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This paper addresses organizational knowledge practices pertaining to the interdisciplinary work of Magnetic Resonance Imaging (MRI) at a hospital radiology department. The setting occasions an interesting venue for exploring domestication of MRI as it unfolds in distributed settings of collective practice, pertaining to the selection, examination and diagnosing of patient conditions. The processes cut across diverse domains of knowledge practices and interrelated competencies, at once simplified, yet, also complexified, through the sociomaterial practices of organizing (following Mol & Law, 1994). The displacement and tension in such hybrid configurations of knowing and organizing (Patriotta, 2003) are related

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to the realm of technology's domestication in a pluralistic performative context, grappling with the complexity, non-linearity and multi-vocality of its framing as it unfolds.

The ethnographically informed study engages particularly the practices of different occupational groups (radiographers, radiology nurses, clinicians and radiologists) as these are implicated in the imaging work and in relation to the radiology department's clinical surroundings. A broadened constellation of personnel were envisaged to deal with the department's appropriation of a new MRI scanner, occasioned by the replacement of an existing model. Work was reorganised to reflect this aspect in the practice protocols from early on, where personnel previously assigned only to other imaging modalities such as the department's CT-scan and X-ray machines, were to take on MRI scanning, on an albeit rotational basis. Opening up to a broader group of operators to the scanning practice was to allow for organizational flexibility and a broader basis for competence building among radiology staff, where different occupational groups familiar with the existing scanning practice were involved in the development and use of 'in-house' protocols for conducting the MRI examinations. The paper elaborates on how users and their knowledge practices were translated with respect to the MRI and in the (re)organization of work, facilitating, and yet, in tension with, efforts at organizational transformation - its occasioning(s), mediations and contingent effects.

The case study is based on direct observation and interviews, exploring and drawing upon the idea of different units of analysis as a methodological means to address the intricate, hybrid underpinnings of domestication in interdisciplinary practice. The implications this holds for the understanding of the co-constitution and enactments of organizing and knowing is also the paper's contribution to STS research. Here, actor-network theory and its non-dualistic stance prove fruitful in grappling with configuration and tensions in knowledge and practice without any resort to pre-defining users, interdisciplinary coordination, or knowledge, in some well-delimited sense. Rather, what comes to expression in the study's approach to domestication is the configuration of knowing and organizing as part and parcel of de-centred instances of occasioning and effects, coordinating, while also interfering with, collective engagements of practice both within as well as across departmental settings. Working (with) protocols, enacting them in their development and practice, as but one such site of study, embodies past negotiations and enter into the collective mediation of situated practice(s), rendering a multiplicity of objects as well as their situated contexts, mutually relevant to address.

1.2.9: Marketing or Market-Things

STS: a Marketing Perspective

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This paper argues that marketing plays a central and neglected role in the development and design of technology. Many companies adopt a marketing orientation, giving marketing a commanding role in the design and development of new artefacts; consequently it is marketers, rather than engineers, who steer innovations to successful launch. The first section of the paper critiques SCOT from a marketing perspective. Marketers plays an active role not only in configuring the 'relevant social groups' that SCOT takes for granted, but also in resolving 'interpretive flexibility' to produce common solutions that meet the different needs of these groups. It is misleading to treat relevant social groups as part of the context of technological development, because these groups are actively selected, shaped and even constructed during the marketing of innovation. SCOT recognizes that marketing activities can be designed to reduce the interpretative flexibility of technology, but such closure is not always desirable from a marketing perspective - artefactual diversity can be a source of supernormal profit. A marketing perspective also exposes SCOT's conflation of two different processes: stabilization of a technological category and the adoption of a name for the technology.

The second part of the paper focuses on ANT, noting similarities between the concepts of translation, enrolment, mobilization and marketing rhetoric. Marketing plays a key role in the formation and stabilization of new technological networks, not only because designers and engineers frequently work to marketing briefs, but also because marketing deliberately aims to translate, enrol and mobilize networks. ANT also illuminates marketing theory, elucidating two key marketing concepts, positioning and branding. The marketing concept of positioning can be understood in terms of translation, and the concept of branding can be understood in terms of 'black boxes' and the mobilization of a network. Marketers in marketing departments use inscriptions and artefacts to help them build brands in the making, but ready made brands gain their reality and equity from the networks they conscript. The paper is theoretical, but is grounded in the author's experience as a brand manager in marketing orientated companies such as Unilever and Cadbury, and as a lecturer in marketing. It also employs secondary research, facilitated by the Internet, to trace the influence of marketing on developing technology categories. The paper contributes to STS by revealing the important role of marketing activities in the development of technological artefacts, and in the shaping and naming of technological categories.

Why Use Plastic Crates?
Socio-Technical Alliances and the Integration of
Vineyards and Wineries in Argentine Wine Production.

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This paper forms part of the PhD research by Polly Maclaine Pont and is based on extensive field observations and in-depth interviews, source- and literature study. It is embedded in the

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research program on the production of knowledge-intensive technologies in Latin America, directed by dr. Hernán Thomas at the Instituto de Estudios Sociales de la Ciencia y la Tecnología of the Universidad Nacional de Quilmes, Argentina. The contribution of this paper to STS lays both in new insights in the empirical case and in new theoretical suggestions.

Through a framework based on the Social Construction of Technology (Bijker 1995; Pinch and Bijker, 1987), this paper sheds an alternative light on certain problems observed by the people involved in Argentine wine production. According to them, major changes have taken place over the past two decades due to a switch from high-quantity table wine to high-quality premium wine. Many technological improvements have been achieved in both wineries and vineyards. As premium wine makers profess that wine is made in the field, an important part of such improvement involves integrating vineyards into the production process. However, in Argentina traditionally grapes are bought from independent producers. Many winemakers and experts now complain that most of them are not willing to comply with the new standards for premium wine.

Premium wineries, for example, like to transport grapes in plastic crates. But why is this so and why would a producer take to their use? An analysis of the different key problems, solutions and preferred artifacts of several relevant social groups shows that the need for integrating vineyard and winery results from a need for enologists to control grape quality. This is shown to imply not only new artifacts, but also new social groups which gain relevance over others. Artifacts like the plastic crates embody these socio-technical alliances, which helps explain why social groups on the outside do not relate to them.

The analysis sheds more light on the complexity of the struggles between different social groups and the technologies and methods they hold high, affording new insights into why some attempts to integrate producers have been unsuccessful. Through a comparison with certain other harvesting practices, the case also shows that the alliances found have great variation and flexibility. This explains why the authors find it necessary to substitute the original SCOT term "technological frame" with "socio-technical alliances".

The Past Future of the Mobile Phone:
Consumer Microelectronics Market Forecasts in the 1980s

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In the early 1930s Erich Kästner described in his children's book "The 35th of May, or Conrad's Ride to the South Seas" an observation of a man using a mobile phone in the futuristic city called Elektropolis: A man suddenly takes out a phone handset from his coat, while on the street and calls his wife to tells her: "Listen Gertrud, I'll be late for lunch; about half an hour. I want to go to the laboratory. Goodbye darling." Then the man puts away his pocket phone and hurries away."

About 50 years later Kästner's literary vision of a portable mobile phone became reality, as handheld devices such as the Motorola DynaTAC 8000X were commercially released. It was about in that time when the European PTOs (Public Telecommunications Operators) began to plan their popular mobile phone networks and the topic of the "mass consumer mobile

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phone" drew the attention in telecommunications expertise. In Switzerland, a prominent study based on expert interviews and proportionate sampling statistics was published (Pro Telecom, 1985). Also the Swiss PTO began to forecast the mobile phone market participants for the coming 20 years.

The paper to be presented will focus on the construction of the future mobile phone markets and services in the 1980s. In a first part statistical market forecasts will be analyzed and compared to today's official telecommunications statistics. The categories and techniques of the forecasts and predictions are the topic of the second part; especially by comparison to "imaginations" of the future mobile phone by Erich Kästner or Gene Roddenberry, the question will be focused, whether they can be characterized as scientific or not. A third part addresses the anticipation of the digitalization of mobile phone technology in forecasts: Is the mobile phone already discussed as a computing and multimedia device?

Erich Kästner, Der 35. Mai oder Konrad reitet in die Südsee; Illustrations by Walter Trier, Berlin: 1932. A copy of Walter Trier's illustration of the scene cited can be found at: www.fsw.uzh.ch/pka/home/projects/gsm/trier_30s_mphone.jpg
Pro Telecom, Telekommunikation im Jahr 2000: Schlussbericht, Zurich 1985.

1.2.10: ICT Practices

Acting with IT Architects
- Reenacting IT Architecture in the Development of Standards and Classification Systems for the Healthcare Sector

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Standards and classification technologies play a central role in the current efforts of digitalizing the healthcare sector. In particular the Danish IT and Telecom Agency and the Danish Board of Health has initiated several standardization and classification initiatives some of which collectively are coined IT architecture (or related to this term). Architecture understood as a metaphor has been used through history for various purposes within various disciplines. In relation to the study and design practice of information technology the metaphor has played a dominant role in the way designers (IT designers, engineers, IT architects, etc.) think about and interact with these technologies. This is true both for the development and the utilization of IT artifacts. However, the metaphor is more than just a figurative way of speech. The language it proposes influence the way IT designers think about and construct information technologies. Therefore I suggest that we, instead, understand architecture as a multiple enactment within a heterogeneous group of actors in order for them to achieve some tangible comprehension of information technology.

The awareness of the socio-linguistic history of the architectural metaphor as a mean to describe IT artifacts are however at best vague among practitioners (and also among many scholars for that matter). Thus, the notion of architecture and its applicability to information technology is not put into question. In order to bring about a more reflective attitude towards 'Architecture' I suggest that we pay attention to the actual work practices of architects. That is, to move focus from architecture to that of architecturing.

Here I would like to emphasize the multiple understanding of architecture that such an approach brings forth; architecturing is understood as all the various ways that the architectural metaphor is enacted. In order to study this multiple enactment of 'architecture' in relation to health information technologies in Denmark a multiple qualitative case study with four different departures are suggested: The architectural office situated within the Danish IT and Telecom Agency, The organization for Continuous Digital Healthcare in Denmark and two case studies that take their point of departure in the actual treatment and care of patients within the Danish healthcare sector. The ambition of putting together these four different cases is not only to achieve a multiple understanding of how IT artifacts are enacted, but also to drive forth an understanding of how the standards and classification systems labeled 'architecture' (or is related to such work) has consequences for patients and healthcare professionals' lives and work practices. Put more bluntly; it is the ambition of this study to not only describe how some standards and classification initiatives affects real human beings lives, but also to suggest new ways to enact the architectural metaphor by critical investigate the actual work practice of IT architects.

1.2.10: ICT Practices

Robot Repertoires

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In January 2007 Bill Gates proclamed The Robotic Future.: "An office worker checks her home-gadget webpage from her work computer (Scientific American Jan 2007). The tasks she set for her home robots in the morning have all been completed: washing and ironing, vacuuming the lounge and mowing the lawn. She orders dinner from the kitchen chefbot - sushi today, using a recipe from a Japanese website - then checks her elderly mother's house. The companionbot has given mum her medicine and helped her out of bed and into a chair." Gates argues that the robotics industry is on the cusp of a big expansion. Not only Gates but also the Japanese Ministry of Economics, Trade and Industry (METI) foresees a flourishing future for robots. METI predicts a domestic market for robot technology of appr. 6000 billion yen in the year 2025.

Social robots, specially designed for social interaction with humans, fulfil a central role in these envisioned futures (Restivo 2001). According to robot researcher Cynthia Breazeal (2001:1) a social robot should be socially intelligent, learn about and understand itself and people in social terms. A future achievement is: "they could befriend us as we could them", implying a fully new dimension in human-technology relations. In order to achieve this aim the appearance of these social robots tend to resemble humans (humanoid robots) Currently this innovative development on social robots is mainly technology-driven. The societal demand and socio-cultural acceptance of social robots in the various envisioned settings (domestic, health and elderly care, education, etc) is still a 'terra incognita".

In this paper we analyse the envisioned sociocultural settings in which the social, humanoid robots will function that explicitly and implicitly guides the technological robotics research programmes (based on data of four research groups (2 in USA /2 in Japan). The dominant innovation research "robot repertoire" will be compared to three distinct socio-cultural meanings of social (humanoid) robots based on the analysis of the socio-cultural representations and meanings in public media (3 films and 5 magazines) of the last five years. These three socio-cultural "robot repertoires" are contrasted with the dominant innovation robot repertoire in order to gain insight into the complexities of the future socio-cultural acceptance of social robots.

1.2.11: Standardizing, Controlling, and Understanding the Mouse in Biomedical Research

How Fatty is your Mouse Chow? : Communicating Protocol Information in Mouse Research.

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This paper will discuss a trend in the mouse research community towards collecting and sharing "metadata" about how the experiments are performed. Particularly in behavioral research where there are multiple possible tests for the same measures and many ways that each test can be performed, researchers are increasingly arguing that more information that what is typically found in published papers is needed to interpret experimental results. This information is especially important to researchers who are interested in variables that are not normally considered to be part of the experimental protocol, such as the type of food that the mice are fed, or what kind of housing they were kept in.

I will focus on one such data gathering and coordinating initiative, the Mouse Phenome Project (MPP), using published documents and ethnographic data from a recent visit to the site. The MPP is an interdisciplinary initiative hosted at the Jackson Laboratory to gather basic physiological and behavioral measurements on commonly used strains of mice. The project also involves collecting information on environmental conditions in the laboratory and protocol details, presented in a "reader-friendly" format in the database. Since the project gathers data from researchers with extremely diverse backgrounds, the online protocols are meant to make explicit some of the tacit aspects of laboratory practice that would be unfamiliar to readers from other disciplines.

I will explore some of the implications of using protocols and laboratory practice as the means through with information is coordinated amongst members of the mouse community, and contrast these "practice based" efforts at coordinating research and researchers with other "language based" efforts that focus on communication through controlled biomedical vocabularies.

Marketing Mice: Narratives of Control and the Jackson Website

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The 2007 Nobel Prize in Physiology or Medicine was awarded to Drs Mario R. Capecchi, Martin J. Evans and Oliver Smithies for their work on transgenic mouse biotechnology. It is not an understatement, in my estimation, when the Nobel Committee states that "gene targeted mice have become indispensable in virtually all aspects of medical research," and that the future development of novel therapies to "correct genetic defects in man" will hinge on research done in transgenic mice. Examining how transgenic mice are created and used is therefore of critical importance to our conceptualizations of health and illness. My paper focuses in particular on the internet marketing of transgenic mice by the Jackson Laboratory, the largest supplier of laboratory mice worldwide. Using an interdisciplinary approach that includes rhetorical criticism of science, laboratory studies, and STS studies more generally, I

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look at how mice represent what Joan Fujimura terms "pre-packaged conventions for action." Acting as a "highly transportable interface among different laboratories," or among different "social worlds," standardized packages of theory and technology provide not only the technology and the questions, but also "a framework within which to interpret the outcomes of such manipulation." Since mice have become a necessary 'technology,' how does the Jackson website help to package the mouse body within a certain, preferred, theoretical narrative? What kinds of specific uses of mice as technology are encouraged? How is laboratory research therefore potentially constrained by Jackson's preferred narrative of the mouse body? By extension, then, how might the marketing of Jackson mice affect the kind of knowledge researchers are encouraged to seek through these mice? As a ubiquitously used biotechnology, mice must also be standardized, their performance in individual laboratories guaranteed. How does the Jackson website construct the mouse as standardized technology? A central theme in the website is the notion of control, particularly over the genetic make-up of the mice. Lurking underneath this theme, however, is the opposite narrative, that of potential loss of control (through genetic drift, unseen mutations, and human error). This dual tension between control (exemplified as an expensive cryogenic freezing program), and loss of control, points to the ambivalent place of the mouse in research, and the potential mistrust of the scientific knowledge the mouse body helps create worldwide. Examining biomedicine's relationship with the mouse body gives us important incites into how the human body might eventually be conceptualized.

Murine Bio(geo)raphies:
Tracing Transgenic Mice Origins and Ontologies

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This paper uses the figure of the experimental laboratory mouse to reflect upon the production of contemporary transgenic biogeograhies. Space is critically intertwined with the emergence and definition of species. Spatial parameters of proximity and distance influence species evolution; geographical relationships with the environment shape plant and animal distributions; whilst certain spaces, such as museums, zoos, field centres and laboratories have been central to understanding the relations between species and the spatial. Yet, as a variety of agricultural, biotechnological, cultural, economic and political process reconfigure environments, organisms and the spaces that link them, these biogeographies and the techniques through which they are produced and understood are shifting. Through the concept of biogeography, the paper seeks to connect practices concerned with the production and management of biological life in contemporary biotechnology - characterised through concepts of biocapital or biopolitics - with the emergent and stochastic qualities of life. Specifically, it identifies a tension between two forms of narrating the development of transgenic mouse strains. Firstly, it explores the documentation of new strain development, which through accounts of personal biography and chance discovery, attest to the contingent and situated moments of biotechnological production. Secondly, it reflects on subsequent efforts to standardise mouse ontologies and disease phenotypes in developing, stabilising and globalising murine strains. The co-existence of these two narratives within the same database draws attention to the oscillation between chance and control, determination and emergence in the development and implications of these new forms of life.

1.2.11: Standardizing, Controlling, and Understanding the Mouse in Biomedical Research

Immunological Research and the Standardisation of Practices with the Mouse-Model

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Immunology is highly complex biological system. Research on aspects of the immune system is confronted with a high degree of uncertainties. This makes inbreed strains of mice a good tool to stabilize the experimental systems in immunology, although the mouse might not always be the best model for the human immune system. A second stabilizing effect in immunological research can be found in the routines of laboratory practice and the stock of experience gained in the work with mice. The knowledge on mice as well as the transformability of them enables researches in immunology to make them fit. Several laboratory studies have shown the struggle for standardization in practice as well as the pragmatics of choosing the right organism for research. With some data on my own laboratory study in an immunology research lab I will show the way researchers are gaining stability on their experimental systems through practice and by using certain types of mice. However, several problems of standardization remain; local standards of practices; differences of laboratory infrastructure; applicability of mice studies for human medical research.

The presentation will focus on the following four aspects of immunological research:

a. The mouse-model in immunological research as a way of reducing complexity
b. making mice fit
c. standardization of practices with the mouse-model
d. remaining problems of replication

1.2.12: Expertise in/on Space

Seeing like a Rover, Acting with a Rover:
Embodied Interaction on the Mars Exploration Rover Mission

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"Acting with" robots with capabilities that approximate those of a geologist on Earth, a distributed team of scientists and engineers rely on NASA's twin Mars Exploration Rovers to do science on another planet. But working with the Rovers requires "learning to see like a Rover", a term which encompasses representations of the Martian surface that support Rover activities, as well as enacting the Rovers' interactions with Mars. This paper draws on over two years of ethnographic fieldwork with the Mars Rover team to reveal the visualization techniques and wide-spread adoption of robotic attributes that enable daily Rover activities on Mars. I first explore the acquisition of tacit visual knowledge required to parse Rover images from Mars for specific instrumental interactions; I then show how skilled readings are embedded into images that both reveal and represent parsed aspects of the Rovers' environment. But these visual skills are also complemented by learning to act, feel, and move like a Rover, a "physical calculus" that not only projects the human operator into the Rover's body but, more importantly, requires the distributed team of scientists and engineers to come together in the Rover's body order to conduct their work on Mars. The paper finally places these visual and embodied activities within the wider context of the history and organization of robotic space missions, especially the consensus-based operation of the Rover team, to examine what work "seeing like a Rover" does for the human team. The paper presents implications for the study of visualization and interaction in the sciences, contributing also to the STS interest in embodiment and the phenomenology of perception; further, observations of a large distributed human team "acting with" robotic explorers suggest methodological implications for the study of human-robotic interaction and large, geographically- and disciplinarily- distributed networks more generally.

Contestation in Outer Space: Pluto and Planetary Demotion

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In 2006, the International Astronomical Union demoted Pluto from planet to dwarf planet. The process of redefinition denaturalized the term "planet," opening a space in which diverse social groups could fight for the power to characterize the heavens. This paper analyzes four boundaries that became blurred during this controversy: between Science and the Public, Professional and Amateur, Science and Policy, and, finally, between planetary scientists identified as Structuralists and Dynamicists. I ask what new mechanisms of boundary work - here following Gieryn - emerge when scientific and popular cosmologies collide. More, following Star and Griesemer, I ask, treating Pluto as a boundary object, what happens to relationships between groups when boundary objects fail to be constructive tools of communication. I argue that contestation over Pluto escalated not because of scientific uncertainty, but because of the different meanings groups assigned to it. Pluto must be understood not only as a scientific object, but also as a cultural one - one that a variety of

1.2.12: Expertise in/on Space

publics feel a connection to and even ownership of. To make my argument, I analyze popular and scientific discourses (conference proceedings, scholarly articles, popular press, listserv activity). For each boundary and each source I draw attention to how the actors depict themselves and their opponents. To what extent do actors project images across boundaries and draw from multiple rhetoric to bolster their views? The tale of Pluto is, in many ways, a classic STS story, fundamentally about controversy, expertise, and classification. More, however, it is about the very nature of cosmic nature itself.

Prospective Humanity:
Language and Power in Non-Terrestrial Habitats

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What will be the micro-politics of a habitat that will not have margins nor ways out? How will technological dependence shape power of control and resistance? What will be like a language that simultaneously have to communicate accurately and to deal with uncertainty, that will have a artificial historicity and will use metaphors when natural references are no more available? The possibility of installing human habitats in non-terrestrial environments like the Moon and planet Mars until 2030, plus the building of large orbital stations, and the years-long journeys in spaceships that may come, have lead agencies like NASA and EAS to promote experimental studies on the psycho-sociological effects of extreme conditions of survival, and to design architectural facilities and tools adapted to ecological systems diverse from those in terrestrial environments. The promotion of survival as the crucial factor that involves both the teams "outside" and their supporters on Earth as focused on the strict control on the individuals behaviours and on the scrutiny of their intimacy, in order to prevent lack of physical capacities, self control, anxiety, and tension. However, the prospective design of new habitats and human ways of living arises questions that reflect and go beyond actual and historical experiences. The understanding of human groups in such new environments - that will reproduce and grow - will give a new significance to the debate of Luhman and Habermas on language (Habermas, The Philosophical Debate on Modernity: Twelve Lectures, 1987), to the recent discussion on the posthuman and transhumanism (Gordijn, B. & Chadwick, R., Medical Enhancements & Posthumanity, 2007), and reinterpret the postmodern assumptions of a risk society (U. Beck, World Risk Society, 1999), of the insignificancy of places (M. Augé, Non-Lieux, 1992), and of the extension of cyborgs (D.Haraway, Cyborg Manifesto, 1986).

1.2.13: Science, Technology and National Policy Imaginations, I

No Room for Doubt: Public Engagement, Science Policy and Democracy at the UK's Engineering and Physical Sciences Research Council

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In April 2006 the UK's Engineering and Physical Sciences Research Council (EPSRC) launched its Societal Issues Panel, with the express aim of helping the "EPSRC take more account of public thinking when deciding how to invest public funds in research". This move by EPSRC followed a number of reports that called for public engagement on science and technology to help shape the development of emerging technologies. The EPSRC has stated that its new nanotechnology strategy will trial the Council's approach to incorporating consideration of societal issues through public engagement.

This paper discusses the Research Council's efforts to use public engagement to articulate societal issues in ways that can inform the design of its funding programmes. Based on a series of interviews with research council staff, members of the Societal Issues Panel and others involved in the Council's nanotechnology strategy, this paper charts the recent adoption of public engagement techniques by the Council. The paper will argue that the Council mobilises a national sociotechnical imaginary of democratic participation and science in the public interest. This imaginary figures the futures of both 'societal issues' and 'nanotechnology' as amenable to appropriate methods of public engagement. This paper contributes to debates about the role of science funding institutions in the governance of science and technology. In particular, it argues that difficulties the EPSRC faces in stabilising public engagement in practice points to the overlooked contribution of doubt as an active element in the relationship between science and democracy in the UK.

Securing the Future or a Threat to Democracy? : Stem Cell Research Policy Debates in South Korea.

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This paper examines how the formulation of South Korea's stem cell research policy, and the debates surrounding it, have been shaped by a contest over broader national sociotechnical imaginaries - that is, collectively imagined forms of life and order through which the nation state conceives and practices its sociotechnical relations. While human embryonic stem cell (hESC) research has been enthusiastically supported in South Korea, its significance has been understood and articulated somewhat differently than it has been elsewhere. Behind enthusiasm is public yearning for the development and protection of world-class "indigenous technologies" which would secure the techno-economic future of the Korean nation against foreign competitors. Though promises of future health benefits (e.g., curing degenerative diseases) have also played some role in fostering South Korea's broad-based support for hESC research, they have largely been interpreted through similar national aspirations (e.g., developing the world-leading cell therapy industry). The South Korean government's decision

1.2.13: Science, Technology and National Policy Imaginations, I

to actively promote hESC research has developed out of this cultural context and has been framed as a key step to the development of new biomedical industries - one of the nation's ten strategic "next-generation growth-engine industries." The government's policy has not gone uncontested, however. Long before the infamous Hwang Woo-Suk scandal broke out, a group of progressive activists - including environmentalists, feminists, and public health advocates - began to strongly criticize the government's handling of hESC research. These activists were pro-choice and did not have a firm stance on the moral status of human embryos. But for them, the government's seemingly unquestioning support for hESC research embodied the "growth-first" ideology that they and their predecessors have fought hard against. Likewise, a pro-development alliance between science, technology, the state, and business - which the proponents of hESC research deemed necessary to ensure the future and survival of the Korean nation - was seen as a threat to civil society, having the potential to subjugate justice and democracy to the so-called "national interests." By situating South Korea's stem cell research policy debates within this larger struggle over sociotechnical imaginaries, I will attempt to provide insight into the ways in which the meanings, purposes, and priorities of biomedical R&D are coproduced with South Korea's distinctive yet contested ideas of public good, citizenship, and national identity. The implications of this insight for South Korea's future governance of science and technology will also be discussed.

Silent Risks:
the Austrian Approach to Human Embryonic Stem Cell Research

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Using the Austrian debate among policy makers and bioethicists in the context of deliberations about EU funding for human embryonic stem cell (hESC) research as a starting point, this paper seeks to 'make sense' of the uniquely restrictive Austrian approach to hESC research (even Italy, which not only in terms of percentages of church goers is a much more devout Catholic country, has a less restrictive regulatory framework and a much more lively public debate on the topic). While it is necessary to take into consideration several historical and political traditions and public narratives to understand this phenomenon, a central political image accounting for the Austrian approach is the defenceless embryo which renders impossible discussions about the potential benefits of this field of research. The way the image of the defenceless embryo is mobilized in Austrian policy debates, however, is different from the U.S. or other European countries, even from Germany: By banning hESC research Austrians demonstrate that have 'learned from history' by protecting the smallest and 'most innocent' 'members' of society. In contrast to Germany , where such exercises can be seen in the context of attempting to re-establish Germany as an ethical nation (see also Sheila Jasanoff's 'Designs on Nature', 2005, and Stefan Sperling's forthcoming article in Science as Culture), in Austria this exercise serves the purpose of establishing Austria as a nation in the first place. I end the paper by showing that these political dynamics do not only apply to hESC research but also to other fields of science and technology in Austria . The presentation draws on a forthcoming paper: Barbara Prainsack and Robert Gmeiner (forthcoming in Science as Culture) "Clean Soil and Common Ground: The Biopolitics of Human Embryonic Stem Cell Research in Austria ."

1.2.14: Surveillance, Privacy and Law

How to Balance "Privacy Issues" and "Safe and Security"?
Case Study of Using RFID Tag Surveillance System.

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The number of crimes against children has been increasing these days. While the needs of ICT(Information and Communication Technologies) such as security sensors or surveillance cameras at school is expanding and lots of new technologies have invented, risks of invading children's privacy are also increasing. In Japan, kidnaps and murders of school children have become serious social concerns recently although Japan is safe compared to other countries. In some private schools, a system was introduced using Radio Frequency Identification (RFID) chips putting on school bags to monitor school children. This system is now expanding to public schools as well through municipal governments. This study investigated why this surveillance system was accepted to Japanese schools despite the concern over human monitoring and privacy invasion. A questionnaire survey was conducted for 576 pairs of parents and children of a private school which is using the system. The results showed they (1) do not take serious of children's privacy rights, (2) accept the system regardless of technical knowledge of RFID, (3) understand the system does not work for children's actual safety but does work to keep parents' peace of mind, (4) are influenced by mass media's kidnapping news rather than actual crime data, and (5) demand more powerful system such as GPS function and CCTV to assure children's actual safety. The paper concluded that the RFID system was accepted because it assured parents' "peace of mind"; however it may generate risk for endangering children's safety by data eavesdropping. Therefore discussion of putting RFID chips on children and needs for regulations on RFID chips as human monitoring tools are suggested. Moreover, this study implies an important concept of how ICT influence on people's notion of public and private space, which is strongly connected to an issue of human safety and rights of freedom.

What Scientists Invest in Biobanks:
'Open Access' and the Social Significance of Data

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The paper uses concepts from STS to explore and explain the conflicting views over 'open access' to the data in biobanks. A general trend is developing across a variety of research sectors towards encouraging the re-use or secondary use of data. The basic principle of 'open access' is that data produced in research is a 'resource' that should be available to other researchers, in order to advance science and serve the public. However, there has been resistance to the translation of this principle into practice. Using data from a qualitative study of biobanking in the UK, this paper explores how the some scientists in the biomedical research community had views that were at odds with the prevailing notion of data as a 'resource'. For them, the re-use of data raised critical questions about the rights and responsibilities of the scientists who have collected the data. On the one hand there were ethical considerations, and they reported an ongoing sense of stewardship over their

1.2.14: Surveillance, Privacy and Law

'collection' and a responsibility to the participants in their studies. They raised issues such as the impact of open access on consent and voiced concerns about control over the future use of samples/ data. On the other hand their worries about open access also touched upon professional issues, such as their role and status, and the need to protect the rewards and/or kudos attached to scientific practice. To conclude the paper, we reflect on a mis-alignment of interests and interpretations, which appears to stem from the different ways in which data comes to be invested with meaning and importance.

How to Say "No" in a World of Ambient Intelligence

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Whereas the main point of attention of surveillance camera's in shops used to be the discovery of individual shoplifters, new "smart" retail surveillance devices concentrate on identifying "hot blobs" or moving "pixel clusters" immediately as belonging to a certain group (e.g. to categories like "shopping unit", "shoplifter" or "female customer" or "affluent early adopter") . In the same way as Amazon uses group profiles in order to make more specialized offers ("Customers with Similar Searches Purchased...") the world which is now being brought in to being - the so-called "Internet of Things" or world of "Ambient Intelligence" (Wright e.a., 2008) - will create permanent adaptive, i.e. cybernetic, informational loops between us and our environment. The coffee machine will learn how you like your coffee and proactively offers you coffee you might like as well, the insurance premium will be exactly tailored to your risk profile, the US "No Fly" computer matching system categorizes you as a potential terrorist, etc.

Such smart devices use probabilistic data techniques to relate you to a virtual "community" or "crowd" in order to make a pragmatic judgement about you - communities to whom you may feel no affiliation whatsoever: "What do I have to do with the group of hypothetical similar people who have a high risk of cancer?". Addressing the uneasiness about such techniques with legal notions like "privacy" and "data protection" has turned out to be rather ineffective as it is not private information which is at stake but "collective" information - which can be, however, potentially even more intrusive than classical personal information. What kind of mediation could alleviate this sense of intrusion?

"What is the difference between seduction and rape?" A cynic might argue that the manipulation with words, red roses and champagne into sexual intercourse is in the end not much different from a Roman simply abducting a Sabine woman by force. Yet, although there is manipulation in both scenarios, the case of seduction assumes that both parties involved share the symbolic technologies involved; technologies which fold, re-order and detour the interaction in such a way that they open up as well a space where things might turn out differently than expected: the girl might show some recalcitrance and say no.

What kind of symbolic technology would enable smart things - humans and devices - to say "no" (an affordance hardly granted in the present day frictionless constellation of things)? "Natural objects are naturally recalcitrant"(Latour, 2000, p. 116), having no scruples in falsifying a hypothesis of a scientist - but with humans and smart devices it is different. In this paper I will explore the possibilities for building a productive "agon" which re-assembles the

1.2.14: Surveillance, Privacy and Law

stakeholders in these data technologies around the issues which divide them.

Latour, B. (2000). When things strike back: a possible contribution of 'science studies' to the social sciences. The British Journal of Sociology, 51(1), 107-123.
Wright, D., Gutwirth, S., Friedewald, M., Vildjiounaite, E., & Punie, Y. (Eds.). (2008). Safeguards in a World of Ambient Intelligence: Springer.

Democracy-Sensitive Co-Production of Profiling Technologies

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Foucault argued that statistics influenced the way people where understood, governed and came to see themselves and thus became an important force in the constitution of subjects. Hacking calls this "making up people" by statistics through the creation of new slots in which to fit and enumerate people. With regard to "modern" ICT-technologies like algorithmic profiling this argument can be extended. These technologies are crucially different from the statistical approaches of the 19th century. Statistical approaches were prestructured by oriented questioning directed at a population. In profiling these preceding questions are no longer required. The available data of a certain population will be algorithmically correlated in order to extract patterns: profiles. In business and government practices certain choices are made and certain services will be offered or withheld on the basis of the profiled segment of the population one is assigned to. When people choose from these options the system reinforces itself and in this way kinds of people are made, without them being aware of the underlying mechanisms.

In legal terms these practices pose threats to important constitutional values like privacy and equality. The algorithms used for this profiling are often protected by intellectual property rights like trade secrets, and are thus not open to public control. One could argue that these intellectual property rights on human creations are still part of what Latour calls the Modern Constitution: they presuppose a fundamental distinction between what is natural and what is man-made. In this case, the collective of practitioners of technology development, business and law forms a non-democratic constitution of aspects of our common public space.

Here the "political" turn in STS studies becomes important. Latour says that a sole "disinterested" Actor Network description of the existing amount of human and non-human actors is not enough. This diverse collective has to be designed to constitute a sustainable common world. Here the task of political engagement starts, clearly illustrated in what Stengers calls the "modern technical laboratory" in which new technologies are invented. This technical laboratory has to satisfy a plurality of different obligations. Scientists, lawyers, technicians, politicians and economists represent the constraints of the practices concerned with the technological invention. These practitioners have to negotiate about reliability, price, patent, security norms, etc. Such a "Parliament of Things" is an example of bringing democracy to the development of technologies that have an impact on the design of our common world.

The "modern" assembled collective of profiling technologies is little democracy-sensitive. New negotiations have to be made in a specific parliament leading the a re-constitution of the

1.2.14: Surveillance, Privacy and Law

collective. Specific legal proposals have been done about the design of profiling technologies. Either value-sensitive guidelines for design have to be negotiated for or, more radical, a vision of Ambient Law has to be developed according to which law and technology are integrated by embedding the posed threatened constitutional principles in the design of technology. Democratic procedure is then enabled to steer the way technologies steer our behavior.

1.2.15: Public Understanding, II

Negotiating the Boundary between Medicine and Lifestyle: Marketing of Commercial Nutrigenetic Tests Online

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Commercial nutrigenetic screens, which offer DNA-based dietary advice online, have been accused of potentially worrying the public and peddling invalid tests and generic lifestyle advice for a high price. To find out what the public is being told we analysed the websites of eight US and UK companies selling nutrigenetic tests. We argue that the marketing discourses negotiate the boundary between medicine and lifestyle through redefining three issues: 1. the role of the individual vis a vis health information, 2. the nature of "genes", 3. the distinctions between alimentation and medication. Most testing companies claim they empower individuals to take personal charge of their health, although some emphasise that they only offer the tests via a physician. The websites emphasise they do not test for disease causing genes but for common gene variants that merely increase the chances of deteriorating wellness, even if some companies pay more attention to the possibility of serious illness. Many companies offer advice on what foods to eat, others offer plant extracts, nutraceuticals or quasi-drugs. These discourses reflect wider social developments and contradictions, such as the shift from paternalistic curative medicine to individualistic preventive one, the promise of genetics to deliver magic bullet cures and the blurring of consumption and medicine and food and drugs. In this situation the companies' websites and the controversies surrounding them become sites for boundary construction, seeking to separate "real" medicine from quackery. At the same time nutrigenetic tests also become boundary objects, which facilitate negotiations to carve out a new space between medicine and lifestyle. This space is defined by two pulls: first, towards harnessing genetics to develop "serious" and specific medical tests and drugs, and second towards incorporating genetics into more ambiguous lifestyle products and advice. The former pull appears more serious but also more medicalising, whereas the latter pull is less serious but also blends into everyday life or even popular culture. The paper calls for critical reflection on the contradictions embedded in the development of this new technology, and the wider shifts in health they form a part, in a situation where much of the debate is framed in oppositional terms as either boon to health or a threat to the public.

Visions of Food in an Age of Genomics

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Nutrigenomics is an emerging scientific field studying the relationship between nutrition and the genome, the complete set of genes of an organism. Not only the genome itself, but also its role in the complex physiologic and metabolic system, often related to environmental factors, is part of this field of research. As such, nutrigenomics may play an important role by elucidating biological predispositions to lifestyle diseases, e.g. obesitas, in genetic or physiological terms and may contribute to preventive and therapeutic strategies with respect

1.2.15: Public Understanding, II

to these diseases. The role of food substances, food composition, or the amount of food that is consumed, in relation to genomic functioning, is an import area in this field of research. One of the effects of the application of nutrigenomic insights may be the scientification of food and food related life styles. It may lead to an increasing emphasis on scientifically proven health aspects of food and food habits.

Currently, we see a growing market for so-called functional foods, food that is manipulated to improve someone's health more then just ordinary food does. It is expected that nutrigenomics may contribute to this development. However, health is only one of the functions attributed to food in daily life. Someone's vision of food may also include references to tradition and culture, views of life and practical use. To get more insight on visions of food people have and how people assess the increasing scientification of food and food habits we have conducted a survey among about 1000 Dutch citizens concerning their visions of food in relation to genomics, food technology and functional food. Our study suggests that different food visions can be distinguished, related to health, views of life, convenient use, and traditions. These visions partly correlate with perceptions on functional foods and genetic or genomic research. We think that this research project can contribute to a better understanding of how people consider scientification trends in society. It also may contribute to quantitative methodologies in STS research.

Learning about New Technology through Science Theatre: High School Students' Opinions about Nutrigenomics and Functional Foods

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Science theatre has been introduced as a novel form of science communication aiming to stimulate interest in, and reflection and discussion on social and scientific developments. In various European countries, in particular the UK, the Netherlands and Norway, a tradition is evolving in which science theatre is being used as an educational tool at schools. We chose this form of science communication and teenagers in secondary schools as the target group in our research project on the social impact of food related scientific developments and functional food technology.

In collaboration with Pandemonia Science Theatre, Amsterdam, we developed a play about food and personal dietary habits in the context of societal and scientific issues such as obesity, nutrigenomics, personalised diets and functional foods. The performance included a debate about two statements after the play. During the period January through June 2007, 15.000 pupils aged 15-17 of the 4th and 5th grade pre-university and senior secondary education at 70 high schools in the Netherlands attended the performance. Twenty schools collaborated in an evaluation study. Using quantitative and qualitative methods we studied the effects of the play and opinions and attitudes of the pupils regarding scientific and social developments in food and health.

In this presentation we will focus on the pupils' views on science and technology in food using data from 600 pupils who filled in a questionnaire after the performance, and 39 pupils

1.2.15: Public Understanding, II

who participated in 7 focus group interviews, also after attending the performance.

The survey data concern the pupils' attitudes regarding the role and effects of science and technology on food, individualised diets and functional foods. Participants in the focus groups were asked about aspects of the performance they considered more or less appealing, and themes they had reflected on. Pupils stated that the performance had raised awareness about scientific efforts to make food healthier. Some pupils were not interested in functional food technology, because they were not interested in health aspects of their dietary habits, whereas others questioned whether technological interference ought to be the preferred way to improve food quality. A personalised diet based on genetic risk assessment was in general not considered a favourable development, because it focuses to much on health aspects of eating. The pupils thought that social aspects of food and eating, together with good taste, are important qualities that will not easily be dominated by the health perspective.

Combing the qualitative and quantitative data, we will contribute to a better understanding of the social impact of scientific and technological developments in food and the significance of science theatre as communication tool.

Food for Thought:
University Students' Understanding of Science in Food

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It is only recently that food has been recognised as a legitimate concern of the social sciences. With the increasing amount of sociological research devoted to the topics of food, the importance of public understanding of food, health and food safety has captured scholarly attention. Nevertheless, within STS the study of food remains marginalised.

This paper attempts to bring food to the STS table. In doing so, it draws upon work in the public understanding of science (PUS). Scepticism about science and a lack of understanding of science are often linked. This assumes a deficit in knowledge on the part of the public. The deficit model, however, has long been criticised for over-simplifying the issues involved. This paper examines people's concerns in the recent technologies applied to food production and their influence on people's relationship with food.

A semi-structured interview approach was adapted to investigate University of Nottingham students' (aged 18-25) understandings of sciences applied to food production through a case study of their views on Genetically Modified (GM) food. Twenty-nine interviews were carried out with 15 science and 14 non-science students. This was to explore whether science and non-science students' understandings of science in food production varied according to the education they had received.

Through analysis of the discourse between science and non-science students, the paper argues that using the term 'understanding of science' over-generalises the scope of so-called 'scientific' knowledge. Preliminary analysis suggests that students' understanding of science in food can be partially explained by the education. More pertinently, however, students' views on GM food were more closely associated to their general beliefs, values, and their

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current priorities in their lives. It was also observed that science students generally referred to GM food using a technical repertoire, and its potential application. Non-science students were more likely to speak about the issues and debates surrounding GM food. Hence, whilst education might not directly contribute to students' views on GM food, it may, however, partially contribute to the types of information they are more likely to receive, thus their general beliefs and so on. Food cost emerged as the salient concern for students and it might have a more significant impact on students' view on food than their understanding of science.

To shed light on the increasing discussion of engaging the public opinions in science and technology policy making process, this paper proposes that whilst it is crucial to understand how people's understanding of science has an impact on their views about a particular technology, other more substantial and personal considerations should also be taken into account.

1.2.17: Scientific Collaboration in Biology, II

Communities, Collaboratories and Systems: Reflections on Big Science in Biology

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This paper traces the developments in the biological sciences initiated during the early stages of the Human Genome Project that have resulted in the proliferation of the big science enterprise in the post-genomic era. This enterprise has thrown up a new 'ómic' language and made theoretically possible the development of an all-encompassing systems biology. Focussing on Proteomics the paper discusses the effects that these changes have made on the concept of the community of science exemplified in the work of early theorists such as Merton and Barber. Most contemporary analytical discussions have brought actors other than scientists and their publics into the picture (Callon, Latour, Law). The paper extends these assessments to evaluate whether there are implications not only for science but also for policy making more broadly.

Collaboration in Nutrition Science: Solving Situated Problems and Constructing Situated Healths

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Solving highly complex problems and reaching ambitious goals is often thought to become 'easier' by enlarging and diversifying the group of experts involved. This results in a diverse patchwork blanket of disciplines, approaches, sites, experiments and boundaries. Such divisions in scientific practice are of importance in understanding how problems are tackled and solutions are constructed; how large-scale nutrition research is made doable (Fujimura, 1987). In this process, various elements of the research situation are re-made. Given the situated character of research, this will result in research which is situated with respect to its doability and politics, for large-scale biomedical and nutrition research programmes are all about norms. Research goals are directed, for instance in contemporary nutrition science, at "making everybody healthy" or "feeding the world". These norms are not immune to the changes research programmes experience when they proceed.

In this paper, I describe large-scale nutrition science, a practice which I have qualitatively studied for over four years via participant observation, literature studies, and in depth interviews, combining a normative, biopolitical inquiry with a laboratory study. Such large-scale research takes place at a large number of sites simultaneously, where at each of these sites a small portion of the overall research problem is addressed. To achieve a doable research situation, at every site re-articulations take place. Every element in the research situation is subjected to re-articulations, including 'health' and other prominent norms. Such situated rearticulations result in number of coexisting healths within the research situation. Furthermore, research sites are not epistemologically equal. A key boundary is the 'wet'/'dry'-divide denoting laboratory work and computational work, respectively. These are different styles of science and employ different conceptualisations of the elements in the research

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situation. Cooperation exists, but does not result in a full merger of these styles. In stead both proliferate alongside a more fluid 'moist' style-in-the-making (Penders et al., 2007, 2008). This epistemological patchwork results in the coexistence of 'wet' (molecularised) healths, 'dry' (risk-based) healths and 'moist' (intermediate) healths. While seeking health, several healths were found.

Re-articulating norms such as health is a normative effect of large-scale nutrition science. This is the realm of biopolitics, the normative pressure towards a norm, towards health, suggesting that each and every individual has the 'duty' to pursue health (e.g. Foucault's work/Rose, 2007). If so, the re-articulation of health into many coexisting healths, has made this duty a difficult one. Which health is the one worth pursuing in which situation?

Supersizing Science: on Building Scientific Collaboration in Biology

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The establishment of the Human Genome Project gave rise to a discussion on the bigness of biology: is biology becoming big science? Against the background of literature on big science and scientific collaboration, this paper focuses on transformations in the organisation of life sciences research. Although natural history is one of the first scientific fields in which collaboration took place, biology has not been part of the traditional big science family, which includes astronomy, physics and space research. However, in interaction with recent developments in molecular biology scientific collaboration is becoming much more prominent. How is scientific collaboration in biology build? Based on the qualitative analysis of three large-scale research projects in biology - respectively investigating life in the oceans, building a cell in silico and developing a new therapy against flu - I will argue that biology is a networked form of big science in which information and communication technologies and issues of standardisation play an important role. Moreover, studying the building of collaboration in biology shows how science becomes big: it reveals the 'supersizing of science'. The emergence of large-scale research projects allows us to identify those dynamics that foster network formation. The projects I investigated demonstrate different ways in which large-scale collaboration is build: the restructuring of traditional collaboration, the creation of a new structure for collaboration, and the combination of different social orderings in collaboration. Furthermore, I will show how the supersizing of science changes the role of scientists and makes us aware of the 'projectification of science'.

1.2.18: Constructing the Public in Scientific Governance

Institutionalization of Ethical Expertise: the National Ethics Councils in Germany and Sweden

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There is a paradoxical development that characterizes the way modern societies deal with ethical problems. Issues concerning the good life are privatized and regarded as individual decisions. Simultaneously, there is a politicization of the ethical. The clearest expression may be the institutionalization of ethical expertise or public advisory bodies that act as consultants to political decision-makers. Public ethics bodies challenge conventional categorical ways of thinking about the distinctness of science, ethics and policy. Therefore, it is not surprising that this new type of institution is a contentious issue in both public and academic debates. The existing scholarly literature focusses largely on the relation between ethics advisory bodies and moral philosophy. This paper explores how such advisory institutions actually work from a double perspective. On the one hand, the paper examines the emergence and role of such bodies in political processes and thus how they have come to be understood as "political expertise"; on the other hand, the paper investigates the concrete working procedures of these councils and thus their modes of producing "ethical expertise". The paper compares two national cases, namely Germany's National Ethics Council with the Swedish National Council on Medical Ethics. Both countries represent contrasting cases of dominant ethical traditions and with regard to the time of emergence of such bodies. The Swedish council was a pioneer institution inaugurated in 1985, whereas Germany´s council was a latecomer, established in 2001. Despite the differences the results of the study indicate similarities in the modes of producing "ethical expertise" which in the longer run might lead to stronger convergence. For the most part, commission ethics proves to be a practical matter chiefly determined by pragmatism.

Publics, Ethics and Experts in the Neuroethics Movement

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Eight years after the "Decade of the Brain," developments in the neurosciences have moved out of the laboratory to become a matter of widespread public interest and concern. Social neuroscience advances in particular seem to have captured the public imagination; PET or fMRI findings on the neural correlates of such subjective as romantic love, racist belief, or political affiliation receive frequent coverage in popular science and general news journals, not least because of the ethical concerns such findings raise. Concurrently, the ethical, legal and social implications (ELSI) of brain research are subject to rapidly increasing academic inquiry and attention. The last five years have seen explosive developments in coordinated study of ELSI issues in the brain sciences, represented in a burgeoning academic literature, in new institutions and funding for interdisciplinary research, and, in the United States, even in an independent field of bio-ethical inquiry: the "neuroethics" movement.

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In contrast to the well studied areas of other biotechnologies such as genetics and reproductive sciences, I suggest that the neurosciences and its attendant ethical movement are under-investigated areas of STS research. In this spirit, this paper examines academic and media dialogue about the ethical dangers of the new neurosciences, with particular attention to the role that conceptions of the public and of issue experts have played in this dialogue and in the neuroethics movement as a whole. In part, I suggest that the neuroethics movement has framed ethical issues in the neurosciences as ones to be explored and resolved by issue experts in neuroscience, law, bioethics and philosophy. In an age in which public participation and engagement exercises are swiftly becoming almost mandatory steps in biotechnology development, I suggest that the neuroethics movement is characterized by a relative paucity of public inclusion.

I orient my discussion around the following questions: Which actors have driven ethical inquiry about the brain sciences, and how might their positions influence the kinds of issues being raised for ethical discussion? Do these actors propose to speak for the public, and if so, which version of the "public" do they speak for? What kinds of discussions (academic, public meetings, legal, etc) are promoted to explore or resolve ethical issues in the neurosciences - and within these discussions, what kinds of issue expertise are considered necessary or sufficient for inclusion?

Ethical Conflicts on Human Genetics in the Mediated Public Sphere

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It has been stated that science and technology become more and more important and integrated in society and that this is part of what we often call a knowledge society. The question of how science and knowledge are represented in society is also related to the concept of risk. Risks produced in a late stage of modernity are invisible and only exist through our knowledge about them. This points to the importance of the actors producing and spreading knowledge, like science and not least the media. Science journalism has often been criticized for being sensationalist and focusing on (or even creating) controversies, but the issue of human gene technology is mainly framed in terms of benefits and ethical and social implications (rather than in terms of risks). Overall, it has been stated that controversies on science and technology are more and more about ethical aspects. How an issue is framed affects how we construct meaning on and make decisions on these matters. For the general public, it's the news media that's the main source of information on complex scientific matters like human genetics and biopolitics. Against this backdrop, the aim of this paper is to analyze whether and how the practice of pre-implantation genetic diagnosis (PGD) is framed as an ethical issue in the mediated public sphere (here represented by the daily press). Or more precisely: What are the main frames in media discourse on PGD? Where, how and by whom is PGD framed as an ethical issue in news media discourse? What are the main arguments and which ethical conflicts can be identified? What is the role of the experts? The results of this study indicate that in the Swedish daily press PGD to a great extent is framed as a discourse of scientists and other experts and that the ethical conflicts mainly occur between social scientists and other experts on the one hand and Christian policy-makers on the other. It's also noted that the disputes are not so much about

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the technology in general but mainly about it's uses and benefits and the consequences it can have for selection and individual choice.

The Spread of Ideas and the Travel of Public Deliberation Methods

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Suspicions have been raised as to why the enthusiasm for public deliberation emerge at a time "globalization seems to render the governance of science and technology more obscure, remote and inaccessible" (Stirling 2005: 218). The focus in this paper is on the ideas around the new scientific governance based on public involvement and deliberation and how such ideas are packaged and travel through certain routes and carriers. The theoretical approach to "the travel of ideas", means a focus on how ideas, as they flow, are also edited, translated and hybridized. There will be certain carriers of ideas, mediating activities and arenas in which the ideas are discussed among experts in order to establish the best way of doing things.

The empirical starting point for exploring the spread of 'public deliberation' as a policy tool in the governance of environmental risk and science and technology is the study of four established methods (citizens' juries, consensus conferences, scenario workshops and focus group methodology). The selected methods are all designed to generate qualitative deliberation among publics. Thus in this paper the focus is on ideas packaged as generic methods aiming to produce deliberations among citizens. These methods are assumed, by those who use them, to be useful in different ways, for the governance of science and technology. The travel of ideas is an active process and ideas are shaped and translated differently in different settings. The carriers of ideas are active in structuring flows and patterns of diffusion but they are also translating the ideas they mediate, reflecting their own interests.

Interpellating and Mobilizing 'the Public' : Public Participation in Scientific Governance and Genetic Research

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Human genetics is a field of bustling activity as regards exercises of public participation.This is remarkable because the intensity of public concern about this technology has rather decreased over the past decade. Hence, we cannot confirm the view that an increasing emphasis on public participation is the result of public opposition to biotechnology.

In the STS and science policy literature, formal arrangements of public involvement, such as consensus conferences, public consultations, stakeholder conferences, or scenario workshops have mainly been discussed, categorized and assessed in terms of legitimacy

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and accountability, impact or effectiveness. STS critics of participatory exercises have focused on what participatory arrangements do not accomplish, what they fail to do, what or whom they exclude, and how their democratic potential for these reasons is limited.

While this type of analysis continues to be important, the paper suggest to add another perspective, moving beyond the "restriction hypothesis" and highlighting not only the negative, restrictive operations of participatory arrangements, but also the positive, productive, mobilizing operations performed by these arrangements. Looking into exercises of "public participation in science" in the issue area of genetic testing in Germany and the UK, the paper asks: How do participatory exercises construct publics? Which are the main types of publics constructed? Through which practices of attribution, invitation, interpellation, categorization and classification? Finally, it suggests to look at the development of participatory exercises and experiments in the context of recent developments in genetic research, exploring and exploiting the double meaning of "public participation in science". The participatory turn in scientific governance is paralleled by a participatory turn in genetic research: 'public participation in science' is built into current genetic research strategies and devices which focus on common complex diseases in a rather literal sense; people, both as patients and as healthy controls, have to participate in large numbers for the process of scientific knowledge production to proceed. The paper will explore the "family resemblance" between these two participatory turns, arguing that they show a similar logic of mobilization.

1.2.20: How Good is Post-Normal Science at Addressing Wicked Issues?

What is Post-Normal Science?
A Critical Review of its Development, Definitions and Usages.

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This paper seeks to clarify the extant definitions, conceptualizations and uses of post-normal science in informing and facilitating public policy making on 'wicked' issues. Based on documentary evidence, academic discussion and stakeholder feedback, this paper reviews the history of post-normal science, examining Kuhn's 1962 definition of 'normal science' and Kay's subsequent acknowledgement of the limitations of science. We particularly examine the need to address gaps in knowledge through consideration of varied perspectives and understandings in addition to those based on science. Our analysis suggests that the 1990s represent a symbolic watershed in the use of post-normal science terminology, when the concept has been further developed and applied to contemporary, highly 'wicked' issues such as climate change. We unravel the variety of terms, uses and applications of post-normal science that have developed since, distinguishing between uses of post-normal science as a normative prescription from those of post-normal science as a practical method. We explore the effects of co-production of knowledge and the interaction between science and policy-making, particularly the attendant redrawing of boundaries between science and politics. We investigate the similarities between post-normal science and research in other literatures on public policy analysis, democratization of science and participatory processes, aiming to uncover the distinctiveness and similarities among them. Building on the work of Latour, we explore what steps may be required in constructing a more general framework for symmetrical approaches to evidence-based risk regulation (ie. taking a non-hierarchical approach to ways of knowing that allows socially-situated, contextual, narrative knowledge from public sources to be respected as inputs).

Snow White and the Wicked Problems of the West: a Look at the Lines between Empirical Description and Normative Prescription

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The aim of this paper is to systematically discuss the ambiguity between normative prescription and empirical description that is simultaneously an observation arising within and a methodological challenge associated with the operationalisation of post-normal science. The paper begins with a review of the empirical origins of post-normal science, first with Ravetz 1970s philosophy and history of science work, followed in the 1980s and 90s by works from Funtowicz and Ravetz on risk assessment and ecological economics. It is proposed that the concept of post-normal science is basically an heuristic that can be helpful for developing theory and practical methodology and which brings up but does not purport to resolve a host of normative implications. On that basis, it is argued that concerns regarding the strong normativity of some work sailing under the post-normal science flag, while valid, are somewhat mis-targeted: it is not so much that a formal theory of post-normal science leads to unreflective normativity but rather that unreflective normativity leads to poor

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operationalisation of the concept. In support of this position three insights gleaned from the use of post-normal science as an heuristic are presented and their implications considered: (1) the idea that there are distinguishable 'post-normal science conditions' is an empirical observation; (2) post-normal science conditions may prevail even where political will appears resolute, or where science appears to have all the answers; and (3) the concept of extended peer review is not only descriptive of organised experiments in participatory science but also describes accidental and de facto situations where the peer review community empowered to judge the validity of a fact claim has been extended by political or other forces.

1.2.21: Japanese Risk Governance

Operationalizing the Framework of Risk Analysis in Japanese Food Safety Administration: Case Studies of GM Feed and BSE

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As in several European countries and European Union (EU), Japanese government has recently introduced the framework of risk analysis into its food safety administration. It established on 1 July 2003 the Food Safety Commission (FSC) as an independent risk assessment organization, functionally and organizationally separated from the risk management bodies, the Ministry of Agriculture, Forestry and Fisheries (MAFF) and the Ministry of Health, Labor and Welfare (MHLW). It was a direct political response to so-called "legitimacy crisis" or "crisis of confidence" caused by a domestic outbreak of BSE (bovine spongiform encephalopathy) in September 2001 and other food scandals. Those events revealed scientific as well as democratic deficit of past administration in which scientific arguments had been sometimes suppressed by economic concerns and decision making process had been less transparent and accountable to the public.

It is of course not easy to overcome the past shortcomings. Indeed, the 4 years since the foundation of the FSC was a learning process for policymakers and scientists to adapt their mindset and practices to new regime of risk analysis. In this paper, we will describe how Japanese risk assessors and managers sought to operationalize the framework of risk analysis by means of a couple of case studies. One is the case of risk assessment of low level presence of unapproved GM corn (Bt10) carried out by the GM Foods Expert Committee (GMFEC) of the FSC, and the other is the Japan-U.S. BSE risk assessment conducted by the Prions Expert Committee (PEC) of the FSC. In each case, we locate and analyze what problems Japanese risk assessors and managers faced and how have they addressed them. These problems are largely classified into two categories: (1) boundary work problems concerning the demarcation of responsibilities between risk assessors and managers; and (2) problems arising from socio-political, trans-scientific nature of risk management.

How to operationalize the risk analysis framework is a common vital problem in contemporary world. Understanding of the differences and similarities of its implementations and problems among different social, cultural and political settings is essential to improve practices in each setting. Our study is expected to contribute to enriching global debates of risk governance issues.

Roles of Professional Associations for Nuclear Safety Regulations in Japan

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In order to develop technical standards for safety regulations, prompt responses to advances in science and technology are required, as well as securing experts and specialist skills. On

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the other hand, at the government level, the current trend for administrative reform in Japan has led to an intensifying drive to use the support from non-governmental sector, including professional association, accompanied by constraints on the total number of civil servants. Under these circumstances, initial attempts have been made to use professional associations to develop technical standards in Japan. Of course, even when professional associations are used to develop technical standards, procedural fairness must be maintained through technical assessment procedure of the government. Issues relating to the development of standards by professional associations and the use of those standards by the government will be discussed in the presentation focusing on concrete dilemmas for managing public-private partnership in regulatory science, such as an issue concerning the links between the procedure in non-governmental organizations and the technical assessment procedure in the government, how to promote the incentives of non-governmental standards development by professional associations, the need for coordination among multiple professional associations in Japan concerning nuclear safety, and securing substantial standards development capabilities in professional associations including capacity for information (concerning incidents and others) collection.

How to build appropriate public-private relationship in risk governance is not a specific problem to Japanese context but a common one in other parts of the world. The analysis of this paper will contribute to cross-cultural studies of risk governance in an international perspective of STS.

Dynamic Function of Framing in the Establishment of Local Regulatory Policy for GM Crops

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Problems of cultivation of GM crop have been big issues nationally, internationally as well as locally in each country and are not only issues of science and technology but also those of politics and economy of agriculture. In Japan, Hokkaido prefecture legislative assembly enacted its own ordinance which regulates open-field cultivation of GM crops, in 2005 ('The Hokkaido Preventive measure Ordinance against Crossing by GM Cultivation'). This ordinance requires those who plan to carry out commercial cultivation of GM crops to get a license from Hokkaido prefecture Governor. On the other hand, in order to grow GM crops in the outdoor field for trial purposes, researchers have only to submit notification to the Governor. Decision making of this ordinance gave rise to serious controversies not only in Hokkaido prefecture but also in national level. Some people say that Hokkaido established a more strict regulation in addition to the national regulations for GMO planting while the Hokkaido prefecture Government argues that the aim of this regulation is to set a rule for cultivation of GM Crops.

In this paper, I describe and analyze the process of establishing the Hokkaido ordinance on GM cultivation, especially focusing on a series of informal meetings held behind the official deliberation in the Hokkaido government. Those meeting were convened by STS scholars, including myself, inviting the chairperson of "The Committee for Planting Condition (2004)" and "GMO Subcommittee for the Scientific Studies of Preventive Measure (2006-)" of Hokkaido government, other members of committees, scientists, local organic farmers, a

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dealer of organic products and consumers, etc. The aim of the meetings was to facilitate trust-building and mutual understanding among participants who had different concerns and interests in cultivating GM crops in Hokkaido. While the meetings were not officially legitimized by Hokkaido government, they had successfully achieved their objectives and produced some influence on the public decision making. Key element was a common problem framing the participants shared, namely "the future of Hokkaido agriculture".

How to build mutual trust and understanding among different actors and how to address the issues of legitimacy of the deliberation process and the commitment of STS scholars are universal problems in contemporary technoscientific world. This study is expected to facilitate further arguments about these issues from cross-national perspectives.

1.2.22: Involving PUS Survey Research

Nanotechnology by the Lights of Biotechnology Survey Research

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Biotechnology was an important challenge in the latter part of the 20th century. From the beginning, biotechnology has been a paradigmatic example of a failure to acknowledge social impact seriously; therefore, biotechnology has created the conditions to slow down or even freeze of research. Perceptions of biotechnology were studied many times by survey research (six Eurobarometers on biotechnology) but their results could have been better involved in development and governance of biotechnology. In order to act with nanotechnology, could we learn from the lessons of biotechnology survey research? Several lessons have been formulated from the experience of biotechnology: on the importance of early time development, the heterogeneity of publics, the pattern of evaluation, the effect of the deficit model, and the effect of trust, accountability and openness (Millstone, 2000; Einsiedel and Goldenberg, 2004). Do they apply to nanotechnology?

A few existing surveys have included items on nanotechnology (Eurobarometer Science and Technology, and Eurobarometer Biotechnology). In this presentation, we will perform secondary analysis on Swiss surveys and compare our results with foreign results (Lee, Scheufele and Lewenstein, 2005; Macoubrie, 2006). According to our analyses, most of the biotechnology lessons apply to nanotechnology. What will happen for nanotechnology in the next few years? Will nanotechnology experience the same troubles and controversies as biotechnology? It partly depends on what is done from the biotechnology experience. Survey results should be involved in nanotechnology development in order to successfully embed nanotechnology in society - in ways that will ensure its long-term sustainability.

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The Relevance of Culture for Public Attitudes towards Genetically Modified Food - the Case of USA and Germany

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According to cross-cultural surveys German and US citizens differ in their attitudes towards genetically modified food (GMF). Germans on average have a somewhat more critical attitude towards GMF than Americans. Former studies that aimed at explaining these cross-national differences by focusing on socio-demographic characteristics of the populations, on

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knowledge or risk-benefit assessments do not explain these differences satisfactorily. By focusing on the influence of culture we offer an alternative view on the cross-national differences of attitudes towards GMF.

Culture can be understood as a semantic tool for sense-making and opinion-forming. To explore the role of culture we focused on two variables that appear relevant with regard to GMF attitudes: appraisal of nature and trust in institutions. Firstly, food can be understood as a part of nature. Thus, the perception of food quality and food-related risks might partly depend on the concept of nature. We assume that higher appraisal of nature leads to negative attitudes towards GMF. Secondly, scientific and technical innovations like GMF may lead to unintended social, environmental or health risks. One strategy to deal with these innovation-caused uncertainties is trust. Focusing on general trust in institutions as part of the political cultures we assume that a higher level of trust corresponds with more positive attitudes towards GMF.

The presentation will show results of a representative cross-national telephone survey conducted in Germany and the US. Additionally it will show further research on the concepts of nature. The results confirm the relevance of culture for explaining attitude differences towards genetically modified food. The outcome of the study can be also useful in the context of changing concerns of STS research. Acting with science, technology and medicine requires particular cultural sensitiveness. The shift towards more intervention in the communication and governance of science and technology by STS researchers comes along with a rise of responsibility. When trying to make decisions that rest on 'socially robust knowledge' (Nowotny, Scott & Gibbons 2001) the needs and values of the general public should be taken into account. The relevance of culture as one important factor for attitudes follows from our case study of genetically modified food (GMF) in Germany and the USA.

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Risks and Benefits from Science & Technology.
New Perspectives from Ibero America.

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The study examines the impact of birth cohort, net gender, education and age on attitudes toward science in Bulgaria and UK in late 20th and beginning of 21th century, using the Eurobarometer surveys of public understanding of science and a comparative representative survey in the two countries. Since the items measuring attitudes toward science in the

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different surveys did not show consistent correlation we treated them as facets of attitude to science. The following facets were included: support for government funding, distrust in scientists, daily relevance of science, belief that benefits of science are greater than harms, To examine the cohort effect we carried out a series of factorial ANOVAs controlling for sex, age and education. The results reveal a tendency for increasing distrust in science and the sientists, decrease of support for science decrease in the belief of daily relevance of science. The paper speculates on the findings referring to the notion of knowledge based society and to some specificities pertaining to the different socio-political contexts in Bulgaria and the United Kingdom.

The Dynamics of European Science Culture: a Preliminary Cohort Analysis of Public Understanding of Science from 1989 to 2005

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Eurobarometer (EB) surveys, the survey instrument of the European Commission in Brussels, has been asking questions pertaining to public sentiment regarding science and technology since the 1970s. The surveys included questions on the following topics: interest in and information about scientific and technological issues, exposure to different forms of media, scientific knowledge, attitudes toward science-related issues, trust in scientists, values, science and technology governance, demographic questions. A series of eight related EB surveys have recently been integrated to form a single database (sample size of over 60,000 observations and around 60 variables), an unparalleled resource for longitudinal study. Precisely, this constitutes a unique database to study the dynamics of the public culture of science and technology comparatively across Europe over the last 30 years. The paper will compare stabilities and changes over time on some of these indicators (interest in, knowledge and attitudes toward science and technology) for selected countries. One of the key problems of such analyses will be to disentangle the effects of local events, maturing in age, and the effect of generational cohorts who simply grew older together (the problems of cohort analysis). Such data might be a step towards assessing the changing science-society relations that have occurred in many countries in recent years, namely the growing activism of science event making and public involvement forums. Bauer, Martin, Allum, Nick and Steve Miller (2007). "What can we learn from 25 years of PUS survey research? Liberating and expanding the agenda". Public Understanding of Science, 16(1), 79-95.

The Changing Attitudes to Science: Geographical and Historical Comparison

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Roaming in the documents issued by the European Commission one discovers that we have been living in (or at leas striving for) a society based on knowledge. Its economy is a

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'learning economy' (Lisbon European Council March 2000) and the entire society creates, shares and uses knowledge for the prosperity and well-being of its people (European Commission 2000, p.5). Being the 'leading actors of knowledge societies' (Ibid. P. 7) people are expected to engage in a constant quest for new knowledge or in other words to become learning citizens (Martin, 2003). Science in its turn 'involves a pursuit of knowledge covering general truths or the operation of fundamental laws' (The New Encyclopaedia Britanica, 15th Ed. Chicago etc., 1993, V 10). Thus due to its very essence science can make a perfect symbol of knowledge society. The study examines the impact of birth cohort, net gender, education and age on attitudes toward science in Bulgaria and UK in late 20th and beginning of 21th century, using the Eurobarometer surveys of public understanding of science and a comparative representative survey in the two countries. The reason we had to compare UK and Bulgaria was three-fold. First of all we had available longitudinal comparative data. Secondly, we have been continuing a track of comparative work on public knowledge and attitudes to science (Bauer, Petkova Boyadjieva, 2000) and long-term trends in the public representations of science (Bauer et al, 2006). Thirdly, the findings of the above quoted studies revealed that the representations of science in Bulgaria and UK can be interpreted in terms of the different social contexts in which they have emerged. Whereas Bulgarian society can be described as a modern post-totalitarian society, the developments, taking place in British society pertain to a new secular transition for which various names have been used: post-modern society Bauman, 1993), post-industrial society (Bell, 1973), risk society (Beck, 1992) reflexive modernity (Giddens, 1991). We believed that tracing the trajectories of variables such as science literacy, interest in science and attitudes towards science in the different contexts of modernity, on the one hand, and post-modernity on the other, would shed light on the chances of our living in a society based on knowledge. Since the items measuring attitudes toward science in the different surveys did not show consistent correlation we treated them as facets of attitude to science. The following facets were included: support for government funding, distrust in scientists, daily relevance of science, belief that benefits of science are greater than harms, To examine the cohort effect we carried out a series of factorial ANOVAs controlling for sex, age and education. The results reveal a tendency for increasing distrust in science and the scientists, decrease of support for science decrease in the belief of daily relevance of science. The paper speculates on the findings referring to the notion of knowledge based society and to some specificities pertaining to the different socio-political contexts in Bulgaria and the United Kingdom.

1.3.1: Performing Legitimacy and Efficiency - Accountability (Infra)Structures as Reinvention of Democracy? III

Data or Deliberation, Performance Measurement or Citizen Involvement, Output or Input Legitimacy?

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Currently there is much debate about problems of state failure, crises in democracy and the assumed gap between politics and citizens. In response to these crises and problems, two main trends are indicated in the literature on governance and democracy: : (1) a shift towards more participation of non state actors (inspired by pluralist and deliberative notions of governance and democracy), and (2) an increasing emphasis on output legitimacy of politics (inspired by neo liberal and new public management steering notions).

Although we observe that both responses are present simultaneously in current policy practice, we argue that this combination is neither simple nor unproblematic. In fact, this paper identifies three paradoxes or dilemma's within and between the two responses. Although participation enhances deliberative democracy, these processes often involve a shift in power to non-elected actors (NGOs, citizens), thus posing a threat to representative democracy (first paradox). Output legitimacy enhances democracy by putting more emphasis on policy performance. However, this approach easily becomes dominated by complicated scientific and technical data requirements and monitoring programs for assessing policy effects. As a result of such 'scientisation of output legitimacy', experts and technical procedures become the judges of whether democracy delivers or not, posing a similar threat to representative democracy (second paradox). Finally tensions also exist between deliberative democracy and participation and a neoliberal focus on output legitimacy. While deliberation puts 'good arguments' of citizens to the forefront, output legitimacy is based on 'scientific input' of certified experts (third paradox).

We use empirical examples, mostly from the Netherlands and the implementation of the European Water Framework Directive, to illustrate our argument and identify the three paradoxes. We conclude our article by reflecting on the implications of these paradoxes for governance and democracy. This meets Jasanoffs call (2004) to revive longrunning debates, in both STS and public administration, on public participation and expertise. Debates, which have sometimes degenerated into purely instrumental comparisons of alternative procedural formats to bring 'the public' into knowledge-based decisions. The implications of a critical review of the paradoxes will highlight the role of science and citizens (Leach et al 2005) and discuss where the democratization of science (Funtowicz & Ravetz 1996; Collins & Evans 2002) and the 'scientization of legitimacy' meet and can improve 'good governance'.

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1.3.1: Performing Legitimacy and Efficiency - Accountability (Infra)Structures as Reinvention of Democracy? III

Data Enrollment in the Implementation of the EU Water Framework Directive - Competing Environmental and Economic Discourses in Political and Participatory Processes

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"The success of this Directive relies ... on information, consultation and involvement of the public, including users." (EC 2000). The Water Framework Directive (WFD) so implements the Aarhus Convention (UNECE 1998) that states: "Considering that, to be able to assert [the right to live in an environment adequate to someone's health and well-being] citizens must have access to information [and] be entitled to participate on decision-making ... in environmental matters." Public participation as mentioned above aims to provide the implementation process of the WFD with public support thereby achieving "input legitimacy". Simultaneously, the WFD sets technical, quantitative standards for good water quality, enabling "output legitimacy". Public participation in its goals of achieving legitimacy and a healthy environment may thus be supported by quantifiable, scientific standards. By having access to clear information on water quality, the public's ability to participate in decision-making appears to be warranted.

On closer examination, the ideal synthesis of input- and output legitimacy is however not that obvious. Standards and indicators are not unproblematic signifiers of water quality (also see Turnhout et al. 2007). Rather, they assume the role of boundary objects (Star & Griesemer, 1989) and are ascribed very different values when set in either economic or environmentally dominated discursive contexts. The paper describes a case where economic driven discourse was seen to hegemonize environmental discourse (Laclau & Mouffe, 1985) and reflects on the implications of this hegemony in relation to output en input legitimacy. The case documents the story of the publication of a scientific report on the implementation of the WFD in the Netherlands and the political reaction to this report. It shows how this affected the Dutch implementation process and participatory approach and trigged the articulation what is nowadays known in the Netherlands as the 'pragmatic implementation'. As the relation between input- and output legitimacy appears to be more complex than was intended by lawmakers, there is a critical role for STS to be had in the evaluation of scientific data used in informing the public and in processes of public participation.

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1.3.1: Performing Legitimacy and Efficiency - Accountability (Infra)Structures as Reinvention of Democracy? III

Continuous Cover Forestry:
Same Science, Different Policy in England, Scotland and Wales

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Forestry in the UK has suffered from a poor public image, based largely on industrial plantation management with large scale planting and clear-felling of exotic fast-growing conifers such as Sitka spruce which since 1919 have radically altered the landscape and affected public access to rural areas for recreation. At the same time, society has become widely disconnected from the knowledge and experience of woodland use and enjoyment that was prevalent only a generation ago. Urbanisation and rapid land-use change have created a woods-alienated society. However, in the last two decades forest policy has shifted towards more participatory and socially inclusive woodland management, and more ecological sustainability.

Forest policy in the United Kingdom has been devolved since 1997, coming under the decision-making power of the separate governments of Scotland, Wales and England. Cultural, environmental and economic differences between the countries also influence public attitudes to forestry. This makes the UK a fascinating context in which to explore changes in forestry policy, paradigms and public value. This study focuses on the way in which continuous cover forestry (CCF) has been adopted in the three countries, as an example of a science-motivated change justified on ecological and social grounds. Only the Welsh forestry strategy explicitly includes this technical shift, with the stated aim to convert half Wales' public forests to CCF. In contrast the term is mentioned in neither the Scottish nor the English forestry strategy. In England, significant changes to management have instead been made by individual private landowners, guided by professional foresters and CCF networks in continental Europe. Despite Wales' policy leadership in this regard, the effect on public perception or benefit is not yet known. The paper explores the nature of evidence that was taken into account in government and private decision-making, and the ways in which that evidence was assessed in the process of policy conversion to continuous cover forestry, compares plans for evaluation of policy outcomes, and assesses the implications for public understanding, appreciation and contribution to forestry.

Mobilizing Fishy Modelling Across Policies for
Sustainable Fisheries

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What is it good for the fish is good for the fishermen, or is it? This article looks into the formal ex-ante evaluation of the sustainable long-term management plan proposed by the European Commission for an important fishery in the North Sea. The exercise sought to account the proposal as a coherent plan according to the new policy regime of having close to maximum sustainable yields from the fisheries by 2015, following the international agreements of the World Summit on Sustainable Development in Johannesburg 2002. It is noteworthy that the

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evaluation was requested by the main socio-economic interests in the fishery who held the view that the Commission's plan lacked of credibility and wanted some sort of proof a priori. In response to the stakeholders demand, the Commission launched an expert workshop actively involving bio-economic modelling to simulate the management measures and render the potential distribution of effects for the fish and for the fishermen knowable. However, the two modelling approaches used in the assessment ended up producing totally divergent scenario-projections. This high level of uncertainty leaded to a thoroughly comparison between the models that, instead of bringing convergence and closure to the plan, teased out a myriad of complexities regarding 'what' exactly is being compared when different biological, economic, political and institutional factors are deeply intertwined within each model. In the end, contingent political concerns added up for a re-frame of the Commission's original long-term management plan into a mid-term economic problem: the stability of the fishing fleet annual rights to fish. The paper will address two different practices of boundary-work across the border between fisheries biologists and economists that played a key role in the final outcome of the evaluation. Then I will move to the analysis of how the two bio-economic approaches mobilized models-and-their-worlds, leading to a struggle over the policy issue at stake. There was, so far, no previous modelling experience of such a problem, thus opening up the question of how existing models travelled as socio-natural orders into the new policy arena. Finally, I will argue about the politics that they brought to the decision-making. I will make use of ethnographic material integrating stakeholders, policymakers, modellers and the models-and-their-worlds. In the analysis, I will draw on the STS and policy studies literatures, starting with a constructivist approach of competing problem frames that use science as ammunition for negotiation over policy controversies.

1.3.2: Risky Environments

Future Earthquakes in Japan and Turkey:
an Analysis of the Social Arrangement of Seismology

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Future earthquakes sometimes have an effect on society as if they were already real. This presentation examines forecasted major earthquakes in two countries. Each of them has been expected for three decades and predicted to cause more than ten thousand casualties; however, they have been treated in very different ways.

One is a quake forecast for the Tokai area of central Japan. In 1976 a young seismologist first reported this prediction, based on an historical cycle of earthquakes of this area. His startling claim was accepted by other experts and helped bring about the reform of the system of disaster prevention in Japan. At that time, scientists claimed they could make a successful short-term forecast of the quake, given ideal research conditions. In response, the Japanese government established the world's densest seismological array to monitor advance signs of this earthquake, and even enacted a law prescribing detailed response measures in the event of an earthquake forecast. Recently, however, the likelihood of the Tokai quake has been called into question.

The other case is in the Marmara region of western Turkey. Seismologists have warned that a disastrous earthquake could hit Istanbul, which lies on the western part of the North Anatolian Fault Line, a long transform fault. Although local researchers, collaborating with foreign teams, started their long-term field research on the fault in the 1980s, this fault didn't attract popular attention until 1999, when a great earthquake struck just east of Istanbul. After this catastrophe, politicians began to treat the prediction of the future earthquake seriously, and have planed to transform a high-risk district of Istanbul for earthquake resistance.

In this presentation, I will compare how the two societies and governments have responded to the possibility of a catastrophic earthquake.

Technological Risk and Citizen Resistance:
the Case of High Voltage Power Lines in Portugal

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Although the health hazards of high voltage power lines have been widely discussed in the scientific and social spheres since at least the 80's, in Portugal this debate has only gained momentum in the past couple of years. And it has been a classic tale in the sociology of risk, with all the "usual suspects": concerned citizens that raise the alarm and mobilize to protest against a perceived danger, for-profit corporations that deny the existence of risk, NGOs and local authorities that support the civic movement, government officials that hesitate which side to back, opposition political parties that join the fray, scientists that are called upon to

make assessments but also often take sides in the dispute (either denying or confirming the risk).

What does make this case worthy of analysis is the specific national setting in which it occurs. In addition to haphazardly urban planning, poor regulation of technological risks and a lack of institutionalised forms of expert advice for public administration and private companies, this is a country with low scientific and general literacy rates and with an incipient civil society. However, ecological movements and specifically mobilization against environmental and public health risks have been unusually frequent and vocal. From co-incineration of industrial waste to the creation of municipal landfills, from mobile phone masts to toxic discharges in watercourses, many technological hazards have been the target of public protest in Portugal in the past decade. Citizens, often viewed as "apathetic" and "ignorant", have come together in impromptu (or sometimes formalised) groups, have gathered scientific information (often if not always from foreign sources), have brandished social and technical arguments with more powerful opponents, have deployed all tools of political protest and even resorted to the terribly slow and expensive Portuguese judicial system to defend their health and safety.

The case of high tension power lines does present some relevant particular traits: conflicting scientific evidence as to its dangers; the absence of studies done by Portuguese researchers; the recent privatisation of the power grid, increasing the pressure for higher revenues and complexifying the role of public authorities; the potential for "contagion", spreading the protests to different locations in the country; social inequality in the distribution of risk (it only affects poor or rural neighbourhoods); conflicting interpretations of "common good", between the health interests of local populations and the economic interests of the whole population (eventually facing power cuts or forced to pay higher electricity bills).

This paper will describe briefly this risk case, proceeding to discuss its wider implications in terms of the relations between technology and society, the collaboration or conflict between experts and citizens, the contentious balance of economical, political, scientific, environmental and civic welfare.

Expertise-in-the-Making about Agroterrorism.
Issues and Paradox of Rationalizing Hybrid Threats.

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A community of scientists and experts concerned by bioterrorism and crop protection has emerged in the US and lately in Europe. Agro-terrorism is certainly an emergent issue for experts of life sciences and agronomic research,it is also a matter of case for the development of Forensics. But, this issue of security research for crop protection has to be considered at the junction of two sagas: that of the amplification and expansion of food scares born with the BSE crisis, which has originated a new kind of regulation regime in food safety in general; and secondly the threatening event of "September 11th", which has sourced a wide range of shared narratives and emotions about the possibility and consequences of such major terrorist actions. Emergent scientific activities about agro-terrorism are conducted in terms of risk assessment at the crossroad of these two sagas in

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order to make the unwanted but possible threats of agro-terrorism simply thinkable. The study of such practices of expertise represents a challenging object of enquiry for social studies of science. Moreover, when this purpose requests the access to this activities and the participatory observation of their setting in relation to a purpose that is framed politically by fears, reason and treason, it becomes also tricky for the observer, both in terms of secrecy and ethic.

In a first section, I will position my own approach in the field of Risk Studies and Expertise. In the light of previous works about expertise and decision making in Prisons disease, I will ground my views in reference to the theorizing of practices and apparatus of expertise in the resurgence of biopower issues. In a second section, I will focus on the empirical approach of the problem of expertise of risk of bioterrorism. I will depict how scientific experts deals with the ill-structured nature of the problem of delivering an opinion about bioterrorist actions - using specific existing pest risk assessment (PRA) methodology- when such actions are not known from them, or only poorly reported in the literature as "real events", though narratives of biological warfare are well known. This observation allows establishing three main layers of interpretation: (1) the weakness of threat definition; (2) the counter-intuitive adoption of lay-thinking in order to sketch out the risk of bioterrorism; (3) the ethical concerns raised by the elicitation of an assessment.

As far as the ill-structured nature of the problem at stake for those experts is concerned, I have framed and proposed the following comment to their sagacity: "what experts realize in practice in order to assess risk and propose to foster preparedness could be very close - in nature but not in purpose- to the practices of a terrorist who would realize the project of knowing and learning how to mobilize pest towards specific targets". In a conclusive section I will discuss the consequence of this paradox and will try to question the nature of my knowledge and my position that had enabled such a reflective stance for experts.

Using ANT to Rethink Collective Action: the Production of Hybrid Collectives in the Doñana Natural Disaster

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Conceptualising and understanding forms of collective action is one of the historic preoccupations of social thought. Good evidence of this can be found in the long line of disputes and polemics that runs through the history of thought about these social phenomena. It shows the difficulty social sciences have faced, and continue to face, when it comes to defining, explaining and delineating a phenomena as ephemeral and liminal as this one.

In this context, I propose that a discussion of the implications an STS focus could have for the analysis of contemporary collective action. The working hypothesis I intend to develop states that the conceptual and methodological baggage that goes with the Actor-Network theory (ANT), and its shaping into what has been called the 'symmetrical turn' in the social sciences, can become a fundamental resource for renewing and enriching the analysis of collective action. For this, I will bring together two main contributions: its alternative understanding of social action (to explain the social it is necessary to leave the exclusive

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concern with social relations aside and take into account the non-human actors, such as the technical procedures in which they are involved); and its original definition of the "collective" (the collective is basically an aggregate of humans and non-humans, without predefined borders, it is just the relational product created by the constant and precarious commitment between heterogeneous elements). Both contributions, I will affirm, allow the opening of an interesting discussion about agency and the possibility of articulating a new theory of collective action (and of social action) that differs from the dominant traditions in that it considers and assumes the heterogeneous and relational character of all social actors, and, as such, it also assumes that all social action is the emergent effect, the interactive product of those hybrid collectives in action.

To give an example of the fertility of this approach, we focus on an analysis of the ecological disaster that occurred in Doñana Park, in Spain. As will emerge from our reading of the events, the action of environmentalist groups mobilised and enlisted human and non-human entities to resignify the content of the political activity and weave a globality that was to resist the attempts at localising the disaster operation. An analysis of the actions of environmentalist groups around the Aznalcóllar dumping of toxic waste will demonstrate that their actions were completely dependent on articulations between human and non-human entities. Rivers, dunes, birds and diggers, elements that until now have not been considered by social scientists, were key to the articulation of the protest, decisive for the redefinition of what occurred, vital to pushing the demand for certain future policies for the affected area.

1.3.3: Health Research

Social Construction of Knowledge for
Medical Research and Practice: Epistemological Interventions

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Increased personal freedom, greater emphasis on and awareness of the rights of the individual, increased mobility, and declining importance of the family unit all have an impact on community-based social networks and have indirect effects on the provision of health care (Kekki 2004). Educated consumers of health care services are becoming more and more aware of the availability of potentially relevant information in the web. Web search engines are used widely by the patients who more and more often question the quality of diagnostic practices based on this information. Bedgood et al. (2007) believe that the web can also provide physician-researchers with useful information about common and uncommon diseases. Moreover, they state that the web allows patients to voice concerns that they may not freely express to their doctor. The web provides a means for collecting data from a larger number of patients than may be available at any single institution (Bedgood et al. 2007).

In general, the developments outlined above exemplify a chance in power relations and social practices within health care. One of the relevant points of view is epistemological. Scientific medical knowledge is socially constructed by the community of researchers and often considered as an objective body of information. This information the medical practitioners then should apply through some well defined procedures, e.g., within the framework of evidence based medicine and technological tools such as the Semantic Web. However, the patients are not machines that could be treated and manipulated regardless of their knowledge and emotions. This means that, optimally, the patients should be included as co-producers of knowledge as a community of experiential practitioners of their own life. Unless this body of knowledge is not taken into account, a number of relevant complex feedback mechanisms are not taken into account. This paper discusses

1. the incluence of an epistemological turn (Knuuttila and Honkela 2005) in the field of medical research and practice,
2. presents some suggestions for participatory practices for medical research, and
3. discusses the information technological tools, based on the principle of self-organization, that could support such developments (Honkela 2005).

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1.3.3: Health Research

From Cakes to Cure: the Role of Charities in the Embedding of Innovative Cancer Treatment Technologies

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Investment in innovative health technologies has been a focus of increasing critical interest in the social sciences. With literature about new cancer treatments increasingly available to the public and key actors/proponents of such systems expounding new techniques, a very strong normative context emerges for their adoption. This paper focuses on the discourse used by charitable organisations involved in such investments and how the involvement of these philanthropic groups contributes to the enrolment of vulnerable groups, such as cancer sufferers, fuelling this normative context.

A central concern of STS is the strategies scientists use when talking (or writing) about their work. This deterministic communication, using the rhetorical devices of scientific discourse, is often reflected in the material used by the fundraiser. These forms of rationalisation, and the normative context of their use, through which the meaning and utility of new technologies are prescribed, strongly shape public-technology relations and the persuasive power of technological change. 'Programme loyalists', such as charitable organisations in charge of fundraising, tend to discuss the system in a normative, deterministic but definitely desirable, way. It is suggested that such groups become deeply enrolled within programmes of development in which the legitimacy of knowledge claims and evidence production are difficult to examine. Drawing on results of interviews with health care practitioners and anonymised examples from public fundraising campaigns linked to two UK hospitals, this paper will discuss how fund raising materials can be regarded as tools for the enrolment of vulnerable groups in the processes of technological change. Where patients, considered to have altruistic motives after their life saving treatment, are called upon to donate money for the newest, and hence perceived best, equipment, practitioners were of the opinion that unnecessary pressure may be placed on the public to support campaigns, the value of which may be unclear.

Where there are public appeals for funds, it is vital that voluntary organisations are seen to explore critically both the evidence of effectiveness and motivations for adoption of new health technologies. The legitimating forces of developing, marketing and implementing new technologies, within the care of very vulnerable social groups, such as cancer sufferers, call for careful evaluation and scrutiny.

Cultivating a Vision of Scientific Knowledge: the Role of a Private Foundation in Biomedical Research in the United States

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Biomedical researchers in the United States rely heavily upon funds from the National Institutes of Health (NIH) in order to conduct their studies. Awards from the NIH, however, fluctuate with broader social, cultural, and political trends. Since the turn of the twenty-first

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century, biomedical researchers have suffered from government cutbacks; the boon of the late twentieth, in which the NIH almost doubled its number of awardees, has declined quickly such that an increased number of scientists have been competing for less than half the funds. With these fiscal changes, the National Institutes of Health's has also moved to fund greater numbers of study groups that focus on specific diseases, like cancer and HIV, awarding grants to scientists who are pursuing translational knowledge-science that has clear and direct applications for human health.

Basic science, the pursuit of scientific knowledge for the sake of knowing, has been, effectively, written out of U.S. national pursuits. Private foundations, however, have been playing a much more active role in the funding of biomedical scientists pursuing basic science. These non-governmental organizations provide young investigators with much needed start-up packages and an opportunity to produce data critical in requesting NIH grants. One such foundation, the Pew Charitable Trusts, has funded close to two hundred researchers since 1985. The members of the Pew advisory committee narrow hundreds of applications to somewhere between fifteen to twenty awardees each year, thereby helping to shape content and focus of biomedical science.

In this paper, I look at the role of the Pew Charitable Trusts in developing certain areas of biomedical science. Using oral histories conducted with the awardees taken a few years after the end of the four-year award and with the committee members taken at various points throughout their career, I compare researchers' perceptions of private and governmental funding in the biomedical sciences, focusing particularly on scientists' views regarding utility and therapeutic potential in their research. I also draw conclusions about ways in which funding sources evaluate non project dependent proposals and help to direct research in biomedical science.

Ethics in Translation: Care & Community in Health Research

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Interdisciplinary research, aimed at accelerating translational goals, is increasingly promoted (and funded) as the means to advancing the next generation of health science knowledge and practice. The multi-level nature of intractable problems like cancer disparities indicate population and behavioral research domains will follow this trend, already underway in basic bio-physical sciences and directly impacting the clinical domain.

This re-organization of the research endeavor brings new formulations of community: both the "community of science" and extramural objects/subjects caught up in such collaboration. Every structure that organizes our experience is constituted and maintained through acts of exclusion. The moral economy is built into the scientific undertaking however and wherever that may be located. Identity is constructed - of populations, communities, and thus of individuals - through the dialectic process of scientific knowledge responding to health needs, and health needs given voice (and political legitimation) through interpellation by that science (Althusser, 1971). Identity politics offers a double-bind: the means to empowerment and organization, these same formulations also constrain the nature of the problem / debate /

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solution to pre-given terms.

This paper takes as a point of departure the anthropologist's transition from four years in a federal health science agency to an academic health center. Tracking the flow of intellectual and financial capital from funder to grantee, I consider how new relationships in translational science are shaped. I follow the flow of particular ethical narratives through funding opportunities and bureaucratic technologies of grant administration to the dynamics of peer review and the evaluation of funded programs that determine additional years of funding. In the academic realm, I examine the rhetorics of autonomy in the professional identity of principal investigators and the instrumental politics of community-based "participatory" research. When the impetus for extramural outreach is tied to securing on-going federal funds, the ethics and pragmatics of patient/subject accrual are cast into question.

This paper uses ethnographic data to ground analyses of organizational ethics and institutional culture as social processes. It contributes to the move to extend science studies beyond laboratory practice by engaging the conceptual networks of university/community-based organization (CBO). Rather than mounting an explicit comparison, it develops in the Geertzian tradition of examining social change through an account of a group caught in the disjuncture of macro forces and multiple commitments while weaving implicit comparison with ideal types commonly glossed as "research," "science," and "community." As such, the analysis seeks to pose a counterargument to Herzfeld's symbolic analysis of bureaucracy by critically framing the ethics of caring against the pluralizing claims of translational science.

1.3.4: Energy in Everyday Life. The Use of Energy Related Technology. II

Regulating Energy Technology in the City:
How Architects Act in a Contested Field of Expertise

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Concern about global warming has shifted the energy efficiency of buildings into the limelight of government(s') policy-making in recent decades. The UK government has - often in tune with European efforts - substantially increased the regulatory requirements for energy-saving technology in buildings and current targets include achieving 'carbon zero' status for all new dwellings from 2016. Aspects of this plan, such as on-site renewable energy technology, pose particular challenges for urban use.

As the scope and complexity of regulations are augmented, enforcement increases the need for regulators, but their numbers have not grown accordingly. Evidence from semi-structured interviews with architects suggests that regulatory interpretation and enforcement is increasingly taken on by project architects, who come to act as if they were street level bureaucrats as part of their wider project remit. Instead of being in the hands of the state, the detailed interpretation and application of regulation is often in the hands of professional designers. Thereby architects act as regulators of energy technology in the contemporary city.

This presentation examines the co-evolution between urban energy-saving technology and architectural regulation. Drawing on the case study of an urban primary school, it will show how designers choose between different technologies to meet regulatory targets. Recent shifts away from prescriptive and towards performance-based regulations open this process up to a large plurality of design responses. Enlarging opportunities for different technological responses often adds complexity to the work of designers. Similarly, the convoluted nature of the regulatory enforcement tools, which are now usually software-based, adds to the complexity of designing. Consequentially, even in moderate to small projects architects rely on a network of other professionals, such as engineers, specialist consultants and specialist designers.

As architects attempt to delegate issues around energy technology to other professionals, they often struggle to maintain control over wider design decisions. The division of labour between those who apply energy technology through design becomes an issue of conflict. More and more specialists compete for taking on the tasks of street-level regulators of energy technologies.

This paper will use a science and technology studies approach to examine how the street-level regulation of urban energy technology is contested. It will show how individual design actors position themselves in a project-specific network to interpret and apply regulation. In conclusion, it will argue that further research could contribute to a better understanding of the co-evolution of technology, regulation and the division of labour in architectural design.

1.3.4: Energy in Everyday Life. The Use of Energy Related Technology. II

Too Hot to Handle? The Appropriation of the Climate Change Problem and the Implications on Energy Use in Every Day Life.

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The energy situation in Norway has been characterised by a large supply of renewable hydropower and large economic dependence on export of oil and gas. This has resulted in an energy culture marked by conceptions of abundant energy sources and comfort oriented energy usage. Today, the comfort oriented energy use is challenged by the climate change threat.

This paper looks into what happens when the comfort oriented energy culture meets a new risk represented by the threat of climate change. To what degree does the climate threat destabilize the comfort orientation of the households? Do people perceptions about how they should live change? Are changes taking place in people's everyday life or is there a divide between attitudes and actions? How is this global problem negotiated in relation to local actions?

In order to pursue these questions we have used focus group interviews with lay people from a broad spectre of the Norwegian public. The interviews demonstrated that people struggled to make the climate change knowledge relevant to their own life situation. First and foremost they demanded knowledge that was seen as relevant to own actions. They asked themselves what actions they could take in order to contribute in a way that gave noticeable results and that thereby appeared as meaningful? The general, abstract climate knowledge was met with some scepticism. The informants had grasped the arguments but did not automatically accept them. One reason for this was that they did not regard the climate change knowledge as socially robust. In addition they did not find the knowledge sufficiently relevant as it was not applicable to their own situation.

The comfort oriented energy culture seemed hard to change, even faced with the view of climate change portrayed as an imminent danger. Many expressed that they could take on actions that did not consume a lot of time and effort, like recycling their garbage. To change the energy consumption was perceived as a more dramatic action and something that few were willing to do as long as the political message was interpreted as void of concrete measures and without obligation.

Energy Behavior as a Collectif in Every Day life: the case of Colonia - Student Dorms at the University of Linköping

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A household's energy behaviour consists of several processes and interactions as well as it involve the decisions and functions of several entities. A household constitutes a technical infrastructure where people live, meet, and shape their identities in different ways. This study

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aims to open the black box energy behaviour and highlight different aspects and entities that influence and shape the way households use energy sources. A household's energy behaviour is defined by different material and socio-economic objectives/aspects. These objectives often conflict with each other in terms of economic resources, political prioritisations, and technical potentials. For example, the implementation of environmental-friendly provisions in a household implies often costs and distribution of priorities. The most suitable method for highlighting and conceptualising the relationship between energy behaviour and different actors' engagement is to study the development and construction of infrastructures (such as houses, apartment buildings etc), since infrastructures comprise the complexity of the modern society.

The aim of this study is to reconstruct and follow the process of designing and implementing a construction project, namely Colonia - the new student dorms at the university of Linköping, through the lenses of household's energy behaviour. Particularly, we aim to investigate how the interaction among different entities, such as constructors, owners, users, ventilators, heaters, climate etc, co-produces energy behavior in the context of residential student buildings and standardizes ways of construction as well as patterns of consumption. In doing so, we intend to reconstruct the households' everyday experiences/patterns as well as to follow construction and owning practices: How does a household conceptualize its own energy use? What kind of actors influences energy use? How material and natural aspects affect the construction process and the production of behavioural patterns of energy use? How do experts and constructors interact with the built environment? What negotiations take place between actors in the process of configuring a specific construction project regarding energy use and how these negotiations materialize in the context of the project, in terms of efficient energy behaviour/use?

The study treats energy behavior as a hybrid collective (Callon & Law, 1995. "Agency and the Hybrid Collectif"). Our aim is to follow and reconstruct relations between the components of the collectif. It is the relations and their heterogeneity that are important in this context. The project will attempt to illustrate how everyday choices, experiences and interactions with other actors regarding the energy equipment of a household define the energy identity and behaviour of its members. In other words, to study the processes through which the design and construction of a house regarding electricity, heat, ventilation, water, drain system etc provides evidence concerning the materialisation of energy patterns within a household on an everyday basis.

The Meanings of Energy in Everyday Life

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In the context of current concerns for the environment, energy is often described as some sort of substance lacking or having certain properties. It is only in this sense that energy can be 'clean' or 'running out'. Defined technically, however, energy is an intangible entity. It comes in several forms (as heat, movement, nuclear radiation, etc) and is only measurable when it is transformed from one form to another.

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In this paper I present results from an empirical exploration into how these technical definitions interact with other representations of energy. These interactions were studied in two sets of symbolically charged and energy intensive practices: domestic reproduction performed in bathrooms (activities related to health, cleanliness, relaxation) and nature-related leisure activities (sports, second homes). In these practices (which in addition to the end-users are performed by producers, retailers etc) technical definitions, conceptions of energy as substance and other metaphoric and symbolic notions of energy are used.

Concluding the paper I ask how these specific uses are best understood and described. Several concepts will be tested for their potential: Are we studying actor-networks, hybrids, amalgams, assemblages or something else?

1.3.5: Educating Science Students

Seeing the Light: Optical Allusions to 'Scientificness'

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In science and technology education, textbooks are one of the most important text forms through which corresponding knowledge, skills, and habits of mind are communicated to non-specialists. Inscriptions - photographs, illustrations, diagrams, graphs, tables, and so forth - are used extensively to communicate techno-scientific content. Critical of the ever-increasing push in contemporary western societies for scientific and technological "literacy," this paper draws on the work of Bruno Latour's Actor Network Theory to consider how textbook images deeply embedded in cultural practice and bound by prevailing conventions and ideologies that underpin school pedagogy - prescribe the force, moral and ethical values, duties and selective attitudes of those who invented them. Specifically, the paper examines the inscriptions found in two Canadian textbooks that support the study of optics. Two analyses of the content of these resources will be presented: (i) an enumeration of the types of inscriptions in two Ontario texts (grade eight and grade eleven); and (ii) a social semiotic analysis of the realist and abstract genres of the visual mode that signal belonging to a community and its practices. Further to this, social literacy theory will be utilized to consider how science education in general and textbook inscriptions in particular often function restrictively and hegemonically to construct specific types of order, relations and identities within the pedagogic discourse of school. Differences exist in frequency of various types of inscriptions as the educational level rises and as the content remediated by the visual images becomes more specialized. The findings of these analyses, I argue, support Gunther Kress's suggestion that the purpose of the science curriculum is "to induct young people into the idea of scientificness."

Exemplary Design Practice:
a Discussion of STS Study Programs with a Design Component

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Study programs with titles such as "Design and technology", "Design and media", "Design and architecture", etc., have been introduced at many universities in recent years. A number of the emerging design programs may be characterized as follows: they combine an STS-related theory component with a design component and an application area. Students consider these programs to be attractive. Indeed we are involved in building yet another design-oriented study program at our own university.

However, teaching design as a central topic in a broad academic program seems to rely on the existence of a body of design knowledge. Moreover, there may an underlying premise that design knowledge is domain independent, for example, independent of whether the domain is software engineering or city planning. These assumptions have since long been challenged by Schön and other researchers on educational practices. Schön argues, in his work on reflective practice (Schön, 1987), that design competencies are tacit and domain

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specific. Educators may face a 'methodology vs. relevance' dilemma, in the sense that abstract, domain independent design methods may not be relevant in practice. This dilemma is akin to the well-known rigor vs. relevance dilemma in research disciplines which are design orientered, including information systems research (see, eg., Lee 1999).

The paper approaches the educational dilemma in two steps: First, we reconstruct two archetypical, didactical approaches, each related to a theory of design: the rationalist didactical approach, which is epistemologically related to Simon's work on design science (Simon, 1996), and the apprenticeship approach, which is related to Schön's work on reflective practice. The archetypes may be summarized as follows:

▷ Rationalist: Focus on theory, problem solving by deduction from generic methodological principles. Design knowledge is viewed as generic; it can be made explicit.
▷ Apprenticeship: Learning from practical work; guidance by a master. Design knowledge is viewed as context dependent and tacit.

Second, a case study of contemporary academic study programs is conducted. The study indicates that several programs teach generic design methods, as in the rationalist approach, yet at the same time the programs teach an epistemology of design knowledge which is phenomenological and context-oriented, that is, the view that underlies the apprenticeship approach. This indicates that the 'methodology vs. relevance' dilemma is present in educational practices.

In a preliminary attempt to resolve the apparent dilemma, the paper proposes a didactic concept of exemplary design practice. The concept is intended to characterize (an promote) an educational practice with focus on design practice and generic methodology, and where studens acquire methodological insights by way of induction from practical design experience, as opposed to the deductive approach to problem solving in the rationalist approach.

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Hierarchy and Discipline: Processes of Initiation and Selection in Mechanical Engineering Classes

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In most Western countries, mechanical engineering remains an area of engineering education with persistently low levels of female enrollment. Though the need for an increase in women's participation in such male dominated areas has widely been recognized by now, the emphasis is usually put on the promotion of female students in order to achieve change. Such a perspective, imposing the burden of degendering on women only, fails to aknowledge the gendered character of engineering cultures themselves.

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This paper, on the contrary, examines specific aspects of the academic culture of mechanical engineering in the Swiss context. It focuses on processes of initiation and selection of beginners in the early phase of their study paying special attention to the way newcomers are welcomed and how the subject matter is introduced to them. I will argue that key features of the disciplinary culture in mechanical engineering are enacted and implicitly transmitted to the newcomers right from the start of the first term.

My presentation draws on ethnographic fieldwork carried out at a technical university in Switzerland, namely on participant observation at the welcome day and in the introductory course of mechanical engineering. In a close reading of the setting and the sequences of these first meetings I will examine the implicit messages conveyed to the newcomers and elaborate on their gendered implications. Bernstein's typology of educational codes (1975), namely his distinction between collection codes and integrated codes, will be used to discuss the pedagogical features of the mechanical engineering classes. These features - high degree of classification of the contents and strong frame of the pedagogical relation - point to the importance of boundary maintenance (Gieryn 1995) and to a strong sense of membership in the professional community. Newcomers are exposed to these processes of inclusion and exclusion from the very beginning. I will show that hierarchy and discipline are crucial to the process of cultural affiliation into mechanical engineering and I will argue that these features draw on a masculine culture rooted in military experience.

Gendered Boundaries in Physics

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Physics is one of the academic fields where women are underrepresented throughout Europe -the higher one gets in the academic hierarchy, the fewer women one is likely to meet. This statistical phenomenon, often observed in academic working communities, has been described with notions such as glass ceiling or leaky pipeline to illustrate the fact that women tend to move upwards in the academic rank slower than their male counterparts while some of them even leave academia prematurely. The reasons for female underrepresentation in the highest academic positions have been related to women's problems in reconciling work and family, lack of female role models and overt or subtle discrmination in recruitment processes. However, feminist studies of science have showed that the gender gap may also be rooted in the cultural and historical definitions of science. Firstly, the criteria of "real science" may have been defined so that women's contributions to science have been marginalized. Secondly, the stereotypes attributed to science may have made it problematic for women to combine feminine identity with that of scientist - women in science are often considered as non-women. (Harding 1991; Fox Keller 1985).

In this presentation, I aim at utilizing the notion of boundary work (Gieryn 1995) when investigating the Finnish university physicists'understanding of their work and professional roles. Accordingly, I understand boundary work as a set of discursive practices that individuals employ when demarcating science and non-science. My main interest is in identifying the ways in which gender becomes articulated when the cognitive authority, prestige and power of science are contended for or challenged in the interview material.

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The interview data consists of 36 in depth interviews with Finnish female and male physicists, both present and former university staff. The interview material was gathered during a multinational research project UPGEM (www.upgem.dk) during the years 2006 and 2007.

1.3.6: The Science of Uncertainty and the Art of Probability: Statistics in Medical Science

Sameness and Difference:
Constructing Medical Stories around Low Birthweight

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Medical stories about phenomena are often presented as certain, objective, and stable, with some being enrolled into public health policy. For example, Low Birthweight (LBW) within a medical arena is depicted as an irreparable risk factor for a variety of chronic diseases in adulthood with a 'poor' in-utero environment as the causal mechanism, and plays an important role in public health policy and practices. However, instead of taking such stories as stable accounts, this paper presents empirical work about the use and representation of epidemiological data about (low)birthweight and analyzes both the category and its application. Specifically, one dataset is molded into three potential stories, from singularity into multiplicity (Dugdale 1999). The object of quantification remains the same, low birthweight, but there are different statistical techniques, actors, materialities, theories to represent the 'causes' of the phenomena, which are projected into different times, spaces and locations. Additionally, the results from each story appeal to different audiences, from the universal to the local. The first story is about a proposed relationship between low birthweight and genetic mechanisms which are purported to contribute to the problem, the second examines the effects of different social factors on low birthweight, and the third is concerned with the relationship between low birthweight and geographical location. Each story provides a lens for examining a different set of social relationships.

I will argue that the production(s) of medical knowledge and subsequent use within health policy and practice, especially in the current environment of Evidence Based Medicine, is governed by competing political interests and translated according to actors' demands.

Individualized Statistics:
Disease Concepts in Molecular Diagnostics

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Medical diagnostic practice is traditionally a field in which quantitative, population based medical knowledge and the particularities of the individual case have to be reconciled. In the last decades several scientific, technological and social developments have strengthened the population based, statistical perspective on 'disease'. This has shifted the conceptualization of both 'disease' and 'health'.

First, the tendency towards preventive medicine made us familiar with the idea that one can be diseased without experiencing any complaints or symptoms. More recently, predictive diagnostics based on genetic knowledge has linked the idea of 'being at risk' to characteristics of the individual body: its genome. However, whether or not your body predisposes you to disease is still determined by statistical insights. Lately, 'personalized medicine' has become a new buzz word. Although the expression suggests otherwise, this

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aim is largely based on statistical claims as well. It usually indicates attempts to differentiate the categories used in diagnosis to enable differentiation in prognosis and therapy as well.

New developments in molecular diagnostics are now presented as realizing a truly 'Predictive, Preventive and Personalized Medicine'. What is interesting in these technologies, however, is that they might reinforce the statistical approach in medicine while at the same time tip the balance to the side of the individual. An 'individualized statistics' is emerging, which once again shifts preceding concepts of disease. On the one hand, molecular diagnostics reinforces the idea of disease as a linear cascade that was already implied by earlier forms of predictive medicine. On the other hand, it may shift the point of reference in distinguishing 'normal' from 'abnormal' test results to the level of individual functioning.

In this paper, I want to analyze this apparent shift in the use of statistics in medical diagnostics and discuss its implications for the role of statistics as well as individual bodily experience in medicine.

The Limits of Quantification? The Category of 'Rare' Diseases.

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STS scholars have devoted much attention to quantification tools and processes in medical science and practice, thus focusing on the areas where they were best developed. Statistics are at the core of these studies. By definition, they apply to large numbers. But what happens when statistics face too few cases? Besides, is quantification in medical science only a scientific matter, or does it involve politics, ethics or economics as well? I address these questions in the light of the history of a specific category, namely "rare diseases" in order to investigate the potential limits of quantitative approaches in medicine.

My study is based on an archive work including 150 documents and on 70 semi-structured interviews. I focused on "trials" (Latour, 1989), that is, on critical situations in which the category is put to the test and re-defined. Two trials are especially important: debates around the Orphan Drug Act adoption in the U.S.A. of the early 1980s, and the process of elaboration of the European Regulation on Orphan Medicinal Products in Europe in the 1990s.

I trace the history of the category by examining the viewpoint of four communities of practice: patients, medical practitioners, the pharmaceutical industry and public authorities. I demonstrate that (1) rare diseases are not a medical category, (2) they are a relevant category for the patients, the pharmaceutical industry and, therefore, for the public authorities, (3) the understanding of the concept common to these communities is blurred, however each one uses it in a precise sense for its specific purposes. Thus, rare diseases qualify as a "frontier object" (Star & Griesemer, 1989).

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Painting Objectivity Red: Is There Such a Thing as Soviet Medical Epistemology?

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This paper examines Soviet medical epistemology, focusing in particular on Soviet notions of objectivity and the values they embodied, and how these values were in turn reflected in clinical research practices. The paper draws on archival materials and published scientific literature generated during the Soviet-American healthcare exchange. Inaugurated in 1972 with the signing of the Agreement on Cultural and Scientific Exchanges, the program consisted of an active and prolific exchange of scientists, materials and research protocols between the two countries, thus providing a platform for the interaction of two different (although in many ways related) scientific epistemologies.

Quantificational Technology in Hospital-Based Medicine: Redefining Disease and Health Risks

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The use of quantificational technologies and statistics in medicine has transformed the conceptualization of disease and health risk, of normal and pathological. This shift has been underpinned by the development of mechanical and electronic devices that monitor physiological actions and inscribe them on graphs or measure them in numbers. These technologies have altered the methods of diagnosing illness and also led to a standardization of diagnostic procedures and a reform of the health care system.

The mass production of medical analyses provided an insight in redefining health risks by linking numerical indices with potential diseases. This type of evidence has cultivated a style of thinking among physicians, and has offered them a powerful rhetoric tool to advocate specific choices, either concerning strictly scientific issues, or sociopolitical ones which involve broader concerns of the medical community. This is well portrayed in the public health field where reasoning upon aggregate numerical data acquires the status of "objective evidence", and thus, generate trust (Porter, 1995).

In this paper I examine the introduction of quantificational techniques/technologies into the Greek hospitals during the second half of the twentieth century. I look at its implications to the depersonalization and standardization of diagnosis, at the reshaping of the concepts of disease and health risk, and finally, I consider its influence in public health concerns. I try to approach these issues by taking into consideration the notion of the biomedical platform and analyze how the particular configuration of instruments, techniques, and individuals engendered concepts, routines, and activities.

1.3.7: Public Engagement with Science, III

Why Do Citizens Patronize the Astrophysics Laboratory?

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The paper describes conditions in which citizens start and keep patronizing pure sciences, based on a case in astrophysics.

BACKGROUND
While public engagement in decision-making or assessment concerning newly emerged technologies is regarded as a key contemporary issue, less stress is placed on public engagement in pure sciences and their research processes. Is it possible for citizens to get involved directly in scientific research?

A good illustrative case is the successful relocation of a radio telescope, named "NANTEN" of Astrophysics Laboratory of Nagoya University in Japan, which was moved to the Republic of Chile with much support from over 600 citizen volunteers who raised 10 million Yen in support of this project. Since then, these citizens have regarded themselves as supporters or "patrons" of the Laboratory and intellectual exchange in various forms between researchers and citizens has been continued.

The goal of our research is to develop recommendations for successful "citizen's patronage towards pure sciences". We studied the details of the case through document analysis, participatory observation, a questionnaire survey and interviews with both patrons and researchers. The recommendations arising from this work for researchers were reported at the past conferences of the European Association for the Study of Science and Technology and the Society for Social Studies of Science. The present paper reports the recommendations for citizens, and potential patrons.

AIMS & METHODOLOGY
In this paper, we aim to explicate (1) citizens' motivations to join in patronage activities, (2) their motivations for continuation, (3) major factors determining degrees of commitment, (4) changes to the public image of astronomy/astronomers, and (5) the significance of being a "patron of science" to their personal life.

We conducted a questionnaire survey aimed at patrons and received 51 valid responses. This survey was followed by ten one-hour, semi-structured, and autobiographical interviews. Interviewees were selected according to various criteria including their age, sex, occupation, and the role they have played in patronage activities.

The data was analyzed using Prochaska's framework, "Integrative Model of Behavior Change" and Andreasen's "BCOS (benefits, costs, others, self-efficacy)" model.

MAJOR FINDINGS
Some of the findings are shown below;

▷ The central motivation for joining is intellectual; to know more about the universe.
▷ In the continuation phase, emotional motivations also come into play; fellow feeling, attachment etc.

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▷ The characteristics of intellectual motivation slightly have changed; to share puzzles and research interests with scientists.

▷ Having an opportunity to make good use of their newly attained knowledge is a key to continuation.

▷ Those who have a firmer commitment share an additional motivation; to realize their social ideals.

▷ Some patrons find a value in being mediators between scientists and other citizens.

EXPECTED CONTRIBUTION TO STS
The conditions for successful "citizens' patronage" provides us with a better understanding of how scientists can engage the active interest of the public and the importance of scientists' good "communication skills", as part of the provision of better training. The next step is to plan how such work can be built on and sustained.

The Roles of Japan's Mass-Media in Reporting Climate Change Science

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Mass media is a very influential tool in shaping public understanding but few studies have examined the extent to which newspaper coverage of such stories reflect issues embedded from scientist in Japan. In order to explore the role of Japan's print-media as a tool informing public the science of global warming, we estimated the relative distribution of stories regarding global warming and climate change science from January 2005 to December 2007. And we assessed the quality of the coverage by means of key indicators such as accuracy, selection of information sources, attention to prevention and mitigation.

Our results showed a rapid increasing of the total number of articles regarding global warming after February 2007, but a slightly increasing of articles regarding climate change science in same period. Articles regarding climate change science could be categorized following three types; 1) reporting new findings of pure science as main topics, 2) reporting social issues, like natural disasters, with relevant previous researches, 3) reporting new policy implementation with previous research, which explaining needs of these policy measures. Between these three categories, we found differences of the pages on which they appeared. Moreover, the difference in page has a significant correlation with the differences between the source of scientific information. We also revealed that few articles in all categories provided the public with the information to understand global warming issues by context including causes, effects, and countermeasures. Moreover, journalists did not always provide information about present and future impact of global warming with scientific accuracy, and they hardly highlighted the present needs to prevent and mitigate their consequences. It was suggested that taking actions to bridge the gap between scientists and the media would be required.

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Trust as a Social Act:
What is Subjective and Active Trust in a Risk Society?

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Studies about trust are developing in various academic domains. In business management, clinical medicine and nursing, studies emphasize the psychological aspects of face-to-face communication and trust is often treated as an important concept for smoothly attaining their primary purposes such as sales targets or medical treatments. It can be said from a sociological viewpoint that they view trust as an active behavior of customers or patients that is generated by the interaction with the business person or the doctor or nurses, and the focus in these studies is on the "how" of these interactions or interventions.

In economics and various branches of engineering, the researchers deal with trust in relation to objects such as the economic profitability or the quality control of products, and they assume the cases in which systems or products break down or do not function as expected. Probably, also in these cases, trust is active behavior by actors but actors grow faint from the surface of argument and are featureless. That is, they do not consider actors as the subject of the act and assume that trust can be automatically acquired if the object of trust is ideal. The theme of this presentation is a sociological discussion of trust towards social systems such as science and technology. This presentation covers subjective and active trust; hence the nuance is near to the former, trust in communication. However, it is underscored that trust is actually not subjective and active despite its appearance. Bearing this in mind, trust in a risk society is reconsidered.

Through the process of modernization, we gain a variety of life courses and are liberated from traditional and static patterns of acting. This causes diverse consequences and we have to think about the risk of our own choices. Trust is often seen as the basis of choices, but we can never avoid, and rather lead to actively accept, the risk of our choices. We have to individually take in the imputation of the risk because the choice is our own choice. This presentation aims to criticize the STS status that stereotypically falls into theories of civil society without any premises. Risk communication is generally seen as a worthy version of civil society like lots of STS discussions. However, when we accept personal risk, which is often demanded with slogans such as "you have to take care of yourself", we should be aware that we may, in fact, promote disadvantages under the name of civil society.

Science, Technology, and the Portuguese Parliament: the Cases of the Medically Assisted Reproduction and of the Nuclear Energy

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Issues of Science and Technology are decisively marking contemporary societies. The paradigm of the double delegation (Callon et al, 2001) is based on the transfer of the authority to work with subjects of administrative and political order to the elected officials and

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public servants through electoral and administrative mechanisms and the authority to deal with scientific or technical issues to duly certified experts. However, with the emergence of new risks (Beck, 1986) like environmental and health and food safety crisis, it has became pertinent to involve the citizens in a reflexive process of deliberation that transforms them in actors and participants of the decisions in matters of S&T. Some of these exercises include consensus conferences, citizen conferences, citizen juries, citizen panels, foresight exercises and scenario workshops.

The national parliaments, spaces par excellence of the legislative work, should also reflect these concerns for the contemporary democracies. In the Portuguese case, due to the inexistence of interface organizations (as cabinets of S&T), the decisions in matters related with S&T, when they involve controversial subjects, are taken without public debates or through broad debates between specialists with different positions, and sometimes the S&T discussions are transferred from the plenary sessions to ad hoc commissions.

Through the analysis of two case studies, the debates in the Portuguese Parliament concerning the nuclear energy and the medically assisted reproduction, we will characterize the ways how the Portuguese MP's approach issues of science and technology, presenting different characteristics of the point of view of the referred aspects (economic, environmental, ethical and social), the collective or individual dimensions, and the ideological associations, showing how the frontiers between science and politics are sometimes very difficult to establish in these two particular debates.

1.3.8: Care and the Art of Dwelling: Bodies, Technologies and Home

What has Happened when You cannot Watch Television because You didn't Eat Your Potatoes? Augmenting the Home and the Art of Dwelling.

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In this paper we will look at the implications of augmenting the homes with context aware systems on the meaning of dwelling for the inhabitants of 'private' homes. We will focus upon one specific problem space that can be defined when researching context aware systems in the home environment: the tension between loss of control and freedom increase. When giving away personal data to the system, most often without having any means of control on it, people with disabilities can increase their freedom on everyday life by staying away from institutional care. This often implicates the institutionalization of their house and seem to imply lose of control for the person the system has impact on. Much in contradiction to mostly all other applications, users often don't have impact on the feedback loop of context aware systems. In the paper an overview will be given of the research of the last fifteen years in academic engineering circles as well in the industry that exist on the topic of context awareness, and the implications of this on the control/freedom debate. Starting from the observation that in most current commercial context aware applications 'context aware behaviors' are pre-configured and don't allow users to co-construct them in any way, we will scrutinize how this is related to the aim of black boxing technology in the name of 'user-friendliness'. We would like to conclude by defining some principles that have to be taken into account when developing and designing context aware systems for 'private' homes that could help to overcome the control/freedom dichotomy.

Dwelling the Securized Home with Heidegger

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Home has been conceived until now as the place of safety. However, the geography of safety is currently under transformation. The order and safety of the modern home was constituted as the effect of a binary moral order enacted in the architectural design as well as in the practices of inhabiting the home. Nowadays, we still handle this idea of home but we have left aside the moral dimension and we have stressed out the technological one. Certainly, thinking about safety at home is related with the development of many technological devices as alarms or fire detectors, and other mundane technological innovations as anti-slip surface rubber bath mats or safety latches and locks for cabinets and drawers in kitchens, bathrooms, and other areas to prevent people from poisonings and other injuries. Summing up, we are going to focus on the security provided by those technologies of risk management. Drawing on Heidegger, we would like to observe some instances of vulnerable people's life at home with domotic and telecare technologies and think critically about the production of secure spaces and the forms of dwelling them.

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More specifically, we would like to put forward that turning the home into the most secure space is not enough for being/feeling at home. Actually, being/feeling at home does not result from foreseeing and avoiding any incident. On the contrary, we want to state that being/feeling at home is possible when we live with insecurities and vulnerabilities (this is what dwelling means from a heideggerian perspective).

Surveillance and Telecare: from Biopolitics to Cinepolitics in the Society of Knowledge

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Any current analysis on power relations takes Michel Foucault's contributions as an inexcusable point of reference. The reason is clear: Foucault was able to articulate in the same analytical framework surveillance, discipline and subjectivity. For this author, discipline is a device in which the technologies that 'allow to see' induce effects of power on the subjects by means of constraint that make those subjects clearly visible. Surveillance is coextensive to discipline and its principal effect is the production of subjectivities. The material and technological figure that articulates this framework is the panoptic, a completely closed space. But the analysis of this author belongs to the past, to a time dominated by institutional realities that are no longer ours. Contemporary societies have developed a new aspect, mostly defined by the massive implementation of information and communication technologies, and the new spatialities they create.

We will explore these transformations by analyzing new care devices used by those in situations of dependency. Among them we will emphasize the implementation of GPS technologies of localization. Their use is promoted on the premise that the person will enjoy greater autonomy and mobility beyond the closed space of the house, as long as she/he is willing to allow her/his movements to be constantly monitored and enclosed. For its operation, this device demands an initial spatial delimitation of safe and risk areas. Such cartography will be periodically up dated reducing the dimension of the safe areas (in the case of dementia) and incorporating new risk spots. This device shows the emergency of new micropractices of power and control: a new anatomy of surveillance. Grounded on movement, it does not require visibility and it goes beyond the physical barriers. Based on the management of trajectories, it allows the permanent location of individuals by tracing and enclosing their paths and their spaces of circulation in everyday life. Foucault showed that the discipline is basically an art of the body, instead this device shows a surveillance that operates through an open and continuous control. "Allowing people to do", permitting permanent movement. As long as there is movement, there is a possibility to trace, monitor and predict its trajectories.

Through the analysis of empirical examples on GPS telecare devices, we suggest that biopolitics has been subsumed by a new diagram of the control and management of subjects based on their movement. Taking Bauman's notion, we will call it "kinepolitics".

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Immunity Beyond the Home:
ICTs and Vulnerable People's Mobile Dwelling

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ICTs might be transforming vulnerable people's care and making it mobile, as some recent developments -such as GPS retrieval systems for children or people with dementia- would show. All of these technical "solutions" work under the same principle: to create secure spaces for vulnerable people beyond the home. Drawing on Peter Sloterdijk I would like to stress the contemporary changes in dwelling caused by these devices. In his work, Sloterdijk develops a genealogy of dwelling practices/spaces, "immunity" being the main concept to talk about the securing spatialities of different socio-technical arrangements through history.

In order to think about these new technical developments in vulnerable people's care, special emphasis will be put on empirical examples of the transition from a spatial regime of immunity based on "feeling secure at home" to a spatial regime of immunity which could be called "individual mobile security".

Dwelling between Pillows.
Pillow Research: Multiple Diagnoses and Hidden Talents.

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This presentation intends to outline a collaborative research approach in the context of the long-term care of severely disabled patients. The long-term rehabilitation of patients in vegetative state and minimally conscious state - conditions of extensive unawareness and unresponsiveness to external stimuli after traumatic brain injury - calls for 24-hour care at specialized wards and nursing facilities where patients live together with professional caregivers, family members, physicians, therapists and - sometimes - with ethnographers, researchers and artists. At this healthcare site, pillows are ubiquitous. They are part of everyday handling and positioning of patients. Many versions of pillows are distributed all over this health care site. They have a location and a function, a surface and a filling. They are soft or firm and they create spaces. But not only there: pillows are also part of the worlds of doctors, nurses, family members, administrators, researchers, artists etc. They are part of memories and they have history. So, we are familiar with pillows: we relate to or with them, they affect us, our body, they are an interface, in between, interesting. The project departs from the assumption that we are facing patients and non-patients with the potential to become "talented bodies/persons" with their original abilities and skills. We further assume that the unfolding of these talents strongly depends on continuous interactions between patients and non-patients. With reference to sensory stimulation concepts as they are discussed in the respective therapeutic context we currently develop a method called "pillow research" that aims at enriching and exploring these interactions by means of modifying and transforming the aforementioned ubiquitous interface - the pillow. In this regard "pillow research" is a method to develop a so-called "pillow kit" - a series of "pillows" that are able to

1.3.8: Care and the Art of Dwelling: Bodies, Technologies and Home

create specific spatializations within this care setting. The development of a number of "technically (digital and analogue) enhanced" pillows follows the principles of a sociology of translation. What we mean by that is that the pillows should be able to "translate" existing routines, habits, procedures, as well as, materials, instruments and devices at the intersection of home and institutional care. This includes the creation of a distributed, situated and collective "diagnostic setting" that explores the meaning of "diagnosing/assessing" of consciousness, perception, emotions at the intersection of clinical medicine, therapeutic nursing and lay expertise.

1.3.9: Ethics as Practice - Organizing Ethics in Everyday Life, II

Ethics Inc.: a Sociological Account of the Contemporary Market for Corporate Social Responsibility

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This paper begins with the observation that presently there is a remarkable and growing concern with ethics in the global business world. Frequently made manifest in the suggestion that companies might behave in a 'socially responsible' manner (captured by the phrase 'Corporate Social Responsibility' - CSR), this contemporary concern, I will suggest, might be usefully approached as a particular kind of market. As a market, ethical forms of conduct are made newly 'valuable' in financial terms, but simultaneously are made significant in ways that come to bear socially and politically. While existing accounts have typically focused on one dimension of 'ethical' practice - usually either the economic, or the 'moral,' in the present account relations between markets, ethics, and politics stand to be further elaborated. Importantly, this elaboration will not seek to reach prescriptive conclusions, the focus will instead be on the doing, on the forms of practice that emerge in this context themselves. The specific emphasis therefore will be precisely on how ethics are enacted in CSR. Both discursive and non-discursive complexes of ethical practice might be said to identifiably assemble and perform CSR, and it is both the specificity and variety of these processes of generation will be of particular concern here.

Isolating collections and patterns of 'ethical' practice for attention, three interlinked, but delineated 'nexuses' of CSR focus will provide empirical substrate for discussion - The 'Ethical Corporation,' 'Ethical Career,' and Ethical Consumer.' Herein, the multiple and reflexively articulated character of a 'market ethics' is demonstrable, while the precise relationship between CSR and 'ethics' per se is not finally concluded but is instead that which is contestable, changing, and continually at stake.

Animal Farm Love Stories: Ethics-in-Action

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The main body of this paper will be an historical ethnography - about a range of human-animal relations at the mixed farm where I was born and grown up in the fifties and sixties in the Netherlands. Though we had never heard of animal ethics, let alone ethics of care, we took care of a series of animals. But it was care of different sorts, for different reasons and different purposes. Often this care was economically driven: the more animals cared for us, i.e. for our income (e.g. horse, cows, pigs, chicken), the better we cared for them. Or, the more threatening they were for our farm-system (ermines, rats, insects, wild or infected animals), the more emphatically we took care of excluding them from the system. Sometimes, however, care was not driven by economics. The dog, for example, was economically useless, but we cared for him with passion - up to the moment he bit to death the sheep of our neighbours. Then he was killed by my father - brutally. Or, take the cows. There were moral limits in taking out our agression on them when they had knocked down

1.3.9: Ethics as Practice - Organizing Ethics in Everyday Life, II

the bucket during milking.

These ethnographical stories will be used to analyse the ethics of practices as well as the practice of ethics - in particular the connection between care and economy, between morality and instrumentality in human-animal relations. What kinds of care are we talking about here? How our, then, farmers notion of care relates to our, now, ethical and philosophical notion of care? Did we have, or even practice, a notion of animal ethics at all? Or did we have 'only' vague moral intuitions? And, if so, what is wrong with that? Good care for animals doesn't require universal animal rights. On the contrary, I would say.

So, the paper is both about ethics-in-action, and itself an experiment in ethics-in-action.

Fair Trade Clothing
- Consuming the Poor and the Certification of Poverty

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Fair Trade clothing is one aspect of a broader movement to introduce ethics to the textile industry. Subsequent to the articulation of multiple concerns regarding low wages, exploitation, hazardous working conditions, child labour, local environmental pollution, lack of market access or information for developing country producers, and so on, Fair Trade has attempted particular kinds of interventions. These are predicated on the notion that a certification system can connect developing country producers of textiles with developed country consumers and that this connection can be used to ensure that the articulated concerns are managed to the benefit of producers. Within this process of certification multiple questions are raised about the how to capture/produce evidence of ethical standards, what should count as the standard, the cost of standardisation, the reliability of standardisation and the consequences of standards.

This paper will look at just two features of this work in order to assess how textile ethics works in practice. First, the paper will look at attempts to figure out who should benefit from Fair Trade, how that benefit should operate and who should make these decisions. The paper will argue that this involves a certification of poverty which can attest to the genuine, authentic poorness of Fair Trade beneficiaries. The paper will look at the arguments over what should count as poverty and how it should be certified. Second, the paper will look at attempts made to link producers in direct relationships with consumers. In place of a face to face meeting come labels, certificates and producers' stories. This allows for moments of communication of authentic poverty and becomes the means by which a retailer can position the value of their, for example, white t-shirt. Although there are many white t-shirts available, this one comes with a story of genuine poverty. Shoppers are thus given opportunities to consume the poor. The paper will conclude with some questions on the issues raised by poverty certification and the consumption of the poor. More broadly the paper will look at how STS can move beyond sceptical analyses of certification systems and ask what it might mean for STS to be useful in ethics.

1.3.9: Ethics as Practice - Organizing Ethics in Everyday Life, II

The Ontological Politics of Ethical Standardising

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Ethicising - often conceptualised under names such as corporate social responsibility, social performance, and sustainability - features prominently as a mode of sense-making in the world of business. Exploring these new economies of ethics, this paper draws on extensive participant undertaken in three explicitly ethical, yet very different organisations: an 'ethical' property company, a professional services firm and a corporation in the extractive industry. The research sites, and the ethicalities enacted in these, were approached with a good portion of 'anthropological strangeness' and a dash of reflexivity. Looking at the messy practices by which organisational members construct standards for making ethics durable, communicable and defensible, the paper makes two arguments. First, that ethical behaviour becomes unthinkable without 'proper' categories and metrics in place; secondly, and related, that standardising can be understood as the performance of ontological politics. Finally, the paper offers some reflections on what these propositions mean for the study of ethics.

Beyond Mutual Shaping

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While the juxtaposing of social constructivist and technological determinist traditions has resulted in a pendulum-like movement of mainstream thinking in the field, recently efforts have been made to integrate both perspectives by pointing out that technology and society are mutually shaping each other (Boczkowski, 2004). However, such theoretical frameworks currently cannot cope with the enormous complexity of the issues at hand. After all, social shaping and the technological determinist perspectives offered the luxury of dramatically simplifying the analytical problem. Thus, the challenge lies in building a theoretical framework which is sufficiently complex to deal with the interaction of new technology and society on an appropriate analytical level while also being sufficiently parsimonious to facilitate empirical work and integration of data in a non-arbitrary way.Given such difficulties we want to explore the idea of using the notion of Communities of Practice (CoP) as a core for a theoretical framework that meets the two-fold challenge outlined above. We propose that this approach is promising because it uses a fundamentally different unit of analysis for understanding the interaction of technology and society. While social shaping approaches focus on individual action as their main unit of analysis, technological determinist approaches set out with macro-structures such as new technologies or institutions. Both approaches then have to grapple with the problem of integrating micro and macro phenomena, namely individual action on the one hand and societal structures on the other. The CoP concept does away with this problem by using a medium-level construct as its main unit of analysis, i.e. the micro-macro integration problem can be avoided to some extent. Of course, integrating phenomena on the CoP-level into societal phenomena is still a huge challenge; however, since the CoP-based approach starts from collective rather than individual action, a decisive conceptual step - integrating individual into collective action - is already accomplished through the construction of the main unit of analysis. At the same time, the CoP-concept allows for clearly defining how action is situated in the world and thus engaged with materiality. Our contribution in this paper consists of demonstrating (1) how larger societal units can be constructed from CoP as the main unit of analysis and (2) how technology can be integrated into the CoP-concept giving it a clear and definite meaning by drawing on advances in Practice Theory.

Different Roles of Technology for Niche Development.
A Comparison of Three Case Studies from Renewable Energy.

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The urge to alter the energy sector at large has led to rapid growth in renewables, partly as consequence of state measures triggered by public opinion and the pressure to climate protection, partly emerging from the intersection of these with economic and technical development. But renewable energy production appears in varying forms which are differently embedded in the infrastructure of the power supply system. We will argue that

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these differences cannot be analyzed in a purely social constructivist way, because the technologies themselves - hardware and infrastructures - matter for the structure of the niches and their development potentialities. We present a comparison of three branches of renewable electricity generation: wind energy, photovoltaics, and biomass energy. This is done by using visualizations of the most important elements and their relations for all three cases. The method for creating the visualizations is constellation analysis, a tool set for mapping heterogeneous constellations. To allow comparison, the portrayal focuses on the technical elements, not to reveal their possible agency or resistance at the micro-level of analysis but to show the manifold relations that make up the structure and dynamics of each of the constellations at large. In the conclusion we present some possible generalizations of the three cases with respect to the question how technology matters, and how these findings can be included in the conceptual repertoire of STS. For instance, the role of technical elements in the constellation can be differentiated into qualities of the core elements, the form and complexity of the coupling of elements, and the form and complexity of the embeddedness in infrastructures. Finally we discuss some consequences for facilitating or constraining the governance of niches, and the possibilities of creating momentum within niches.

The Co-Construction of the 'Innovation Space' : Hybrid Collectives, Networks and Innovation Capacity

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Several case studies in Portuguese firms led us to a preliminary conclusion that large multinational firms and small technology-based firms in science-based sectors have, by definition, an innovation strategy and know how to become a noeud in innovation networks. Small and medium firms work on a traditional basis of Fordist industrial culture, meaning they are still competing in old markets with the same old tools, the most important of which is the price of products as a tool which reduces heterogeneity and defines a specific market segment where these firms compete (Callon,1998: 21). They do not know how to compete in other market segments defined by innovation, in spite of the impact of European public policies trying to guide and shape firms and other institutions for innovation, particularly SMEs. According to these policies, the Portuguese R&D system has been reorganised to improve links with this type of firms in order to facilitate the transfer of knowledge. The main goal was to improve innovation capacity in firms by adapting institutional environment to this goal with basis on the belief of a co-evolution of technology and society and the support of the Innovation System framework. In this paper we analyse the impact of these inter-organizational, institutional structures, and innovation policies in the change of the R&D system and how firms "behaved" vis a vis these changes, including how and why some of them improve their innovation capacity and some did not. In other words, we analysed the co-construction of the innovation space by these hybrid collectives of firms, technological innovation, R&D institutions and innovation policies and we identified the reasons which explain the differentiation in their technological innovation capacity. This analysis is made, at a "macro state" scale, through a survey applied to representative sample of manufacturing firms. For analysing the data we combine several multidimensional methods as Multiple Correspondence Analysis, Categorical Regression and Cluster Analysis.

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Securogenesis - Institutional, Organizational and Individual Dealing with Technological Risks in the Aviation System

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Security is a central promise of the different actors in the aviation system. Be it legislators, manufacturers, air-traffic control, airlines or airline pilots - everyone is dealing with technological risk. In order to minimize the risk of accidents and plane crash, all actors depending on their position in the aviation system, contribute particular problem solutions, ranging from general rules and regulations to particular controls and guidelines of conduct. E.g., all aircraft components are documented from manufacturing to scrapping; aircraft maintenance workers are certified specialists; airlines employ comprehensive report systems in order to minimize operative risks; and aircrews in the face of increasing automation of the aircraft consider themselves as systems managers. A particularity of the aviation system lies in the elaborate cooperation of the participating actors beyond economic competition or special interests. Empirically based on a current research project on commercial aviation in Germany, we point out the inter-institutional and inter-organizational structures of the aviation system. On that basis, we focus in particular on the airline pilots' professional handling of the (technological) risk of flying. With the term "securogenesis" as a joint strategy of the actors involved, we focus on the collaborative effort to reduce risks in the aviation system. "Securogenesis" is conceptualized as an integrative approach to grasp macro-, meso- and micro-level phenomena in high-risk environments that can neither be reduced to technological determinism nor to mere social shaping of technology.

How to Wipe Out Risk from Technological Conflicts?

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One of the repercussions of technology on society is the change of the shape of social conflicts and their dynamics. It allows talking about a new kind of social conflicts which can be called 'technological conflicts'. They are characterized by following features: firstly, they are conflicts about risk connected with a given technology; secondly, expert judgments of the risks involved are divergent and do not represent impartial, objective authorities, but contribute to one or another side of the conflict; as such - thirdly - expert judgments can not any longer serve as a basis for the resolution of the conflict. The changing status of social conflicts has been already well described by social studies on technological controversies. However, they usually concentrate on the problem of technology regulation as a way of conflict solving. There have been described such approaches as 'democratic' and 'technocratic' ways of technology regulation and their impact on conflicts about risky technologies has been discussed. In this paper it is proposed to look at the actual, internal dynamic of the conflict and the way how technological conflicts are being governed by their participants. On the base of a case study on the conflict about the use of genetically modified organisms I describe a reductive model of conflict's governance, which is based on reduction of the risk involved in the technology. The reduction is twofold: the first step is the reduction

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of the risk to its physical dimension and the second step is the reduction of uncertainty. The reduction consists of a series of risk-concealment mechanisms which aim at reducing the technology to a simple phenomena which can be governed like typical ecological or economic conflicts. So we also introduce three kinds of conflicts about technology: the first one, 'technological conflict', acknowledge complex character of technological The second type is 'ecological conflict', which concentrates on physical harm (harm for the environment and human health). The third conflict is 'economic conflict' which excludes any questions of harm and risk from the debate and tends to see technology in merely economic terms. The reductive model of conflict's governance helps to show how different actors, involved in technological conflict, try to reduce the risk to a required level of conflict and which mechanisms of risk concealment they use.

The New Converging Technology and the Principle of Responsibility. How to Cope with Risk Assessment and Risk Governance of Converging Technology?

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The development of technological trajectories results not only from an internal cognitive and social dynamic, but from the mediation of external social expectations and demands as well. Taking in regard the basic theoretical concepts developed by actor-centered institutionalism (Mayntz R., Werle R., Schimank U.) it could be said that the institutions as systems of (formal and informal) rules which are based on the choices of composite actors structure the development of technological trajectories. In my paper, I'll try to argue, why it is so important that in the coming era of converging technologies these "rules of action" must be committed to the basic ethical norms (human dignity, privacy, etc.). The term "converging technology" refers to synergistic combinations of nanotechnology, biotechnology, information technology and cognitive science. Starting point of my discussion will be that the rapid advances in converging technologies (for example: nano-bio-informatics) have the greatest possible implications not only for societal change in the near future, but even for human identity as well. The topic is already proving to be highly controversial. In the contribution, at least some of the most disreputable recent cases will be used to point out the potential threats of the new arising converging technology: for example, how to draw the line between the medical therapy and human enhancement to avoid a new form of eugenics? In accordance with the thesis of actor-centered institutionalism that the so-called constellation of composite actors lead to collective definition of policy problems and strategies to solve them, I'll pay the full attention in the central part of my contribution to the question, if precautionary principles could be an important (democratic and heterarchical organised) policy instrument (at national or global level) for risk control and risk management of new emerging converging technologies. This question will be enlightened from different theoretical and practical perspectives. As it was already said in "Prinzip der Verantwortung" (Hans Jonas), to cope with the unprecedented threat of complex technologies in the future we must be prepared already in the present.

1.3.11: Governing and Institutionalizing Genomics: an Interdisciplinary and
         Interorganizational Perspective, I: Impact on Organizations, Healthcare and Work

From Rheumatism Epidemiology to Genetic Engineering: Study of the Transformations of Connective Tissue Research at the University of Manchester

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This paper explores how the advent of recombinant DNA affected the organisation, patterns of work and research agenda of a scientific group which investigated connective tissue diseases at the University of Manchester. For the period 1966-1996, it analyses the correspondence between the successive incarnations of the group - labelled in terms of rheumatism, collagen, connective tissue proteins and extracellular cell matrix -the acquisition of new techniques and focus on new problems. I will argue that the introduction of recombinant DNA methods such as cloning or sequencing, from the mid 1980s, greatly enhanced the reputation of the group and aided the establishment of a cutting-edge Centre for Cell Matrix Research, funded by the Wellcome Trust. The methodology combines qualitative and quantitative techniques in the social sciences. I will, firstly, present a series of statistical pictures, tracing professional migrations from and to Manchester, together with citation patterns of the papers published by the connective tissue scientists. By filling-in these pictures with interviews and archival research, I will show the connections between this research programme and the new techniques and management strategies introduced more generally in Manchester biomedicine.

The paper offers a historical perspective on the impact of genomics on biomedical research. I build on the work of Duncan Wilson, Gael Lancelot and John Pickstone on recent reconfigurations of science, especially in Manchester University - an institution which received rather than created recombinant DNA techniques. We thus complement the literature on the institutions which helped create molecular biology and genomics, such as Caltech (as studied by Lily Kay) or the Laboratory of Molecular Biology of Cambridge (Sorya de Chadarevian). The combination of qualitative and statistical methods will draw on the work of Peter Keating and Alberto Cambrosio, the latter co-organiser of the other panel of the session. I aim to develop a genealogical approach which combines detailed laboratory histories with wider questions of scientific reorganisation, thus adding to the growing literature on genomics from bioethics, philosophy and sociology of science.

Human Genomics and Public Health: a Social Scientific Appraisal

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This paper will offer a 'big picture' appraisal of the prospects of human genomics for society. The argument draws on analyses in four areas and concludes with a discussion of the conference theme. First, the paper will review the basis of the broader appeal of genomics and public rhetoric of scientists during the late 1990s and early 2000s. Second, the paper will assess the status of the results of human genome research, in particular the status of human DNA sequence reference datasets, also known as 'the reference sequence'. Third, the paper

discusses some recently published findings in human genomics and their envisaged applications in the realm of medicine, in particular the identification of 'risk factors' for common diseases. Fourth, drawing the previous three foci of analysis, the paper will explore some of the connections that may exist between human genomics and public health. Finally, the paper will discuss this appraisal of the prospects of human genomics with respect to the conference theme 'acting with science, technology, and medicine'. The research for this paper is based on a mixed methodology, in particular on participant observation, site visits, interviews with scientific practitioners, analysis of the scientific literature, as well as some historical research.

The paper synthesizes findings from an extensive social scientific research project on human genomics. It does so with a view to broader socio-medical interventions that may follow in the wake of human genome research and in the context of two conference panels that explore related aspects of genomics, in particular the impact of genomics on the organization of biomedical research, which will serve as a useful complement to the argument presented in this paper.

The 'Network' and the 'Factory': Organizing Control in Decentralized Sequencing Projects

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The history of genomics seems to be the story of the inevitable rise of the factory-like centralized sequencing facilities, organized according to industrial principles with an extensive use of automation. However, this model of production was immediately controversial, and other strategies were implemented in the 1990s. The sequencing of the baker's yeast genome was saluted as the demonstration of the validity of the "network" approach, refusing the logic of automation. Instead, the required level of productivity was achieved through the organization of a work division between a high number of small laboratories without specific equipment, collaborating toward the same goal in order to add their sequencing capacities.

The paper will focus on the organization of the European program dedicated to sequencing the yeast genome. I first will show that whereas it was defended on technical grounds in terms of efficiency and cost-effectiveness, the choice of the network approach in European projects was rooted in different political concerns. For the scientists involved, the main advantage wasn't directly technical, but rather that non-specialization allowed to not separate the production of sequences from their use as the basis for experimentation, a question that had been a major source of concern in the initial controversies on large-scale sequencing. For European administrators, the funding of science through the set-up of temporary collaborative networks was a management strategy designed to induce a shift of control by reducing the autonomy of scientists in order to subordinate research to specific economical and political agendas. The second part of the paper will explain how the absence of specific infrastructures was supplemented by a high level of managerial control within the sequencing networks in order to discipline the laboratories enrolled in the project. The attribution of specific roles within the network produced a system of control through the separation of laboratories responsible for sequence production and laboratories involved in the

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management of the network. The conditionnalization of resources circulation between these two levels ensured that the sequencing laboratories complied with the set of regulations defined at the central level. Standardization was replaced by procedures of reciprocal verifications to control the effects of variability between laboratories. By opening a comparative approach between alternative sequencing strategies, this paper will contribute to the history of genomics and its material culture, and provide new clues to the role and modalities of management techniques in various contexts.

Governing Emerging Technologies: the Regulatory Model and Social Values Underlying Stem Cell Governance in Argentina - a State of Flux

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Summary: Given its intimate relationship to the human body, genomic innovation implicates diverse ethical issues and excites a broad range of ethical positions, and this is particularly so with respect to human stem cell research, which relies on material harvested from the body. This paper highlights some of the scientific realities of and hopes for stem cell research, together with some of the more hotly contested ethical issues it raises, articulating the ethically-grounded positions that have emerged within the regulatory environment. It then considers how these positions and the core moral values underlying them are dealt with in the primary regulatory instruments which influence stem cell research in Argentina, and draws some preliminary conclusions about the translation of social values into legal rules in that jurisdiction, which is one of the leading global spenders on stem cell research. It is expected that some of the values are indeed embodied in practical regulation, but the success with which they have been translated into regulatory rules is equivocal at best.

Methodology: This paper constitutes an early contribution from a broader ESRC-funded project called "Governing Emerging Technologies: Social Values and Stem Cell Research in Argentina". In addition to this desktop research, the project will conduct a stakeholder workshop focusing on regulatory options in stem cell governance (from sourcing to commercialising), and will undertake semi-structured interviews with a variety of stakeholders (legislators, regulators, doctors, researchers, etc.), the emphasis being the exploration of value-perspectives and (competing) regulatory objectives amongst them.

Contribution: This project will not only evaluate the regulatory instruments currently operating in Argentina, but will also explore alternate options available to Argentina, an interesting case study because it is in the process of assessing its governance position and drafting new laws with respect to biotechnology more generally and stem cell research and therapies more specifically. Although the emphasis is on uncovering moral considerations and the values brought to bear by stakeholders active in the process, the project will also explore the operation of non-moral forces and objectives throughout the process preparatory to passing the new law with a view to identifying how they diminish the effectiveness of the translation from the moral to the legal. The project will be ideally placed to observe these forces by virtue of taking part in some of the pre-legislative activities.

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Governing Data Sharing: Bio-Ontologies and the Creation of Labeling Centres

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Efficient data sharing is essential to the advancement of contemporary biology, and particularly genomics. However, circulating data across research contexts is difficult and costly. It requires collaboration among data producers, including both academia and industrial R&D, which should be ready to disclose results without retaining control on how and where they are used. It requires the development of tools and strategies specifically devoted to making data travel by 'packaging' them in appropriate ways. And it requires researchers to learn how to 'unpack' data thus circulated, so as to be able to use them for their own research purposes. This paper examines the institutional framework necessary to fund and regulate packaging tools so that they successfully disseminate genomic data. In particular, I look at the development and use of bio-ontologies, a digital system created to label and distribute data across diverse context of research on model organisms. I focus on the Gene Ontology and its use in connection to some of the largest community databases in biology, including The Arabidopsis Information Resource, FlyBase and the Mouse Genome Database. On the basis of archival material and interviews (gathered between 2004 and 2007) with curators and users of these databases, I show that the success of bio-ontologies as packaging tools depends on the following factors:

a. the centralisation of packaging activities in few locations, which prevents the proliferation of standards and enhances their power across contexts;
b. cooperation between these labeling centers and academia, governmental agencies and industry with the aim to make data available and in the right formats;
c. large governmental funding, providing a relatively interest-free institutional platform for labeling centers to do their job; and
d. an institutionally enforced dialogue between database curators, who specialize in developing bio-ontologies, and database users, who need to provide critical feedback so that this labeling effort can be improved.

My examination of the institutionalization of bio-ontologies builds on S&TS literature exploring the role of individual and institutional power in the development of classification and standardization criteria across different contexts (including Latourian 'immutable mobiles', Hilgartner's 'communication regimes' and Bowker's and Star's work on taxonomy) and aims at establishing the implications of creating labeling centers for both science and science policy.

1.3.12: The Nuclear Scene: Waste Disposal, Energy Politics, and the Role of STS

The Culture of Nuclear Waste Management:
Trouble in Canada and [insert your country here]

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Nuclear waste management has in recent times witnessed a flurry of extensive public consultation exercises, many of them premised on nuclear industry claims about the importance of winning trust and learning from the concerns of ordinary citizens. Yes, that would the nuclear industry. Remember them? Once the paradigm case for everything wrong with technocratic, authoritarian, deficit-model-of-the-public decision-making. Plans to bury nuclear waste in very remote locations apparently require far more public relations skill than plonking nuclear reactors close to population centres.

This paper explores how the nuclear waste issue has been used to reinvent the entire nuclear industry. To do this, I suggest we expand our analytic considerations beyond the problems the nuclear industry uses TV time to tell society what the meaning of contemporary nuclear is (it solves energy security and global warming problems). That is, what do current nuclear waste management initiatives tell us about efforts to make decision-making about technical projects democratically accountable?

This paper draws upon developments in Canada to explore these questions. The Canadian waste management proposal, approved by government in June 2007 and currently in the siting stage, has some peculiar features to it. It is extremely portable because key engineering design features, program goals, and implementation parameters, are explicitly left uncertain. The need for political bargaining in the future is inherent to the proposal. Public consultation efforts have, since 2002, been a model of talking to as many groups as possible. Only the most cynical would find something troubling going on in all this public engagement and honesty about the limitations of technical knowledge. At this point we run into what cynicism might mean for STS folk looking at nuclear waste (especially because STS has largely over-looked nuclear waste). For instance when assessing public engagement, of the nuclear kind, should we be cynical about the capacities of publics, or about the capacities of experts? These are often the questions that frame current 'Third Wave' clashes.

To sharpen matters, I suggest another kind of cynicism, which is about whether STS has leaned too far toward a Mertonian conception of science's form-of-life (small-p politics and the effort to get it right). The nuclear case indicates the inadequacy of this picture, for it underplays how creating public meaning is central to expert judgment. In terms of STS's renewed fascination with political philosophy, this implies throwing out the Rawlsian veil of ignorance that seems to accompany the reversion to Merton. Instead, nuclear public relations suggest the merits of picking up (again) the Habermasian emphasis upon pragmatic discourse ethics and the interrogation of the life-world.

1.3.12: The Nuclear Scene: Waste Disposal, Energy Politics, and the Role of STS

Bringing Nuclear Waste Back into STS or Digging Up a Locus Classicus for Studying the Constitutive Co-Production of Social and Material Order

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Nobody apparently is very interested in nuclear waste. The ultimate cliché of public resistance to science and technology, the so-called NIMBY phenomenon appears to have spawned a similar resistance among STS scholars to giving the issue of nuclear waste management the type of attention it so richly deserves - a NISTS phenomenon? This widespread neglect is all the more surprising given that literally nothing appears more appropriate to extend STS concerns with 'ontological politics' and the 'constitutive co-production of social and material order' than just nuclear waste. Transuranic elements pre-date genetically-modified organisms and the former have been interpellating STS scholars for decades, but to comparatively little effect.

Of course, this may all be about to change after the UK announcement of a major programme of nuclear new build; the gathering momentum of President Bush's Global Nuclear Energy Partnership launched in 2006 and the 2007 publication of the European Commission's new vision report on a Sustainable Nuclear Energy Technology Platform. This paper, therefore, is intended to be preemptive, seeking to help set the tone for what will, in all probability, be a sustained re-engagement by the STS community in the coming years with the nuclear waste issue and nuclear energy politics more generally.

The renewed promise of nuclear power today is closely associated with its advertised ability to help resolve two global problems: national insecurities of energy supply and unacceptable levels of anthropogenic greenhouse-gas emissions. For nuclear power to be able to speak for itself today, however, an old Achilles Heel has to be seen as already consigned to the history books. This of course is the issue of nuclear waste management. While no country has as yet commissioned a final disposal facility for spent nuclear fuel or high-level waste, a credible programme of government for establishing such facilities appears to have been crafted on the Baltic Rim between Sweden and Finland.

This paper will discuss the emergence, stabilization and apparent portability of a programme of nuclear waste management originating in Sweden called KBS 3 - Nuclear Fuel Safety 3. Although devised in relation to the Swedish nuclear power programme alone, KBS 3 is increasingly being seen today as symbolizing a global solution to the problem of spent fuel and high-level waste management. How has KBS 3 developed into such a social and material 'package deal' for worldwide application? What combination of material and social technologies does it encompass and how are these being standardized for broader application? Analysing the significance of the KBS Programme in relation to the international renaissance of nuclear power, nuclear waste management resurfaces as an exemplary issue for the further elaboration of STS perspectives on the co-production of technology and society.

1.3.12: The Nuclear Scene: Waste Disposal, Energy Politics, and the Role of STS

Energy Security and Climate Change Discourses - Constructing Energy Realities in the UK

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Energy options for electricity generation in the United Kingdom are currently being constructed in terms of their desirability in light of both climate change and energy security pressures. In this paper we explore relationships between language and constructed realities, examining the historical trajectory and positioning of the climate change/energy security metadiscourse. We assert that this metadiscourse does not merely reflect an objective 'reality' but instead has been actively constructed to open up a policy window so that particular energy options can be (re)considered. Of particular interest to us in this paper is the recent (re)framing of civil nuclear power as both 'green' - as an apparently low carbon dioxide emitting form of energy - and as important in ensuring secure supplies of electricity for the UK. This framing is apparent in the HM Government 2007 Energy White Paper, the Government's nuclear consultation (DTI, 2007), and the new White Paper on nuclear power (BERR 2008). The climate/energy security metadiscourse can be seen as central to the re-emergence of nuclear as an important 'energy option' for the UK. This is marked by the differing degrees of attention given to civil nuclear power between the HM Government 2003 Energy White Paper (DTI, 2003) and the 2007 White Paper (DTI, 2007). The extent to which emerging energy policy can be seen to consistently reflect the concerns highlighted in the metadiscourse is examined through interviews with over 20 relevant stakeholders and an analysis of significant policy documents.

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HM Government . 2003. Energy White Paper: Our Energy Future - Creating a Low Carbon Economy. Department of Trade and Industry (DTI): London, February 2003.
HM Government. 2007. Energy White Paper: Meeting the Energy. Department of Trade and Industry (DTI): London, July 2007.
HM Government. 2008 Meeting the Energy Challenge: a White Paper on Nuclear Power. Department for Business Enterprise and Regulatory Reform (BERR), January 2008.

Risks or Benefits? The Social Construction of the Risks of Inland Nuclear Power Stations in China.

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This paper analyses and discusses the findings of fieldwork concerning debates about the development of an inland nuclear power station in Dapu Town, China. It has been reported that China will build its first inland nuclear power station on the upper reach of the Han River (Dapu town). The Han River is located in Guangdong Province and is the source of drinking water for 10 million people living in South East Guangdong. News of the project has provoked uproar from local people and Deputies in Shantou and Chaozhou city took the

1.3.12: The Nuclear Scene: Waste Disposal, Energy Politics, and the Role of STS

unusual step of asking for an inquiry meeting to address the issue.. This is the first time that civil nuclear power development in Mainland China has provoked negative media coverage and opened up a public debate. In order to investigate this controversy I spent three months (June to August 2007) conducting an ethnographic style case study in three cities (Meizhou City, Chaozhou City and Shantou City) in Guangdong Province. The findings of this case study reveal the process through which nuclear risk is being constructed in contemporary Chinese society. They demonstrate how people from different levels of society (local people, local government officers, scientists, people's deputies, journalists) play different roles in the 'arena' of risk construction (Renn 1992, Hannigan 2006). My findings also suggest that citizens' views about the risks of this nuclear power project cannot be separated from their socio-economic positioning. When this context is taken into consideration, it is possible to see how the 'risks' of nuclear power can be rendered irrelevant by the material 'benefits' this development will bring to local people.

These findings will be contrasted with literature which has theorized the concept of risk (e.g. Beck's 'risk society' and Danger's 'risk and culture,' etc), in order to reveal the difficulties involved in using theories developed in Western contexts to understand the construction of risk in a developing country.

1.3.13: Science, Technology and National Policy Imaginations, II

Regulating Access, Constructing Citizenship: Provision of Genetic Health Services in the Netherlands, Germany and Britain

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Recent developments in human genetics have led to an increase of clinical procedures for testing, risk assessment and risk management around hereditary conditions. Although it remains questionable whether a general 'molecularization' of health will occur in the near future, genetic health services need to be incorporated in health care. This is not only a matter of regulating and organizing genetics, but of enabling and restricting access to these services for patients and people at risk as well. Access to genetic health services, then, is co-produced by genetic procedures in the clinic and structures for health care delivery.

In most Western European countries health care delivery is regulated and organized in arrangements that aim to ensure access to health services population-wide. These arrangements are highly specific for particular nation states and can therefore be understood as central elements in European nation building. Their central role in European states further entails ascribing rights and responsibilities to patients as citizens. Regulating access to health services thus means constructing health care citizenship. This paper will discuss how health care structures in the Netherlands, Germany and Britain each have their own particular way of dealing with the rise of genetics in health care. Several examples of genetic technologies in health care will be used to demonstrate how each of them has its own specific approach to these technologies. On the one hand, identifying these varying approaches to incorporating new technologies in health care delivery will contribute to analysis of public policy for science and technology in national contexts, related to but distinct from studies of regulatory policies.

On the other hand, an argument will be made for the political significance of these approaches for health care delivery. In incorporating genetic technologies in specific ways, each of these three structures contains certain expectations about the competencies that citizens need to have to access health care. By analyzing these expectations, this paper will start to conceptualize citizenship in health care delivery with regard to the rise of genetics in health care.

Biotechnology, Democracy, and Patentability: Comparing the Governance of the Patent Office in the US and Europe

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Over the past 30 years, as patents have become more central to technological development and science and technology have become more controversial across the world, patent systems have come increasingly under attack from civil society. Citizens and governments from both the developed and developing world criticize these bureaucracies for paying inadequate attention to the social, ethical, public health, and environmental consequences of

1.3.13: Science, Technology and National Policy Imaginations, II

their decisions, and have begun to demand that patent offices take public interest issues into account. While pressure to consider patent offices in democratic terms is increasing, however, it is also relatively recent and still unpopular among the traditional clients of the patent office, patent lawyers and inventors. They argue that patent offices are purely economic, technical, and legal institutions that operate and should remain separate from public deliberations. In this paper, I consider the bureaucracy of the patent office in democratic terms and analyze, in particular, what democracy means at the patent office. What kinds of democratic objectives are and are not incorporated into the rules and practices of these bureaucracies, and how do they compare in the US and Europe?

In order to address these questions, I analyze controversies over the patenting of human-derived life forms (e.g., embryos, stem cells) in comparative perspective, at the US Patent and Trademark Office (USPTO) and the European Patent Office (EPO). In the US, I explore the attempt by Stuart Newman, a developmental biologist, to force USPTO to re-consider its rules on the patentability of humans by filing a patent application covering a human-animal chimera. I also discuss the use of the re-examination process, previously used only by industrial competitors, by the Public Patent Foundation, a civil society group, to challenge patents covering human embryonic stem cell lines (owned by the Wisconsin Alumni Research Foundation and considered to be foundational technologies.) I compare these citizens' engagements with USPTO with the EPO post-grant opposition pursued by 14 civil society groups and national governments against a European patent covering methods to isolate and selectively propagate mammalian (including human) embryonic stem cells, issued to the University of Edinburgh.

In exploring these controversies, I compare the rules and infrastructure that make up the governance of the US Patent and Trademark Office (USPTO) and European Patent Office (EPO), particularly in terms of 1) public oversight and engagement; and 2) incorporation of public interest issues in its decisionmaking. I then compare how citizens have tried to engage with these systems, and investigate how, as they offer different ideas about patentability and technology, these groups also provide alternative visions for the democratic governance of the patent office.

Transnational Convergence in Risk Governance? : A Comparative Study of Nanomaterial Regulation in Europe and the US.

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Previous comparative studies of toxic chemical regulation in Europe and the U.S. have shown that the very framing of, and policy responses to, risk differ significantly across the Atlantic. In the case of nanomaterial regulation, however, a somewhat different picture seems to be emerging. In both sides of the Atlantic, the style of regulation based on harmonization, integration, and cooperation appears to be gaining ground. In the U.S., the Environmental Protection Agency (EPA) has launched a voluntary "Nanoscale Materials Stewardship Program" under the Toxic Substances Control Act (TSCA) to set the standards, harmonize test guidelines, and burden-share the costs of testing nanomaterials. The chemical manufacturer DuPont and the nonprofit organization Environmental Defense have also agreed to set up the "Nanorisk Framework," a joint framework for risk assessment of

1.3.13: Science, Technology and National Policy Imaginations, II

nanomaterials. In Europe, the United Kingdom and Germany have established similar voluntary regulatory schemes under the OECD Working Party on Manufactured Nanomaterials. Do these developments signal a real convergence in approaches to the assessment and management of risk? If that is the case, how is it possible in diverse political cultures? Do different framings of risk persist despite the adoption of seemingly similar regulatory policies? In order to answer these questions, I will draw on interviews conducted with various actors involved in the regulation of nanomaterials in Europe and the U.S. "scientists, government officials, industrialists, and NGO activists" to examine how the risk of nanomaterials has been framed, and what forms of governance have been seen as most desirable, by these actors.

Images of 'the Public' in European Nanopolicy as an Externalisation of Risks

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While technological innovation occupies a central position in modern society, its role is seen as ambivalent: On the one hand, there is growing fear about the unintended side effects of new and emerging technologies and the inability to control them. On the other hand, to abandon innovation by not investing in research and development is also considered risky. Luhmann has tried to describe this phenomenon on a more abstract and therefore comprehensive level. From his point of view, the crux of this ambiguity is a novel relation to the future reflected in an increasing transparency of decisions: "Die moderne Gesellschaft erlebt ihre Zukunft in der Form des Risikos von Entscheidungen" (Luhmann 1992:141). That makes risk attributable to the decision makers, who make decisions without being able to know all the possible adverse effects for third parties. In parallel, risk semantics are increasingly politicised. More and more, the concerned public addresses the political system and asks for collectively binding decisions on increasingly complex problems. However, such a demand is too excessive for a hierarchical form of governance, which is still predominant in contemporary political systems. Hence, the state tries to counter this overload by introducing novel ways of coordinating the new heterarchie. Since the retrospective accountability of decision makers could endanger the necessary latent ability to govern, the state endeavours to externalise the increasing decision risks. This can happen both in other functional systems (e.g., scientific experts) and in the system's own periphery (e.g., as illustrated by the increasing civil society participation in all policy areas and on all levels). Even though these trends are widely known and well described on an abstract level from different perspectives, how they condense and take shape in a specific context remains to be examined. In this study, the recently emerging European Nanotechnology Policy, being the latest "and perhaps even most novel" expression of these trends, has been selected as a case to demonstrate the ratio, the acute design, and the development of these mechanisms to maintain latency. In particular, different images of "the public" in the European Union's regulation of nanotechnology will be presented and analysed as functionally equivalent ways to externalise risks.

Luhmann, Niklas (1992) Wissenschaft der Gesellschaft. Suhrkamp Verlag: Frankfurt am Main

Nutritional Epidemiology:
Generating Health Standards and Renegotiating the Self

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This presentation will discuss the re-configuration of the Homo Europaeus (as conceptualized in the life sciences since Linné) in current research in nutritional epidemiology. The main focus will be on the use of population categories to define subgroups in epidemiological research, a field of that has received little attention among STS scholars. In exploring this topic for the case of nutrition and health, we will combine an ethnographic study of applied biomedical science with examining the perspectives of the research subjects and the negotiations in everyday practice.

Epidemiological studies investigate the influence of nutrition on various health outcomes, such as cancer or cardiovascular disease, by integrating data at multiple levels from population to genome. We will examine the categories at stake in such complex biopolitical data assemblages and the complex stabilizations that are required to manage large scale population studies over decades. As an empirical case study, we draw on the example of a multicenter study, the "European Prospective Investigation into Cancer and Nutrition" (EPIC-study), conducted in ten European countries. The first part of this paper will focus on the standardization efforts at multiple levels, e.g. the study design, data organization and biostatistical modeling. In a second part, we focus on the effects of epidemiological knowledge for constructing the self. Here, we discuss the processes of subject constitution in relation to the epidemiological risk assessments and along with differentiations into subgroups: Which roles do categories such as gender, age, health and illness or locality play in nutritional epidemiology? In what ways do actors - participants and scientists - appropriate these categories? Furthermore, we explore the ways the knowledge generation plays out in the constitution of scientific/biological citizenship and interrelates with the process of Europeanization of public health policies.

Prevention and Nutrigenomics:
an Analysis of Talk on Genetics, Overweight and Health Risks

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Nutrigenomics promises to contribute to the prevention of diseases by calculating health risks of nutrients on the basis of insight into their interactions on a genome level. This knowledge can be used for dietary advice based on personal risk information, or risk information about groups, and for the production of functional foods.

Up till now, research on ethical, legal and social aspects (ELSA) has mainly focused on the problematic consequences of nutrigenomics research. There is hardly any debate about the implicit assumption in nutrigenomics research that personal risk information will automatically motivate consumers to change their health related behaviour. Moreover, it is still unknown if,

1.3.14: Engagements with Applied Science: Nutrition, Health, Quality Standards, Europe, I

and if so, how the notions of genetic susceptibility and personal risks play a role in everyday talk and if these notions are problematic.

This paper draws on discourse analysis to examine accounts of overweight and genetic determination in six group interviews conducted in the Netherlands. The role of genetic predisposition and family history in explanations of overweight and overweight related health risks were the main focus. Preliminary results show, firstly, that accounts focused on genes are used by participants in the last resort, and that they are offered and treated as requiring specific evidence. This suggests that the gene repertoire, while hard to undermine once it is coined, is at the same time interactionally problematic and risky. Secondly, whereas it does not lend itself for an easy explanation of ones own overweight, the gene repertoire is regularly drawn upon to manage blame and responsibility in relation to others.

Encounters of Nutrigenomics and the Practices of Everyday Eating

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Nutrigenomics is an emerging multidisciplinary field of science that is rapidly advancing the medical and nutritional understanding of the links between food and health. Nutrigenomics, also referred to as nutritional genomics, studies the interaction between nutrients and gene expression and investigates both diet and genetic variation as risk factors for chronic disease. This new field is envisioned to develop nutritious foods that can prevent, mitigate or cure disease and to facilitate individually tailored health-optimising diets that are based on the genetic makeup of individuals.

In recent debates on the conditions for nutrigenomics attention has increasingly been drawn to the ethical and regulatory issues relating to the study of human genes. However, the study of the wider social aspects and implications of this new technology is still in its infancy. Practical applications such as genetically tailored and health-optimising diets have a potential to dramatically transform the meanings of food and eating as well as further individualise and medicalise the ways that people eat.

The aim of this paper is to discuss the possible encounters of nutrigenomics and the social and cultural aspects that contextualise the ways in which eating takes shape in everyday life. The starting point of the paper is the notion of practices of eating as closely connected to the social organisation of society and the culture we live in. By analyzing sociological as well as practice theoretical approaches to food and eating the paper looks at the ways in which notions of health, healthiness, genetic susceptibilities and dietary interventions may interweave with other aspects of eating. The paper also aims at developing the theoretical basis for an empirical study focusing on the social and cultural conditions for nutrigenomics in the context of everyday life.

The paper contributes to the current studies of science and technology by discussing nutrigenomics as an example of the medicalisation of modern societies as well as the potential interactions between the genetic turn in life sciences and the practices of eating as a particular area of everyday life.

1.3.15: Interactive Technologies about Gaming, Wiki and Magic

Grieving and Griefing in Contested Zones: Negotiating the Rules of Play in Massively Multiplayer Online Games

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On March the 5th, 2006, around 5:30 p.m. members of the Horde on Illidan gathered together at the Frostfire Hot Springs in Winterspring at a memorial service for Fayejin, who suffered a stroke and passed away earlier in the week. As her avatar shone brightly by the shore of the lake and as mourners slowly filed past and paid their respects, a group of Alliance players led by members of the guild Serenity Now charged through the snow-clad forest, down to the shores of the small lake, and killed everybody.

While not necessarily common or frequent, the practice of holding weddings, funerals, birthday and dance parties and the like in Massively Multiplayer Online Games (MMOG) are well known. The practices of 'griefing' - taking actions to deliberately frustrate, annoy or harm other players - in these online worlds are also well known. The above events that occurred in the MMOG, World of Warcraft, are noteworthy because members of Serenity Now made a video of the event and posted it online. Like much on the Internet the piques people's interest, the video has been posted and reposted, recycled and rehashed. It can be found in dozens of locations, has been viewed millions of times, and has been discussed by tens of thousands of people in various online forums. With each reposting discussion, debate and controversy over the 'rights' and 'wrongs' of the actions depicted have emerged.

In this paper we follow the public debates that have raged across video hosting sites, bulletin boards, blogs and other online forums where the video has been posted and chart the terrain of the controversy surrounding it. Was Serenity Now in the wrong for crashing the funeral or were the organizers of the memorial in the wrong for holding the memorial in the first place? Are online memorial services legitimate activities for these online worlds? Does playing the game by the 'rules' and 'as intended' legitimize the actions of Serenity Now? As well as these ethical questions, aesthetical issues are also at stake. Is holding an online memorial service, or is crashing it, in bad taste? Is it just a game or something else?

We remain agnostic on who is right or wrong within the controversy. As has been noted in the classical sociology of Durkheim and others, deviant behaviour can perform useful societal functions by providing a vehicle for discussion and clarification of expected behaviour and we want to follow these discussions. We find, underpinning these discussions, uncertainties and ambivalence about the ontological status of online worlds like World of Warcraft: the relationship between online and offline life remains unclear; the solidity of the virtual, and fluidity of the real, uncertain. At stake in these debates is their status as games or as something consequential. Are they merely games apart from real life inside their 'magic circle' (Huizinga 1970) or have they become legitimate parts of everyday life?

Huizinga, J. (1970). Homo Ludens: A Study of the Play Element in Culture. Temple Smith, London.

1.3.15: Interactive Technologies about Gaming, Wiki and Magic

Collaborative Mass Knowledge Production Online: Cross-Cultural Comparison of Variation in the Communities of Wikipedians

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The process of knowledge production among scientists has evolved over the years due to social and technological changes in society (Cronin, 2004; Nowothy, Scott, & Gibbons, 2003. There has been more emphasis on collaboration, cross-disciplinary research, and boundary crossing in knowledge production recently. At the same time, many organizations have begun to elicit cooperation from researchers outside of their own organizations for new discoveries (Tapscott & Williams, 2006). One of the novel tools that organizations use for knowledge production is wikis - Pfizer's successful wiki-based scientific encyclopedia is an example (Mullin, 2007). Further, wikis have become prevalent in our society and are used for multiple purposes, such as education, knowledge sharing, and collaboration. Wikipedia is one of the most popular examples of wikis that supports collaborative mass knowledge production. Wikipedia allows the general public to contribute content to knowledge creation endeavors. These knowledge production processes in Wikipedia serve as examples that can shed light on understanding collaborative knowledge production at large.

The literature on Wikipedia is mostly anecdotal; most of the research has focused attention primarily on the accuracy of entries compared to established online encyclopedias (Emigh & Herring, 2005; Giles, 2005; Rosenzweig, 2006) and traced the evolution of articles over time (Viégas, Wattenberg, & Dave, 2004; Viégas, Wattenberg, Kriss, & van Ham, 2007). Others have examined the quality of contributions on Wikipedia articles (Stvilia, Twidale, Gasser, & Smith, 2005). However, only a few studies focused attention on the Wikipedia community, and even less common are analyses of Wikipedia in languages other than English, or comparative analyses across languages (e.g., Pfeil, Zaphiris, & Ang, 2006). There is a need for an international, cross-cultural understanding of Wikipedia because there is a paucity of knowledge about user communities in non-English languages and there is a limited understanding of the processes of this large scale collaborative knowledge production. In an effort to address this gap, the study focuses on an analysis of international and cross-cultural research of Wikipedia that illustrates variation of norms and behaviors on talk pages among Wikipedians in four languages: English, German, Hebrew, and Japanese. Wikipedians' interactions and behaviors are identified through an online ethnographic observation and content analysis of randomly sampled talk pages. More specifically, the analysis focuses on the following three categories: community wellbeing, information sharing, and writing style. Variations of norms exist not only among various talk pages, but also across Wikipedia in different languages. These variations reflect different communities of users and modes of participation, as well as content and purposes of interactions. The study provides an understanding of the diverse Wikipedians' communities from a global perspective. As such, the contribution of this study to the science and technology studies literature is by its various manifestations of mass collaborative knowledge production among Wikipedians across multiple languages and within each language community.

1.3.16: Actor Network Theory meets (Post)Phenomenology

I Have Never Been Modern... Nor has Postphenomenology Been So

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Paul Forman, in a recent issue of History and Technology argues that there has been a "primacy of science in modernity, of technology in postmodernity, and of ideology in the history of technology." Here is yet another version of a shift from modernity, which in Forman's case the argument that the watershed can be rather precisely located around 1980. He may be close: Bruno Latour and Steve Woolgar published Laboratory Life and I published Technics and Praxis, simultaneously in 1979! In my book, I argued specifically for a kind of primacy of technology, embodied in science through its instruments, just as Latour and Woolgar were arguing for the social dimensions of science in the laboratory.

And while not yet calling my non-modernist notion of phenomenology, postphenomenology, it was in 1984 that I delivered a set of lectures in Goteborg, Sweden, on a hybridized phenomenology-pragmatism, published in 1986 as Non-Foundational Phenomenology. By then I saw that the anti-foundationalist, anti-essentialist and a-modern thrust of pragmatism could avoid the negative connotations of 'subjectivism' and an 'anti-science [and technology]' reputation of classical phenomenology. And by 1991 with Instrumental Realism I had already substituted the old body/mind problems of modernity, with what I called a 'body/body' problem for a contemporary phenomenology, as well as a praxis-perception or actional emphasis in interpreting both technology and science. It was also in that book that I first dealt seriously with Bruno Latour. And then by 1993 there was Postphenomenology: Essays in the Postmodern Context. Now I had the a-modern name right.

And, I have been a sympathetic and critical reader of Latour ever since as well - but I hold that his phenomenological education seems to have stopped with the Merleau-Ponty of his university days, and similarly, his notion of philosophy of technology seems to have stopped with the still Eurocentric Heidegger of those same days. And while a deeper reading of both Merleau-Ponty and Heidegger surely would show struggles with modernity, neither are read in that way by Latour. Thus, in this presentation, I shall explicitly outline some of the ways in which I think postphenomenology is a-modern or possibly in some ways postmodern. These will involve the themes of embodied experience, technological mediations, the mutual constitution of an inter-relational ontology, and the contemporary 'second scientific revolution' I find in the posthuman capacities of imaging technologies.

Posthuman Perceptions:
on Hybrids and Human-Technology Relations

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Contemporary imaging technologies reveal things that otherwise remain invisible to the human senses. A living human body, cut in extremely thin slices. The heat flow in a leaf of a tree. Sound beyond the reach of the human ear. Such technologies are not simply an

1.3.16: Actor Network Theory meets (Post)Phenomenology

expansion of our sensory repertoire. They not only create a new world of impressions, but also generate a new perceiver, with new frames of reference and new forms of understanding. Moreover, perceptions like these all involve 'nonhuman' perceptions: devices that perceive phenomena beyond human reach and translate them into the human realm.

How to account for the imbrication of human and nonhuman elements in these human-technology relations? The paper will use both actor-network theory and postphenomenology to answer these questions. Both approaches conceptualize blends of the human and nonhuman in their own idiosyncratic way: ANT focuses on hybrid forms of agency, postphenomenology on technological mediations of perception. Both need augmentation. Postphenomenology because the human-technology hybrids involved in these high-technologically mediated perceptions involve more complicated human-technology-world relations than usually accounted for, because of the 'nonhuman intentionalities' involved here. ANT because its focus on agency fails to grasp the bodily-perceptual aspects of these hybrids, and because its symmetrical approach downplays the distinct roles played by human and nonhuman entities here.

In order to compare and augment both approaches, the paper will elaborate three types of 'posthuman intentionality' at work in mediated perceptions, which all involve specific blends of the human and the technological. Technologically mediated intentionality occurs when human intentionality takes place 'through' technological artifacts; hybrid intentionality occurs when the technological actually merges with the human; and composite intentionality involves the addition of human intentionality and the intentionality of technological artifacts.

Interactivity as Performative Articulation

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In this paper I will explore the uses of both Latour's Actor-Network-theory and postphenomenology for the understanding of contemporary art, in particular interactive digital art. Interactive digital art confronts aesthetics and cultural theory with the problem that it cannot be described and analysed without taking the input of the visitor into account. Even if one is sceptical about the suggestion of free choice, creativity and control implicit in the notion of interactivity, the theoretical and methodological question remains where to locate the artistic intentionality of the work and the aesthetic experience of the visitor if what the work amounts to depends not only on the interpretative but also on the configurative performance of the visitor. In this context it is significant that rather than focusing on the analysis of representational content, as has been the dominant approach in art-historical and cultural theory, theorists of new media and digital art increasingly foreground the visitor's bodily performance and its capacity for tactile and kinesthetic experiences. The body's motor activity becomes the mediator between a plurality of technically extended realities in which the real and the virtual are mixed.

I will argue that in spite of their differences, a common ground between a postphenomenological and an ANT approach might be found in the emphasis on the materiality of both bodies and technologies considered as performative practices and their questioning of the transparency of technical mediation. Starting from Latour's claim that

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'having a body is learning to be affected' I will develop the notion of 'performative articulation' in an exploration of the affective and sensuous dimensions of some interactive digital works.

The Impact of Technology and the Constitution of Subjectivity

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This paper will discuss how descriptive claims about the technical mediation of action can be related to moral philosophy. Both the post-phenomenological approach of Don Ihde and the actor-network theory of Bruno Latour are primarily descriptive. Not only do both authors abstain most of the time from making normative claims; their approaches also challenge the notion of the moral subject. Both Ihde and Latour have been trying to overcome the transcendental categories in modern philosophy, most notably the subject-object dichotomy. They have instead promoted empirical research into the multiple and concrete forms of human-technology relations. The merit of this starting point is that these authors have come up with rich and important accounts of the role of artifacts in shaping scientific knowledge and human praxis. At the same time, these 'nonmodern' approaches seriously challenge the notion of the moral subject, which is central in ethical theory.

Even though the claim that technologies shape our lives - as expressed in Ihde's concept of technological intentionality and in Latour's notion of script - is descriptive, this claim raises ethical concerns. How can the impact of technology be normatively evaluated and to what degree and in what way can control be exercised? Moral philosophers, aiming for normative claims, have hardly been able to integrate the work of Ihde and Latour into their theories so far. The obvious reason is that they are troubled by their abandoning of the subject-object distinction. Especially Latour's claim that action is not limited to humans, but that things can be agents too, has led to much confusion. Philosophers have primarily asked questions like: Can things really act, do they have intentions? How can things be held responsible for their actions?

Questions like these revolve around the question how much of a subject can be in an object. This paper calls for a different and more fruitful approach. Rather than questioning the subjectivity of things, one should focus on the shaping and transforming of one's own subjectivity under influence of technical mediations. This approach is suggested by Michel Foucault. In his latest books, he called attention to subjectivation practices as a part of ethics. Instead of presupposing a moral subject that is able to obey ethical principles and rules, he addressed how humans shape their mode of being by practices of the self. The moral subject, therefore, becomes not just the condition for, but just as much the result of human action. This seems a promising framework for bringing theories of technical mediation closer to moral philosophy.

The paper will outline a framework for discerning technically mediated subjectivation practices. In order to do this, the paper will analyze the example of Intelligent Driver Assistance and its impact on driving practices and moral subjectivation.

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Gameplay as Embodied Interaction

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Every time when I read reviews, discussion lists or weblogs on computer games, the term 'gameplay' pops up as one of the most used indicators of the quality of a game. This rather fuzzy concept is used by designers, players and critics to describe the overall bodily-sensorial experiences involved in playing computer games. Although scholars in the field of games studies continuously stress the fact that games should be studied as performative because they are actively played, a theoretical framework to analyze the bodily interaction of the player with the game as a technological object has yet to be developed. In this paper I argue that a theoretical framework to elucidate the role of bodily-sensory perception, the senses and meaning effects in technical mediation, can be developed on the basis of Actor Network Theory, complemented with insights derived from postphenomenology and semiotics.

The player's embodied interaction with the game is mediated through different avatars which are not necessarily represented by fictional game characters. Avatars mediate between the actions of the player's body and the gameworld and can literally be anything. The avatar is part of a larger family that comprises dolls, puppets, but also Dinky Toys, Lego or radio controlled model planes (see also Klevjer, 2006). The mediation can be of a more prosthetic or instrumental nature (such as the controller, the instrument panel or representation of a table tennis bat on the screen), or of a more fictional nature, such as the body of a player character. Computer games have, as Don Ihde states, 'machinic and technical properties' but are also real 'fantasy-enhancing devices' which present the players with imaginary trajectories (Ihde, 2002). The study of computer games as technical objects should therefore account for the rather complex imbrications of technical, fictional and bodily mediations.

I will show that the mediation of the player('s body) in simple games like Break Out, or more complex games such as the music game Elite Beat Agents or Grand Theft Auto, can be analyzed in ANT terms as hybrids of human and nonhuman elements (actants or actors). Instrumental and fictional mediations can be analyzed in terms of shifting in/out and shifting down, or quasi-subjects and quasi-objects. But to analyze the sensorial experiences and meaning effects, that are equally constitutive for the construction of technical objects, we need to augment the ANT with postphenomenological and semiotic concepts.

Ihde, D. (2002). Bodies in Technology. Minneapolis: University of Minnesota Press.
Klevjer, R. (2006). What is the Avatar? Fiction and Embodiment in Avatar-Based Singleplayer Computer Games. Unpublished Dissertation, University of Bergen, Bergen

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From Intention to Interaction:
Examining the Artist Interview in Conservation Practice

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In the last decennium, the artist interview has become an extremely popular means in the conservation of contemporary art works. In this particular domain of museum practice, interviewing the artist about her working materials, practices and related meanings is considered a vital tool in reconstructing the artist's intention at the moment of its conception in order to maintain the integrity of the work of art and the intentions behind it. (Hummelen and Sillé 1999; Laurenson 2003; Depocas 2003 a.o) The role of the museum professional is here generally understood as a passive custodian.

In this paper, the practice of artist's interviews will be re-examined against the background of developments in ethnographic research and oral history. Building on insights from STS scholars and other ethnographic work, the paper argues that in museum practices, 'intention' is not reconstructed but instead created in interaction between the artist and museum professional. Rather than being a 'passive custodian', the curator or conservator of contemporary art can be considered to be an interpreter, mediator or even a (co-)producer. In some cases (for instance with commissions and in situ installations) collaboration between artist and curator or conservator already starts at the very beginning of the artistic process. This development has far reaching consequences for the role of the museum professional and raises questions, such as: how far do ethics allow museum professionals to bear their stamps on the conceptual and physical dimensions of the work of art?

Reframing the artist interview in this light, suggests a new research agenda: not only the artist as a central actor should be studied, also the museum practices in which this 'intention' is manufactured should become part of inquiries. To what extent then could STS literature reflecting on the 'acting with' or interventionist approach provide a framework to understand and reflect on this new engagement of the museum professional in conservation practices?

The paper is informed by field work produced during several ethnographic moments at contemporary art museums and close examination of selected interviews conducted by the Netherlands Institute for Cultural Heritage (ICN) and the Foundation of Contemporary Art (SBMK).

From the 'White Cube' to the 'Light Cube' :
Looking into Recent Surveys on the Projected Image

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In the 1960s, artists started to exhibit in museums and art galleries works of art using projection. The Walker Art Center reacted quickly to this phenomenon and organized in 1974 the exhibition Projected Images. Even though the exhibition gathered the work of only six

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artists, the variety of projective media used was striking: closed-circuit video projection, camera obscura, laser, super 8 synchronized sound films, and 16 mm films. In the last decade, numerous exhibitions have specifically addressed the very notion of projection such as: Being & Time: The Emergence of Video Projection (Albright-Knox Art Gallery, 1996); Into the Light: The Projected Image in American Art 1964-1977 (Whitney Museum of American Art, 2001-2002); Beyond Cinema: The Art of Projection. Films, Videos and Installations from 1963-2005 (Hamburger Bahnhof, Berlin, 2006-2007); and Projections: A major survey of projection-based works in Canada, 1964-2007 (University of Toronto, 2007). What comes out of these recent surveys? Do we assist today at the confirmation of Malcolm Le Grice's 1972 prediction that the future of experimental cinema was possibly going to take place in art galleries? An analysis of the numerous artworks gathered in these exhibitions makes one realize that projection is a medium that has been largely investigated by artists not only technically, but also conceptually: the projected image has been fragmented, multiplied, modified, or altered in order to create new narratives and establish a new language of representation.

This paper will look into how the different surveys mentioned above have been elaborated and will try to determine if they have contributed to establish a canon of projected artworks.

Back to Tehné: Negotiating Captions and Representing Art In Museums Digitalized Catalogues

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Art and technology are often parts of a same convergence, and more and more in contemporary world. They divide is part of a taken-for-granted discourse, but their boundaries are often blurred.

In a research carried out in Tuscany, we studied a heterogeneous convergence involved in developing a software to manage a network of small museums. Covering by a European project and sponsored by local bodies, a small software house developed a system for remote management of museums collections, of museums accountability, and of museum ticketing. The subject of the negotiations developed inside this process was very broadened, including political actors, software developers, the finishing point of the project, but also different ideas of museum and management of technology/art divide and of the boundary between these two ontologies.

Hybridization of knowledges and development of new skills was a result of the encounter between (among other actors) software developers and historians of art, with a particular stress on the captions and their role in the museum digitalized catalogues. But this particolar topos was the battlefields of two expert knowledges, expressed in term of explanatory style, appropriateness of terms, choice of pictures, and length of captions. The weight of different formalized esthetical references played an important role in the conflict, for legitimation purposes of every group involved (especially software engineers, computer graphic designers, museum curators, and historians of art), and as object of multiple intertwined translations. They were redefined in the use and often didn't reach a consensual status. Anyway, the convergence didn't interrupt its way until a (conventional) final point.

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Art Installations and Architectural Presentations as Dispositifs of Explicitation

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Exhibition practices often imply knowledge production and display. Artists and architects display and demonstrate in order to explain [but also to provoke, trill and convince]; they strive to explain as they believe they know more. At the same time, to know is to be able to explicitate (Sloterdijk, 2004), to explicitate is to be able to exhibit - to show, display and demonstrate. Departing from ethnographic descriptions of the practices of art installations and architectural presentations as quasi-installations, I analyse

1. their rhetoric and cognitive styles, and performances;
2. their material dimensions: the objects, their modes of selection, arrangements and modalities of action; and
3. their spatial settings: the specifics of art installation and architectural presentation as spaces of explicitation; cognitive capacities and material arrangements; the concrete spatial geometry of these settings: dimensions of the room, spatial transitions, distances among speakers, presenters and the publics enrolled.

I also follow the publics that gather around the artistic and architectural objects in these different installation settings, and account in an anthropological fashion their reactions, their interpretations, their ways of communicating with objects and spaces.

I will argue that to display/present in art and architecture means to re-enact a building or an artistic phenomena, to make it happen in the moment of ambling among objects, turning pages, pointing to different visuals, holding models in hands, evaluating and testing material samples, bearing effects. Material, spatial and cognitive features of art installations and architectural presentations matter because it is according to them that an artistic or architectural event 'happens' for the first time and endures in time-space.

[The paper is based on a fieldwork in Musee d'art moderne de la ville de Paris, and in a number of architectural offices in Rotterdam, Vienna, and Manchester.]

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Phones and Phanatics: the Adoption of Mobiles in Kerala, Ghana, and Kenya

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The prevailing view of new information and communication technologies (ICTs) in the developing world is that they constitute a "leapfrogging" technology, enabling rapid modernization. Enabling faster communication and more rapid diffusion of knowledge, they will aid growth and the integration of countries into the global economy. According to UNCTAD statistics released in February 2008, the digital divide is widening in some respects. While the gap in the number of Internet users is slowly falling, the gap in broadband penetration is growing. What has happened during the past decade is the explosive growth in the adoption of mobile telephony, which has dramatically outpaced adoption of the Internet. Building on a study of mobile phone use by scientists and professionals in 2002, we returned to many of the same sites, and added a sample of non-professional uses, many of them small business owners and workers. This essay reports the results of a 2007 survey of 917 professionals and nonprofessionals in Kenya (n=320), Ghana (n=300), and Kerala, India (n=297) that we supplemented with video ethnographic research on a subgroup of users. We examine differences between types of users in terms of the ways in which mobile phones are used and their association with characteristics of social networks. Mobile phones, in the eyes of many users, represent a technology of perfection - economic costs are their only disadvantage. Unlike the Internet, which is often still viewed as a foreign technology without sufficient personal benefits to justify investment, mobiles require minimal learning and their immediate advantages motivate expenditures that can be significant. While speculation on the diffusion and meaning of the Internet in the absence of mobile technologies is fruitless, the mid-diffusion introduction of mobile technology has powerfully affected the trajectory of the Internet in the developing world and widened a digital divide in some ways, while narrowing it in others.

"Al-Portable is the Sixth Pillar of Islam" : the Economic and Social Impacts of Mobile Phones in Morocco

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In nearly one decade of commercial viability, the mobile phone has been enjoying a stunning rate of uptake and use in Africa. In Morocco, between 1998 and 2007, the majority of people have gone from no telephone ownership to ownership of mobile phones. Currently, one in two Moroccans has a mobile phone: that is about 16 million subscribers. This astonishing rate of adoption can only be explained by the privatization drive in the telecommunications sector that Morocco initiated in the early and mid-1990s, the role of the informal sector and smuggling circuits, and the ease of use as well as the economic and cultural utility of the mobile phone. This staggering rate of penetration of mobile phones, as elsewhere, underscores the degree to which this new technology has become part of everyday routines

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and has been tinkered with to serve various communicative needs regardless of time and space constraints. Based on ethnographic research among urban skilled and semi-skilled laborers and slum dwellers in the city of Mohammedia and farmers in the remote province of Errachidia, I claim that mobile telephony is a resource for human agency and action, not jut a force for culture change in itself. Second, I contend that mobile phones have expanded the productive opportunities for certain types of economic activities by enlarging the circle of opportunities and by enabling supplementary informal income-generating activities. Third, I explore ways in which mobile telephony is distinct from traditional technologies. Fourth, I provide a theoretical framework for a better understanding of the transformative qualities and effects of mobile communications, especially the mobile phone.

Highwaymen Running Business: Mobile Phone Acquisition and Use on African Streets

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According to the 'Fourth World' account of globalisation, Africa was to be condemned with other economically peripheral areas to structurally irrelevant 'black holes of informational capitalism'. When compared with capital flows conducted in the North - and those conducted by the comparatively fewer African-based businesses with weighty international connections - the financial increments at the domestic level in most African countries are indeed miniscule. But Africans have not been passive victims of information and communication technologies. Based on ongoing fieldwork conducted in Tanzania since 2002, and drawing on accounts from various other countries across the continent, there is much evidence to suggest that many individuals are active in accessing mobile phones and in using them in developing their own solutions to their particular needs. This paper seeks to transcend the preoccupation of what mobile phones do to Africans, and deepen our understanding of what Africans do with mobile phones. What the application of these technologies in micro and small enterprises shows is that even at the poor and less visible reaches of the global economy, mobile phones are being used to keep capital mobile. Capital flows - or what at the global level would more accurately be described as capital 'trickles' - are increasingly being set into motion through mobile phone-based applications that enable the transfer of money and pre-paid airtime credit; a new 'currency' for the poor. At a speed that outstrips even the fastest of long distance bus drivers(-cum-cash deliverymen), in parts of Africa mobile phone-enabled money transfers now pass remittances from the urban to the rural in seconds. The rural can now stay in touch with the urban with greater ease, heralding both a rapid change in Africa's 'communication landscape', and in the language (or 'beeping') of communication using mobile phones. True to the constant mobility that mobile phones enable, the language about them is also changing apace. In Swahili the mobile phone has been ascribed numerous pseudonyms, and terms associated with mobile phone handsets and means of communicating using them contributes to a richer lugha ya mitaani, or street language. It is the streets of Africa's cities - and Dar es Salaam in particular - and the highways that link the urban to the rural, that this paper draws its inspiration from. The 'urban metabolism' of Africa's cities is faster and more mobile than it may sometimes appear. Researchers preoccupied with surveying entrepreneurs in fixed premises pass by pockets of microenterprises; businesses run from mobile phones carried on the person. For while in more prosperous countries mobile phones and other ICT mean that the boundaries between

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previously discrete entities such as home and office are becoming increasingly blurred, mobile phones for many Africans in Tanzania and in other countries on the continent - especially when they are accessed for business purposes alongside other ICTs - are the office. This fuels another business of mobile phone acquisition and resale, where pockets are picked and handsets reach new users who themselves are sometimes running businesses that have to be mobile. The research introduces an ethnographic and Africanist perspective to geographies of mobility.

Mobile Phone Use by Rwandan Small and Informal Business Owners

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The presentation will reflect on the panel's theme of revolution versus evolution by revisiting two studies of mobile use by Rwandan small and informal business owners in 2004-2005. First, it will suggest that while the practice of missed calls (beeping, flashing) is sometimes used as an illustration of user-led innovation, it is also an illustration of how new socio-technical practices can do as much to reflect and reinforce existing social norms and structures as to alter them. The Rwanda interviews suggest that new mobile users quickly come to learn 'the rules of beeping'. Second, the presentation will re-explore survey data which suggests that, in aggregate, the content of calls by small business owners is less commercial and more personal than we might expect. The presentation does not question whether mobile use is beneficial to (some) microenterprises - it is. Rather, it will suggest that these benefits are neither monolithic nor equally distributed. The presentation will close with a brief discussion of the role of technical and systemic factors in introducing variability into our understanding of "the mobile phone"; a brief comparison of studies in African and South Asian contexts can illustrate how factors such as interface language, network pricing, and availability of alternative forms of mediated communication alter how the mobile (so often reduced to the handset) is actually used and interpreted.

The Moral Economy of the Mobile Phone in Rural Uganda

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This paper explores how mobile phone acquisition and use in rural Uganda is shaped by the moral economy of family, clan, and neighbor relations. At the same time the introduction of a mobile phone into a novel social setting results in the construction of a new moral economy of phone owners, phone operators, and phone users. By exploring the concept of moral economy, 'rights' and 'responsibilities' are added to a vocabulary that presently includes 'trust' and 'social capital' as central tools for understanding the social dynamics of the mobile phone in parts of Africa. These new terms broaden the scope of study beyond the utility of phones in trade and business exchange and into the domain of distributed family support.

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This examination also provides a clearer explication of the shared use of technology - a model often considered to be a necessary solution to realize access to resources in the developing world. Shared use is not fully encapsulated in the 'one device-multiple users' configuration. A variety of roles emerge around the phone. In rural Uganda, there was considerable variability from one phone to another in terms of how shared use was configured. It was defined by employer/employee, spousal, and other relationships. The decisions about how to configure shared access to this resource ultimately framed who benefitted from it and how. I will argue that specific channels of obligation and reciprocity (and not necessarily a general communal sensibility) in rural Uganda extended the beneficiaries of the phone far beyond those who benefit from a single device in industrial societies where stronger boundaries of ownership and privacy are enacted. In keeping with the 'economy' component of 'moral economy' this paper will also look at how rural financial flows were managed via the phone. I will address one particularly prevalent user-driven adaptation of the phone - the use of 'air-time' as a form of currency that could be remitted from one remote locale to someone (often elderly parents or dependent children) in another. The phone reconciled some of the displacements and disruptions of rural-urban and rural-rural migration. The incorporation and restoration of existing moral bonds temper claims for the revolutionary potential of the mobile phone in this developing region. However, this paper will also consider extensions and new forms of agency that are facilitated by the phone.

From Dots to Checkerboard:
the Mobile Phone Phenomenon in East Africa

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In a space of less than ten years, mobile phones in Africa catapulted from novelties in the hands of the privileged to everyday necessities. With a current level of over two hundred million subscribers, this is indeed a phenomenon. Is this a revolution? Why did it happen? The answer is hardly attributable solely to the technology but significantly lies in the social and economic dynamics of African societies. Viewed from the perspective of the prohibitive network fees, though improving, the high demand for mobile phones points to the fulfillment of the communicative aspects of unfettered mobility that had always been there. The urban and rural are rather a continuum than distinct spatial clusters through which people freely go back and forth. Even in urban areas, economic and social activities are less frequently tied to the industrial regiments of fixed places as well as timeframes.

Based on my ethnographic encounters in East Africa, I argue that the growth of mobile phones marks a humungous transition, rather than a revolution, from sparsely scattered dots to checkerboards of electronic presence. Mobile phones directly mapped onto the mobile and fluid socio-economic relations that encompass a large swath of the population that ekes out a living in the so-called "informal" economy. For all its merits, framing these changes as "revolution" reifies the paternalistic fact that change happens only when introduced from outside. The optimal technological landscape that can energize African socio-economic webs is if the design of products fully absorbs the scalable particularities of on-the-ground processes.

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Evidentiary Truths? The Development and Spread of Evidence-Based Medicine.

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This paper takes as a focus of analysis the phenomenon of Evidence-Based Medicine (EBM) itself and the particular variety of 'evidence' that forms the basis of its approach. I trace the development and transformation of Evidence Based Medicine over the past 15 years from epidemiology into clinical medicine, its methodological elaboration within medical statistics, and its spread into other forms of health care and broader arenas of social policy. While proponents of Evidence Based Medicine take the value of this evidentiary approach and hence its rapid uptake to be self-evident and increasingly focus on 'translational' difficulties, a social historical account of Evidence Based Medicine can offer some alternative insights into the reasons for its rapid colonisation of medical territory and its increasingly hegemonic status in policy formation, if not in clinical practice. Certain political and social configurations can be seen to foster receptiveness to evidence-based approaches, while specific features of Evidence Based Medicine can reciprocally be identified as appealing to a wide range of potential constituencies. While seeking to place clinical decision-making on a more rational basis, Evidence Based Medicine can simultaneously be understood as one of a broader array of institutionalising techniques of accountability associated with the decline of trust in professional expertise as sufficient grounds for authorising intervention. The question remains, however, whether Evidence Based Medicine will live up to its promises or whether the opportunities for accountability will be squandered. A close analysis of historical materials will allow us to examine the track record of evidence based medicine over the past two decades.

"But You Can't Disregard Peoples' Values!" Policy Lay-Men's Critique of Evidence-Based Policy-Making.

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A development which has garnered increasing attention by scholars is the adoption of evidence-based medicine as an administrative tool. This development raises questions about what demands for evidence "do" to the organisation and outcome of policy-making processes. This paper addresses the attempt by a Swedish county council to develop an evidence-based policy for the prevention and treatment of overweight. The Weight Project (WP) was initiated by politicians and civil servants within the county council's purchasing organization. However, since a key idea was that the policy should be knowledge-based, a number of "key stakeholder" representatives were recruited to the project. The paper looks at how the recruited healthcare professionals' and patients' representatives criticized the WP's assumptions about what knowledge they should provide, how this knowledge was to be used - and what consequences this had for the outcome of the project.

The design of the WP reflects two common assumptions regarding how to undertake evidence-based policy-making: 1) that there are clear lines separating rational policy-making and politics; facts from values and, 2) that knowledge is cumulative such that more evidence implies 'truer' knowledge and hence 'better' policies. Thus, the first six-month period of the WP was intended to result in the formulation of a specific policy goal for the status of overweight in the county's population. This goal would then guide the formulation of a concrete action plan during the second phase of the WP. In order to formulate a realistic goal, significant resources were dedicated to compiling various kinds of knowledge.

The paper focuses on the critique levied by WP's 'topical experts'. During the project, these 'policy lay-men' repeatedly questioned the possibility of separating facts from values, or the relevance of considering knowledge separately from its organizational setting. Following these conflicts over the role of knowledge, the paper goes on to consider how the politicians and civil servants responded to the critique, and how the controversies evolved over time. As it turned out, most of these controversies were never 'closed'. This resulted in the failure of the WP to fulfil its purpose of formulating an evidence-based policy.

In the paper, I will argue that the ongoing debate over the concept of knowledge, combined with a lack of a common definition of this concept, contributed to this failure to deliver a usable policy - evidence-based or otherwise.

Evidence-based medicine is ostensibly well-suited for use in regulatory processes, since it is standardized through agreed rules about what knowledge is and how it should be produced (and used). However, the example of the WP illustrates how these rules were challenged by other ideals. In everyday clinical practice, the presence of multiple conflicting principles is common - but there are ways in which they can be managed. The WP shows how such conflict of principles is more de-stabilizing for a policy-making process. In such processes it is desirable to achieve an "informed ignorance" - a coherent, if simplified, version of reality on which to base a particular decision or rule.

Putting Everyone in Their Place: Evidence, Uncertainty and the Making of Epistemic Identities in the Administrative Court

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In the last decade, a variety of agencies have been set up in Europe and North America to provide standards of health care based on the best available evidence to patients, professionals and managers. A growing body of research has been concerned with how such standards are constructed, how they interact with health care practices and about their role in decision making in technological democracies. In this paper, rather than providing a direct analysis of these processes [Moreira (in prep) 'Experimenting with Cost-Effectiveness Analysis in the NHS'], I investigate the way in which the apparatus of administrative law [Latour (2002) La Fabrique du Droit] articulates them. The paper draws on a qualitative analysis of the transcripts of the judicial review of the National Institute of Health and Clinical Excellence's (NICE) advice to restrict funding for dementia drugs within the National Health Service [R. v. NICE, ex parte Esai (2007)]. The analysis suggest that if, on the one hand, the court is able to display a sophisticated understanding of the interplay between the production

of evidence and the making of uncertainty, on the other, it does so by ascribing fixed, legal identities to the actors involved in the process. It is this ordering device that enables the court to close a debate that previous deliberative efforts had been unable to. As a case study, this analysis contributes to our understanding of the ways in which the law is intertwined with knowledge production [e.g. Jasanoff (1995) Science at the Bar] and suggests that the law might be an under-explored contributor to the stabilisation of health care standards. The analysis will also be used to propose an exploratory typology of modes of interaction between production of evidence and deliberative processes in decision making in health care. I conclude by outlining how STS might in this way contribute to academic debates in health policy and political theory and to institution building/change in health care.

Evidence-Based Health Economics? Conflicts over Calculations of Pharmaceutical Cost.

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Evidence-based medicine (EBM) draws on the dual assumptions that objective and cumulative knowledge about treatment effects can be produced using particular techniques, and that such knowledge should be used as a basis for determining the contents of medical practice. That these ideas may come to stand in principle and practical conflict with idea(l)s in local medical practice is well-known. Discussions about the spread and administrative codification of EBM often highlight gaps between knowledge about treatments gained in medical practice and evidence about treatment effects garnered from clinical trials. Such gaps are used by various parties to argue caution - or resolve - in the deployment of evidence-based treatment recommendations. But what happens when "the numbers don't add up" for forms of knowledge that have similar ideals of objectivity and generalizability - and a shared use in attempts at intervention in local medical practice?

This essay takes its point of departure in the observed clashes between two ideals for objective and cumulative knowledge, as played out in conflicts over how to appropriately account for "pharmaceutical use" in calculations of drugs' cost-effectiveness. This was a pressing problem for a Swedish governmental agency tasked with deciding the subsidization of prescription drugs, where health economics was intended as a tool for judging whether the cost of a given pharmaceutical's use fulfilled the legal criteria for subsidy: having a "reasonable cost" of use (#15, The Act on Pharmaceutical Benefits etc).

Against the broader backdrop of attempting to construct "action-able" knowledge on which to base its decisions regarding subsidy (which, by extension, is also supposed to influence prescription behavior), the study takes an interest in how the studied organization's practical attempt to control reality was seen to require more than the use of controlled data. In particular, the essay highlights a number of debates centered on the provenance and characteristics of medical and economic data. The specific focus is on the debate over whether health economics calculations should be based on data from clinical trials or medical practice. Here, the acknowledged desirability of "good evidence" about pharmaceuticals' treatment effects was difficult to reconcile with more "worldly" data about the cost of treatment in clinical practice.

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Building on earlier discussions concerning the "politics of metrology", the essay posits that the organization's deployment of "worldly" calculations of cost helped to leverage "laboratory-based" data from clinical trials and turn the latter into a tool for intervening in healthcare practice "in the wild".

Making Medical Evidence Move: Multiple, (Im)Mutable Mobiles

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Evidence-based medicine (EBM) is, in short, the attempt to implement the latest and best evidence to medical practice. One institutional means for this implementation is the function of central agencies such as the Cochrane Collaboration, or (in the UK) NICE, that collect, select, summarize and send off research results in systematic reviews and guidelines.

In Sweden, at least three central agencies are involved in this porcess, viz. SBU (The Swedish Council on Technology Assessment in Health Care), the SoS (The National Board of Health and Welfare), and SALAR (The Swedish Association of Local Authorities and Regions). SBU is responsible for the production of systematic reviews and may thus be dubbed the agency of medical evidence and EBM in Sweden. SoS is reponsible for a growing library of national guidelines intended for the regional management of hospitals and clinics. SALAR is the organization - out of the three mentioned here - that is closest to the actors in regions, hospitals and clinics. All three organizations are involved in the compilation and implementation of medical evidence, but whereas SBU is closest to the compilation, SALAR is closest to the implementation. SoS is somewhere in between.

This paper asks: what happens to medical evidence as it is packaged and re-packaged by these organizations in documents and other activities? Two methods are used to answer the question: interviews and text studies. By interviewing central actors the explicit views on evidence is highlighted. By studying published reports and guidelines the formal evidence and recommendations can be analyzed. Medical evidence is - and is not - the same thing within these organizations, i.e. in their views and in their products. All actors profess a high regard of evidence, but also hold quite different views on the role and meaning of evidence in good medical care. It has been noted in STS and elsewhere that there is a gap between controlled scientific studies and the messy clinic. Just moving between the three organizations displays the mutability and multiplicity of evidence even before it reaches the clinical mess.

These observations are further deepened and elaborated by a corresponding theoretical tension within ANT and STS generally. There are a series of concepts trying to capture the varying degrees of stabilization of knowledge and the role of objects' immutability and/or malleability in the coordination of practices: from black boxes, to boundary objects, packages and standardizations, into the realm of multiple bodies. When considering this range of theoretical solutions the study of how medical evidence move and mutate between the three organizations in Sweden turns into not only an empirically interesting case. Actors are (often) not naive and provide their own sophisticated theories about the relation between mutability and mobility.

1.3.20: The STS Contribution to Innovation
         How can STS Contribute to, or even Intervene in Innovation, and What Are the
         Limits to Such Interventions?

Governance of Innovation

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Responding to the question "How can STS contribute to, or even intervene in innovation, and what are the limits to such interventions?" the presentation will position STS in a broader context of social science. There is a number of more or less useful heuristics for the study of innovation environments (e.g. Porter's diamond; Triple Helix; Innovation System; Technology Regimes, Multi-Level-Perspective, Transition research). It is a weakness of all such approaches that 'agency' and 'governance' are not thoroughly conceptualized (yet). Actor's de factor leeway for effective intervention in innovation processes is often not known. The political science notion of 'governance' - used as a heuristic - may help to shed some light into the black box. The presentation will discuss the relevance and use of 'governance' as an extension of the Innovation System / Regime Perspective. It will point to the need for further conceptualization, exploration and testing of the role of 'de facto governance' as a shaping variable of technological innovation.

Prerequisites for Regime Shifts to Unfold:
Exploring the Case of the Baroque Violin Technique

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From an evolutionary perspective, changes in technological regimes are considered as multi-layered processes evolving over longer periods; processes of variation, selection and retention result in new configurations of a path-dependent nature. Niche management and accumulation have been identified as important ingredients in grasping the micro-dynamics of the reconfiguration processes taking place. At the same time, these processes are situated against the background of existing regimes, characterized by a certain degree of homogeneity. In this paper, we focus on how to reconcile this apparent contradiction between the emergence and development of innovation on the one hand, and the presence - and influence - of existing regimes on the other. This question is addressed through analyzing one of the invention processes (chinless violin technique) that contributed to the transformation of performing baroque music today. Our findings reveal the crucial role of creative entrepreneurs, embodying idiosyncratic problem definition and solving capabilities vital for effectively pursuing trajectories of a more novel nature. These capabilities enable persistence and adequate levels of confidence to succeed, with the latter related directly to a certain level of familiarity with the 'unknown'. Not only does 'diversity' becomes critical to understand dynamics underlying regime shifts, our findings also suggest a reconciliation of the role of entrepreneurs during such episodes as inherently technical and creative. Whereas the presence of supportive roles and complementary niche activities are identified as instrumental, neither the presence of a clear market demand nor 'problems' of existing regimes emerge as important for regime shifts to occur. Implications for innovation processes and suggestions for further research are being addressed.

1.3.21: The STS Contribution to Innovation

Positioning STS in a Globalising World
- Acting with Development and Development Studies

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In our globalising world science and technology are regarded as crucial constitutions for the development of societies, in both the global North and South. This paper focuses on the question of how STS can position itself in a globalizing world by investigating its interactions with development and development studies.

Scholars in the social sciences have stated that the dominant 'paradigm' of a 'simple' North-South transfer of knowledge and technology is in the process of being replaced by a model of exchange of knowledge and technology between different parts of the world. This 'paradigm' change itself needs to be empirically and critically investigated and raises questions relevant to STS, especially with regard to concepts such as participation, intervention, transformation, and normativity. Positioning the field of STS in a globalizing world leads not only to increasing interactions of STS researchers with(in) the development context but also to relations with other (academic) fields such as development studies. Both may have consequences for the field, concepts, categories, methodology, and audiences of STS in both the global North and South. For example, the strong interaction with science and technology by civil society in India may inform notions of public participation in the North.

This paper presents a conceptual analysis of key concepts in both STS and development studies that relate to issues such as participation, intervention, transformation, and normativity. Therewith it sets the (theoretical) ground for discussion around these concepts and the ways in which they are used within the fieldwork-informed contributions to this session. The aim of the paper is twofold. An extensive literature review of prominent journals in the fields of STS and development studies over the past 15 years, allows us to 1) study the use and change of the crucial concepts mentioned above and 2) compare how STS and development studies have intervened in development practices. The study of the use and change of concepts in both STS and development studies allows us to assess possibilities for mutual (conceptual) learning between these fields whereas findings about interventional activities in developing practices aim to inform mutual learning between South and North. This will provide insights for both STS and development (studies) about ways of acting with(in) the development context of a globalising world.

Constructing Stakeholders:
Controversy Surrounding the Biosafety Bill in Kenya

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One of the major strengths of STS has been examining the co-construction of science and politics within regulatory decisions. However, like STS in general, much of this work is based on research in Europe and North America. With the growing presence of 'high' technologies,

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such as new biotechnologies, in developing countries, the politics of technology regulation in these countries deserve more of our attention. Part of this attention involves working out how, and if, we should intervene in regulatory 'controversies' and how our scholarship and interventions interact with those from other (inter-)disciplines which themselves are often tied to normative agendas.

This paper makes one step in that direction by exploring controversy surrounding the draft Biosafety Bill in Kenya. The role of the bill is to establish a legal framework to support research and development of biotechnologies in Kenya, including genetically-modified (GM) technologies. The bill has been in preparation since 2003, yet it still has not been presented for debate or vote in the Kenyan Parliament. This is despite the fact that GM technologies have been in development since 2000. GM development in Kenya has been operating in a legal vacuum, a fact that increases the urgency and the political stakes of the Biosafety Bill.

The particular issues that the paper explores are ones common to the world of 'development' and in development studies, namely participation or representation of poor and marginalised groups in decision-making that will affect their lives. In the case of the Biosafety Bill, participation and representation become embodied in the makeup of the National Biosafety Committee and particularly by particular civil society organisations and non-governmental organisations. Certain actors have participated in the development of the biosafety system and the Biosafety Bill much more than others. Based on qualitative ethnographic fieldwork in Kenya that took place between 2004 and 2007, the paper asks why this is the case. In particular, it examines the roles which scientific knowledge and technical 'know how' play in constructing 'stakeholders'. It argues that science and technology play important gate-keeping roles and clear lines cannot be drawn between science and politics. Furthermore, the paper is reflexive about intervention, or the researcher's role in the controversy, and how he himself became a stakeholder.

Shifting Agendas in Agricultural Development Research?

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Development studies in the field of agriculture put much emphasis on the shift from top-down models of technology transfer towards stakeholder-driven dialogues of knowledge production. My paper reflects on this shift by introducing two case studies from the Indian agricultural context: the cultivation of genetically modified cotton (Bt cotton), a classical example of top-down technology transfer, and Non-Pesticidal Management (NPM), a dialogue-based Civil Society Project. The paper is based on archival research and an extensive set of qualitative interviews with scientists, policy makers, multinational companies and farmers in India.

First, I will show how these two models of knowledge production co-exist in the Indian agricultural context: Bt cotton, which was originally developed by the US-based Monsanto Company, was transferred to the Indian agricultural context in 2002. Since then, a steadily increasing amount of farmers are adopting this technology. At the same time, NGO's and the state government of Andhra Pradesh join hands in order to upscale the dialogue-based process of NPM, a set of methods, which operate on the basic principle of pesticide free

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agricultural practice. NPM builds on century old forms of farmers' knowledge in combination with modern agricultural scientific forms of knowing.

Secondly, my interviews indicate that both the Bt cotton transfer model of knowledge production and stakeholder dialogues of knowledge creation in NPM involve risks and benefits to farming communities. Drawing on observations from my fieldwork and interviews with Bt cotton and NPM farming communities, I will show that different interpretations about Bt cotton and NPM as being a beneficial or a detrimental technology are constructed along the lines of communities, their structural setup (caste, class) and their respective resources (i.e. farm land size, technologies, access to irrigation).

Thirdly, I use my findings as a basis to reflect on the role of STS research(ers) within the discussion on competitive forms of knowledge creation. What could be 'the best way' of dealing with the opposite forms of knowledge production? Should we, based on our insights into the interpretive flexible meaning of paradigms, take a relativist stand and opt for the co-existence of the two paradigms? Or should we as STS researchers actively engage into advocating one paradigm over the other? On the basis of which criteria should we take such political and normative decisions? Or could we offer our classical insights into the contextualized and political character of knowledge and serve as 'brokers of dialogue' between the opposing knowledge communities? Could that help a country like India to arrive at a more contextualized, sustainable and need-oriented understanding of knowledge production for development?

The Politics of Knowledge Production in Plant Breeding Profession

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Modern science and technology play an important role in all sectors of human activity - agriculture being no exception to this. Inputs from scientific research were successful in conferring resistance to various biotic and abiotic stresses in food and cash crops. Research in the public sector institutions played an important role in providing better yielding varieties to the farmers. The conventional plant breeding programs are based on Mendelian Genetics where the level of understanding of the plant is at the phenotypic level. In the Indian context, molecular biology has been introduced since 1980s into the breeding programs. Since then the way plant breeding research has never been the same. These techniques enable the breeder to incorporate 'genes of interest' from any living organism from the plant or animal kingdom. These developments have significant implications for the scientific community engaged in plant breeding research.

Using the perspective offered by Kuhn, this paper aims to make a sociological analysis of the nature of changes at the level of cognition, the level of intervention and also at the level of organization of the profession that have occurred in the plant breeding practices in the changed context. The concept of a paradigm - a way of looking at the world - enables us to understand the consequences of shift in the paradigm for the worldview and also the practices. A new paradigm not only looks at the world differently but also a different world. Related to this is the shift in the practices - instruments and instrumentation techniques, experiments, standard ways of applying paradigm theory to different situations.

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Constructionists like Knorr-Cetina (1981) argue that scientific knowledge is an outcome of constructions based on a series of interconnected selections - theories, methods, experiments and interpretations. The selections are influenced by local contingencies and cultural contexts. Scientists deploy practical reasoning, analogical reasoning and socially situated reasoning in the process of production of knowledge (Knorr-Cetina, 1981). This perspective is useful to look at the process of production of knowledge by the community of scientists engaged in plant breeding. In this process, practices of the professionals would change and bring new set of values - cognitive and social. In this context, it would be interesting to look at the implications of molecular biology on the profession of plant breeding.

Changing States of Science - AIDS Research, Citizens and Governments in Tanzania in the Era of ART

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The recent roll-out of ART (antiretroviral treatment) in Tanzania has brought new hopes and hypes: as the Tanzanian president proclaims the vision of a 'Tanzania without AIDS', health care professionals and people living with HIV/AIDS throughout the country are called upon to finally design a 'positive life' with a 'real future'. In this process AIDS research has gained new significance, yet has transformed as well. While the relationship between health, governments, scientists, knowledge and citizens used to be straightforward within the framework of the 'developmental state' was a straightforward one - governments paying their national medical institutes to collect data from their citizens, a knowledge that governments then used to improve the health of the latter - neoliberalization impacted on these states of science/ scientific states. The new order is now characterized by an increase of private interests and non-governmental players, by transnational research collaborations providing opportunities for 'big science', e.g. the conduct of large clinical trials, and of internationally approved research ethics calling for 'informed consent' and 'participation'.

In the wake of 'scaling up' ART, the hitherto largely epidemiologically driven research opened to include socio-cultural dimensions. In order to provide this new type of data communities and clinics were turned to experimental sites for AIDS research/ researchers, driven by burning issues such as ART acceptance, access, adherence, and the anxiety about both drug and social resistance, in particular with regard to the main target groups of ART, women and children. However, relatively unproblematized are processes of translation inherent to this knowledge production, and the ways that experts, data collectors and informants shape and transmit data.

Drawing on ethnographic fieldwork in one such setting - an antenatal care clinic in Northwest Tanzania - this paper brings a critical STS perspective to studies of ART and pregnancy. Focusing on data collection as the first step in making science work, it explores standard interviewing of pregnant women by project staff to illuminate the micropolitics of institutional knowledge practices. It discusses the tacit assumptions that feed into the production of authoritative knowledge, while keeping the question of 'the underdog' open to empirical scrutiny. And it suggests the study of/with these new scientific entities as a new form of

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intervention that helps to disrupt the assumption of a one-directional North-South transfer, and may contribute to development and development studies.

1.3.22: Locations: Latin America

Teaching with the Sources: Presenting a New Interactive Database in the History of Science in Latin America and the Caribbean

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Studies of the social impact of science and technology in Latin America have been growing in number and sophistication. However, attempts to integrate analyses of Latin American science into mainstream history of science scholarship and curricula have been limited despite growing interest. There is a need to build bridges between area specialists in Latin American history of science and those trained in the history of science in other parts of the world, in particular the United States and Europe.

In this presentation I will demonstrate a web-based collection of primary sources in the history of science, medicine, and technology in Latin America and the Caribbean. This electronic database, called HOSLAC (History of Science in Latin America and the Caribbean), funded by a grant from the National Science Foundation, will ultimately provide digitized primary sources, ranging from pre-Columbian times to the modern day for teaching and research.

Using the latest new media tools, the shell consolidates sources from all media types (images, text, audio, video) into a single, seamless interface. HOSLAC is organized into 23 Topics (e.g., Aztec agriculture; exploration and navigation; Humboldt and America; tropical medicine), and contains a total of over 150 primary sources. These sources include historic maps; photographs of pre-Columbian tools and artifacts such as the Inca quipu (knotted strings that served as writing and accounting systems); photographs of individual scientists, scientific institutions, and universities; and excerpted translations of texts such as Darwin's descriptions of Latin American flora and fauna. The sources are accompanied by texts, built on recent scholarship, that places them in historical, political, and social context. A number of interactive features, such as maps and timelines, are included as well.

When complete, HOSLAC will be of use in a variety of classes, such as the history of science, the history of technology, geography, Atlantic history, Latin American history. It can be used as a tool for lectures, to illustrate a point or argument, and/or as a learning device for students. Faculty will be able to assign primary sources and interactive maps for students to study and incorporate in their written work.

A vital step in the production of this database is review by scholars and teachers in the field. During my conference presentation I will solicit critical comments from the audience about both content and usability. In the end, it is my hope that HOSLAC will contribute not only to the classroom learning environment, but also to scholarly and public understandings of the history of science, medicine, and technology in frequently overlooked regions such as Latin America and the Caribbean.

1.3.22: Locations: Latin America

Science and Scientists in Brazil:
Oscillations between Colonized and Colonizers

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The Instituto Oswaldo Cruz organized scientific expeditions into Brazil's remote interior between 1911 and 1913, covering extensive areas of the Amazon and the northeastern region. Contrary to previous expeditions, those of this triennial were of a longer duration and directed predominantly towards scientific investigation instead of short term sanitary concerns. The members of the expedition not only gathered data as to the medical and sanitary conditions of the population but also compiled a detailed register of the geographical, economical and sociocultural aspects of the places they visited. The information brought back by the expeditions to the urban centers, giving account of the penury prevalent in the interior of the country, nourished the already heated debate about the candescent questions of national identity and the extension of civil rights to a population recently egressed from a society of slavery: where was the true identity of the country? In the center of remodeled cities, candidates for the position of European cities south of the equator? Or in its poor suburbs? Or in the vast interior, living still immerged in colonial standards? In this debate, the expeditionaries vigorously defended the modernization of the country using the European model based on scientific progress and dreaming of the possibility that the country emerge a fruit of scientific construction. This paper will examine the dream of those scientists to construct a Brazilian nation under the leadership of science made in Brazil by Brazilians, and will also analyze the colonizing contents of a scientific production that professed to be universal. The expeditions serve to examine more thoroughly the colonial question, starting from the very frontier localization of the expeditionaries, divided between the world of the colonized that wanted to become modern like the 'others', the Europeans, and the eurocentric world of the colonizer, the latter convinced that its institutions, its practices and its conceptual schemes expressed the pinnacles of human development.

Amniocentesis in Colombia: Individual Choices, Social Implications

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The availability of foetal genetic information enabled multiple and new definitions of the foetus. The first of such makes the foetus an object of research from which valuable information can be retrieved. At the side of the definition of the foetus as a research object appeared the understanding of the foetus as a 'tentative' being, given that research's results may signify that the foetus would be dismissed.

Colombia provides a recent and visible example of such a change in the foetus' status, allowed by prenatal testing technologies. In May 2006, by Sentence C-355/06 relative to the crime of abortion (Sentencia relativa al delito del aborto) , the previously highly restricting abortion law was changed to allow the abortion of a clinically proven severely (genetic,

1.3.22: Locations: Latin America

chromosomal, or otherwise) malformed foetus.

Genetic technologies, amongst which amniocentesis is one to test for foetal genetic and chromosomal (ab) normalcy, are producing (and reproducing) an illusion of universal determinants that overrule cultural explanations for diversity, and provide the grounds for perpetuating ideals and beliefs regarding differences between fit and unfit individuals, and the archetypical life of both, overstressing what are consider to be the downsides of unfitness. Based on such archetypes and moved by an urge for normality, individual reproductive decisions are being made upon amniocentesis' positive results. Nevertheless, despite of being individual, reproductive choices do have social implications.

Departing from the shared understanding that the functions, uses and repercussions attached to a particular technology depend on a given time- space scenario, I propose to explore amniocentesis in Colombia. The aim of the talk is to present amniocentesis' history and its deployment in Colombia in order to elucidate how the availability of foetal genetic information evokes eugenic ideas

"First for the Country and Then for the World" : Colombian Interventions in Plant Genetic Engineering within Global Biotechnology

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Latin American scientists operate in a world in which /global/ connections and disconnections in the formation of scientific knowledge and application must be engaged, negotiated, and surmounted both /individually/ and /institutionally/. Furthermore, this occurs within a complex array of socio-economic, regulatory, and other factors. In the case of plant genetic engineering in Colombia, international sources of funding, international collaborations and out of country training (for graduate students and skill development) are all important to continuance of research. Scientists from Colombian institutions (universities and research centres) and from an international research centre situated in Colombia all draw on such connections in order to shape space for their research projects within the international practice of science. At the same time, scientists situated in Latin America must transverse disconnections created in this field through scarce research funding for tropical crops, difficulty retaining trained scientific staff within the country, complications importing basic scientific reagents, and language barriers. All of these factors place scientists working within Colombia in a position requiring them to intervene across space and time with complex patterns within international biotechnology research in order to participate in international genetic engineering research. These patterns in global biotechnology are affected by widespread inequalities in socio-economic and political power. These include not only what have been termed global north-south divisions or developed-developing divisions, in which the United States plays a hegemonic role in global scientific research, but additional locations of major biotechnological research such as China and India. Furthermore, such research occurs within processes of globalization, which, along with an increasing internationalization of science, includes regulatory harmonization and concern with not only scientific research, but also scientific regulatory capacity. Work of Latin American scholars suggests that careful attention to the development of institutional priorities, such as those

1.3.22: Locations: Latin America

involved in regulation and scientific research policy, is necessary, as these may not reflect the needs of Latin American peoples. Opponents of genetically modified organisms within Colombia echo this concern in their critiques of biotechnology regulation. Such questioning of policy direction in the Latin American context suggests that the interventions in the production of global biotechnological knowledge of Colombian genetic engineering scientists attempts, as suggested in the quotation in the title, to hold in balance an emphasis on local, Colombian impact and participation in international science.

F.N.M. : a Brazilian Counter-Laboratory

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From the 1940s to the 1960s a Brazilian state-owned company - the Fábrica Nacional de Motores (F.N.M) - performed different propositions of machines, raw materials, objects, subjects, classifications, accountings, professions, and communities, as compared with those enacted by the multinational automobile manufacturers from the U.S. and Germany that expanded their activities in Brazil at that time. This study shows that, as a counter-laboratory, for more than a decade F.N.M. contributed to obdurate and grant reality to other possibilities for an automobile industry in Brazil.

Since the laboratory studies in the 1980s, it became clear that acceptance or rejection of the truthfulness of a (scientific, legal or historic) fact is also a political act and not (only) the result of an epistemological assessment. Political options can not be made absent from the constitution of a reality that takes form through the resolution of controversies, for STS have shown that Nature and Society are no longer "out there" with their predefined forms or entities that can be discovered "out there" to solve the controversies. Before the resolution of controversies, every laboratory is a counter-laboratory that fights to obdurate the entities that it creates. To establish and maintain a proposition as a fact, to turn it into a constitutive element of reality, frequently requires to withdraw reality from the results of a competing counter-laboratory.

This is precisely what we found when studying the case of Fábrica Nacional de Motores (F.N.M.). F.N.M.'s propositions were competing with different propositions that the multinational automobile industry was establishing and disseminating as facts in Brazil during that period, bringing local obduracy to the version of reality of their own globalization. The closure of F.N.M. meant the end of controversies and also the closure of other possibilities for the constructed reality of the automobile industry in Brazil.

1.4.1: Sources of Stem Cell Lines: Classifications and the Implications for Governance

A Rat in Parliament: Scientism, Stem Cell Classifications and the Framing of Public Engagement

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Various calls have been made to democratise science. For instance, further "upstream" public engagement has been put forward as a way to open-up decision-making in science and technology. There are limitations to this participatory turn, especially since engagement exercises can impose identities on participants (e.g. Leach, Scoones and Wynne, 2005). Consequently, the need for social scientists to investigate the "framing" of public engagement becomes ever more necessary. In particular, the voices of science and scientists, often set up as the voices of rationality, play important roles in shaping engagement exercises and "performing" imagined publics (cf. Wynne 2006). Scientists' definitions and classifications of scientific objects can dominate public discussions of science and technology, and also pre-determine the roles and identities of potential participants in engagement projects. Therefore, it is important to investigate scientists' discursive practices and the implications of these for science governance.

This paper explores how scientists rhetorically merge and separate fetal and embryonic stem cell sources, and examines the repercussions this may have for the governance of stem cell research. Drawing on transcripts of parliamentary debates in Australia and on interviews with 31 stem cell researchers working in the same country, it highlights some of the assumptions embedded in scientists' discursive practices. It starts by introducing an experiment using so-called "pluripotent" stem cells in rats and reveals the social and political nature of the ways in which scientists classify these cells. It goes on to draw out the identities that this process imposes on potential participants in public engagement in stem cell research. For example, this paper suggests that claims such as "We can't let the public decide: they don't even know the difference between an embryo and a fetus" are problematic not only because they hide the conceptual fluidity of these two potential sources of stem cells, but also because they impose "scientistic" interpretations of reality (where science is given as the only frame within which to make sense of the world). This scientistic focus as well as the types of boundary work performed are shown to prevent particular types of arguments from being made and particular voices from having a place in public fora. This suggests that scientists' discourse can enable/disable different kinds of "scientific citizenship" (Irwin, 2001).

Embryos and their Classification: Findings from a Project on Public Engagement in Stem Cell Research

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When we hear about embryonic stem cell research (SCR), this often implies the use of embryos created for IVF that are then donated to SCR. However, what constitutes a 'human embryo' is an expanding, if contentious, issue. There are now many different sources of embryos for SCR: using cloning techniques and human eggs from so-called 'egg sharing'

1.4.1: Sources of Stem Cell Lines: Classifications and the Implications for Governance

arrangements or 'altruistic donation', and using animal-human embryos. Additionally, recent research that created induced pluripotent cells from skin cells raises the possibility that human gametes can be created from these stem cell lines. These various embryos raise different social and political questions and challenge conventional systems of classification. How, and by whom, these entities are ordered is rendered visible, allowing us to explore what social and moral order is created through these processes of classification (cf. Bowker and Star, 1999). Questions about how we categorize these entities, in turn, propel questions about the role and nature of regulation of this expanding area of research.

Drawing on data collected from 18 discussion groups and three public events, this paper examines the different ways in which diverse actors classify the various embryos used in SCR. In a project exploring the social dynamics of public engagement in SCR, our research has involved stem cell scientists, patient groups, nurses, clinicians and community groups from across Scotland. This project has two overarching aims: 1) To investigate a range of peoples' views of SCR, 2) To critically explore critically the scope for increasing public engagement in SCR through a range of public engagement techniques. Focusing particularly on embryonic SCR, we begin by outlining the creation of different embryo entities. We then go on to demonstrate how distinctions (or elisions) between different embryos are accomplished and draw out the normative implications for their use in research and how they are regulated. By contrasting the accounts of different groups, we will consider the discursive mechanisms by which some meanings achieve dominant status in spoken discourses on SCR while others remain marginalised or excluded.

Aborted Fetuses, Fetal Stem Cells, Social Science and Investigative Journalism

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Aborted fetuses are considered the 'right tool for the job' in some research fields. They are responsible for one of the milestones in the recent history of stem cell science: in 1998 John Gearhart, of Johns Hopkins Medical School, Baltimore, USA, announced that his laboratory had succeeded in keeping alive cultures of human stem cells derived from embryonic germ cells of therapeutically aborted fetuses. Stem cell scientists on both sides of the Atlantic use aborted fetuses in their research. Indeed, stem cell products derived from aborted fetuses are closer to the market than those derived from pre-implantation embryos created in vitro.

Research using aborted fetuses is mired in the controversy surrounding abortion. This presentation provides a comparative analysis of the impact of controversy on the regulatory environment in the US and Britain, and its influence on scientists' procurement strategies. Although the noise surrounding the controversy is much louder in the US than in the UK, and American anti-abortionists are politically highly active, abortion rates are similar to those in Britain.

Stem cell and other scientists prefer to hide the extent to which aborted fetuses are used in research out of fear of provoking anti-abortion challenges to their work. In publications of their research the origins of the research material is often disguised. Classification of fetal

1.4.1: Sources of Stem Cell Lines: Classifications and the Implications for Governance

stem cells is a social and political accomplishment with important implications for social scientists who venture into the field. Although the research described here involved documentary analysis and interviews, perforce it was conducted in the spirit of investigative journalism. Findings can make uncomfortable reading. This kind of investigation into a controversial and subterranean field invites questions about feminism and science studies.

1.4.2: Risk Governance in Newly Industrialized Country

Risk and Drug Regulation:
the Transforming Osteoarthritis in Taiwan

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Risk has been widely used to study medical controversy. Osteoarthritis, with estimated prevalence between 10 to 20% in Taiwanese over 60 years of age, has been recognized as a significant public health problem by WHO by designating the years of 2000-2010 as the Bone and Joint Decade. This paper examines the transformation of osteoarthritis through the dynamics of fact-making by the state, pharmaceutical industries, and medical professionals in the regulation of drug for osteoarthritis in Taiwan. Data were drawn from major newspapers and four popular health-related magazines dated from 1951 to 2006, as well as the official documents from the health department in Taiwan.

The results show that the transformation of causes of osteoarthritis is evident and shifted from occupational hazards in the early 50s, to organic degeneration attributed to aging in following decades, to lifestyle factors (e.g. obesity, malnutrition) during mid-1980s to mid-1990s, and finally to instability of molecular and biochemical materials such as cartilage tissue in the body. Osteoarthritis, rather than the disease of "the elderly" or "improper lifestyles", is now standardized as "cellular inactivation disease" in the frame of preventive discourse. The attribution of lifestyle factors based on the preventive discourse had led to the fast increase in the consumption of glucosamine. The investigation of the new drug regulation in 2002 to categorize glucosamine as health food rather than prescription drug has indicated that the successful leveling the expenditure of glucosamine by the state has been achieved through challenging its efficacy. However, the pharmaceutical company produced drug namely "Viartril-S" transformed the controversy into its advantage by advocating its preventative use. The claims by "Viartril-S" call on risk factors of individuals who are younger and at earlier stage of osteoarthritis. The multiplication of the pathways to the establishment of credibility provides the space in the constructions of "scientific" knowledge by various interest groups. Furthermore, the scientific knowledge constructed by the government justified the shift of state responsibility of risk management to the individuals.

The study on regulatory practices of glucosamine among the state, the pharmaceutical industry, as well as medical professionals has demonstrated the negotiation of scientific credibility and risk in Taiwan. Privatized risk strategies relief from state intervention has instigated the commodification of glucosamine in Taiwan.

Chicken, Duck, Pig, Goat, and Man: Whose Health? Whose Risk?

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In this case study, I explored the local knowledge, regulatory science and risk governance of dioxin-polluted food in Taiwan. The first case was the 2005 "poisonous duck egg" in Zhang-

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Hua County, and the second case the 2006 goat pollution in Taipei County.

The "poisonous duck egg" started with one duck egg from a local grocery store with elevated dioxin level. The scientists, under the governmental commission, traced it to the duck farms in a rural town. It ended with destroying thousands of eggs and ducks, and banning duck framing in the whole town. The actions created wide media coverage, a public scare, and the market price of duck eggs dropped dramatically within one day. To compensate the duck farmers for their losses, the government applied the regulations either for the chicken or for the pig farming. The references of the dioxin level of the duck eggs, however, were from the European Commission for chicken eggs.

The second case started with a pot of goat stew with elevated dioxin level in a mountainous area near an incinerator and a fire power plant. The scientists and the government traced it to a goat farm, slaying all 50 goats. In a follow-up study, there was a she-goat with elevated dioxin level in another farm near by. Under the pressure from religion and animal protection groups, the local government did not kill the 146 goats in the farm, but bought and confined all of them.

The questions that I aim to explore include: What is dioxin risk? How is dioxin tested and regulated? Who will bear those costs? Who is responsible? The study indicates that there are much controversies and uncertainty behind the regulatory science of dioxin. In collaboration with the farmers' local knowledge, there is a lot to improve in the sampling, regulation levels, and compensation policies of dioxin risk governance in Taiwan.

Risk Formation of the General Public in Taiwan: the Cases of Nuclear Technology and Genetic Technology

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This article tries to explore trajectories of risk formation of ordinary people in Taiwan regarding to nuclear technology and genetic technology. At the first stage of risk formation, the focus will be put on what kind of factors trigger people's attention to varieties of science and technology risk. Afterward, social actors might face many risk events that they need to make decisions whether they will take technology or not. It is very important to investigate how these people make stories to justify their risk judgments and what are rationales used by them. These actions will either reinforce or modify the previous risk frame of social actors. Some people might move the subsequent stage in which they develop relatively risk frame and they tend to employ this frame when they encounter new technology risk. Although this article employs a stage metaphor to elaborate risk formation of the general public, it does not mean risk formation of the general public is a linear process.

There are two different pictures between these two technologies in ordinary citizens. Many social actors tend to believe that nuclear technology can lead to massive damaging disaster to human being while genetic technology seldom makes serious negative impacts on all the people but only some individual injuries. Moreover, applications of genetic technology usually leads to direct benefits of social actors such as medical treatment, food but there is no similar direct effect experienced by the general public. This article will argue that if social actors do

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not transfer their previous risk frame into new technologies, they tend to form different risk frames related to these technologies because of mass media presentation, knowledge familiarities, and models of direct benefits obtained by social actors.

In the process of risk formation, risk events in social actors' courses become their arena to practice their judgments as well as to show the degree of personal risk-bearing. According to preliminary results of in-depth data, some interviewees employ rational cost-benefit approach to evaluate whether they will be in favor of applications of new technologies or not. Based on this criterion, many people consider genetic technology provides more direct person benefits than nuclear technology. While, some other interviewees base on the degree of new technology against Chinese ontology of both nature and body and there is no surprise that quite a few persons count on experts' judgments. Since genetic technologies can often be applied directly into human body, social actors are very likely to reject them if they consider genetically-modified materials unnatural. This justification is seldom applied to nuclear technology. In genetic technology, it is easy to observe that a complicated combination of both the rational model and the traditional habitus in risk decision of genetic technology.

Reflexive Risk Governance: a Critical View of "Bring the State Back in" Newly Industrializing Country

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In confronting all kinds of challenges in the process of globalization, the cry to "bring the state back in" is being raised again. It is expected that the government can well ably play the role of risk regulator to enhance the capacity of risk governance. Taiwan or East Asia countries, as a newly industrializing country, due to its distinct historical background, technocrats still play an influential role in terms of the theory of the developmental state. They are highly authoritative and autonomous either in technological or in risk policy decision-making.

The purpose of this paper is to critically reflect decision-making problems in developmental states that deal with disputed and sensitive risk policy. The main focus of analysis centers around a discussion of authoritative technocratic expert politics, and of its inner conflict and challenge of transformative risk governance regarding risk and technological policy, for instance, global food risks, GMO, stem cell research, nanotech and so on. The author will also address the development of corresponding special and glocalized risk structure and risk culture which are all vital in the creation of reflexive risk governance in developmental states.

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Expert Expectations:
Exploring the Relationship between Sleep, Work and Health

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In addition to health care and emergency services, the move towards 24 hour living has given us an array of entertainment services that are available around the clock. As a result, a growing number of people are required to work at times outside of the traditional '9-5' working day. Such changes to work patterns can result in disrupted or inefficient sleep. Sleep deprivation is emerging as a significant social and, under certain circumstances, medical problem. As we move towards a global '24/7' culture, questions of how to manage sleep and deal with sleep problems are therefore extremely pertinent. This paper is concerned with exploring the relationship between sleep and health in the context of employment from a medico-scientific perspective.

This paper investigates 'expert' expectations relating to the role of medicine in the management of sleep and sleep disorders in order to gain an understanding of the relationship between sleep, work and health. To assess how this relationship is understood by the 'expert' community is of importance, not only conceptually but also on a normative level, as in wider society such views and opinions can become prescriptive, often forming the basis of rules and regulations for health behaviour.

Semi-structured interviews were carried out with leading clinicians involved in the management of sleep disorders and those with 'expert' knowledge in related fields, such as neuroscientists, circadian biologists, and clinical psychologists.

The data were analysed using a framework based upon the sociology of expectations. The ways in which the relationship between sleep, work and health were conceptualised by the medico-scientific community gave rise to different expectations regarding the role of medicine in the management of sleep and sleep disorders. On a number of occasions medical interventions to manage sleep were discursively linked to existing technologies. Such comparisons were used to 'tell moral tales' acting to justify expectations about the role of medicine in managing sleep and sleep disorders.

Results showed that the relationship between sleep, work and health seems to be conceptualised by the expert community in two ways: either through a psychosocial model [focusing on a combination of psychological and social factors impacting sleep] or through a biosocial model [focusing on the interaction between social and biological factors]. Each model corresponds to different expectations about the role that medicine should play in the management of sleep and sleep disorders. The two models formed the basis for two discourses of sleep 'regulation', one where the individual takes responsibility for their sleep or lack of it and engages in sleep hygiene for example, and another that recommends controlling sleep problems through medical interventions using drugs or other medical technologies.

This study establishes a link between the emergent sociology of sleep, the sociology of expectations and the role of 'expert' knowledge in the organisation of health care.

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Tuberculosis: Contemporaneous Urgency between Old and New Models of Disease

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Tuberculosis has been declared world emergency in 1993 by the WHO. Part of the world was able to forget about tuberculosis from the second half of the 20th century on. It is only this part that can declare now that tuberculosis is a (re)emergent disease. In fact tuberculosis never stopped being an important fact in the lives and deaths of many people in the world. Tuberculosis is found along the lines of inequality and poverty, as well as, since the eighties, along the lines of another infectious disease, AIDS.

In its beginnings, epidemiology focused on the collective character of disease, as an heuristic scale and also as one very important level of intervention in dealing with diseases. Along time, however, epidemiology suffered huge changes in its dominant approaches and came to focus mainly on aggregates of individuals. This hasn't been the only way of looking at diseases, as proposals like social epidemiology demonstrate.

The triangular model for infectious diseases - agent, host, environment - was instrumental for the development of the understanding on these diseases. While one of the three points - environment - seems to have been largely forgotten, it is interesting to notice how the perception of (re)emergent infections as world menaces is accompanied by deep reflections on ecosystemic approaches to health. The contemporaneous discourse on (re)emergent diseases seems to speak more of the increased awareness of the failure to understand, and thus prevent and treat, infectious diseases in their context (historical, social, political, biological, ecological), than of a new dynamics of disease emergence. What is also continuous is the structural violence determining a disproportionate incidence of these diseases in the poor and marginalized people of the northern and the southern hemispheres.

Through comparative bibliographical analysis this paper will explore the contributions and implications that such old and new perspectives may have in the thinking and acting upon tuberculosis in our days. It will equally explore what role is to be played by social scientists, particularly those involved in social studies of science, in such an urgent endeavor.

Liquid Technologies of Health and Well Being: from Therapeutic Bath to Modern Spa

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Even though ritual bathing and spring water drinking can be found across different places, times and cultures, the notion of "taking the waters" as a therapeutic device has a unique history in Europe. In the eighteen century, taking the waters in places like Bath was part of the repertory of the English gentry portrayed by Jane Austen; in the following century, the emerging classes in France seeking to display sophistication adopted the spa as the epitome

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of restorative leisure, while a growing number of physicians argued for the healing properties of thermal waters. Medical hydrology developed as a specialty that studied those properties and therapeutic applications. Spas became increasingly similar to hospitals. Like in a hospital, the spa client/patient could find an atmosphere of discipline, segregation, submission to the uniformed health providers and their prescriptions. There, also, one could find an increasingly complex array of specialized techniques and devices for spreading water throughout the body, to direct water to specific body parts, or to introduce water and vapours into the body orifices; and then, one could relay, or accept, the devices to recover from all those exhausting practices. In spite of all that, the leisure component was never lost. Taking the waters was always a change in routine; the tourist industry eagerly took charge of that sort of demand.

In France, the medicalization of hydrotherapy led to its coverage by the national health system, which in part explains why spas flourished in the continent while they declined in England, where there was little medical support to the activity, as argued by George Weisz. But that, too, would change, and while the traditional, medicalized and heavily ritualized spas also declined in the continent towards the end of the twentieth century, new forms of using the waters for well-being purposes multiplied.

They range from the healing-oriented self catering of thermal waters, as we observed in rural Portugal next to sulphur springs, to the beauty-parlour "spa" industry that claims a genealogy from invented "sanitas per aqua", to the reconfiguration of ancient spa towns where the old immersion in smelly sulphur waters and the mud applications are combined with, when not replaced by, massages with ayurvedic oils and hot stones, immersion in wine or applications of chocolate paste.

Based on empirical data collected in the years 2003-6, I will develop a political, economic and cultural interpretation of the transformations in the "liquid technologies of health and well being."

Debating Possession/Mental Illness with Mental Health Professionals and Clerics: Acting with a Symmetrical Approach in Adverse Fields

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We study how catholic quasi/religious experiences are dealt with in psychiatric care. We ask how it happens that, in particular therapeutic or pastoral settings, phenomena such as hearing the voice of God or having an apparition of Virgin Mary are enacted by participants as, on one hand, a legitimate religious experience or, on the other hand, a symptom of mental illness. To understand this border-work carried out, from time to time, in psychiatric (and also pastoral) practice, we used a symmetrical approach, in which no preference is a priori given to spiritual or medical explanations. That is also why we interviewed, among others, not only psychiatric professionals, but also catholic priests. Our interviewees frequently manifested their genuine interest in our research. Facing their curiosity (but also initial hesitations) we started thinking about the value of symmetrical approach somewhat differently. We appreciated that the "politics of symmetry" has implications far beyond what

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and how is known and started thinking more of what the symmetrical perspective means for "acting with our scientific knowledge" in the medical and pastoral fields. We decided to set up an experiment. In our early paper on the topic, we discussed a horror/court drama "Exorcism of Emily Rose" (Scott Derrickson, 2005), which tells about a catholic priest accused of negligent homicide of a young woman, Emily Rose, who had been considered by her family and the priest as possessed and did not survive attempted exorcism. Two competing versions of the case were confronted during the trial: while the prosecutor argued that Emily had been sick and exorcism directly led to her death, the defendant - with the help of an anthropologist - tried to take seriously the reality of possession. In this early paper, we show how the movie on Emily Rose carefully develops a balanced view of the phenomena and we also use this analysis to explain the principle of symmetry in our own research design. In the experiment, we have asked some mental health professionals and clerics, to watch the movie and read our early paper to prepare themselves for subsequent focused discussions with us. In the paper proposed for the 4S/EASST conference, we thus want to offer a close analysis of these discussions and shed some light on how the (explained and applied) principle of symmetry might be understood or misunderstood, accepted or rejected as relevant by the concerned professional audiences. We therefore want to contribute to the STS literature on symmetry by a small empirical exercise focused not so much on the "cognitive" relevance of this methodological standpoint, but rather on how symmetrical accounts can be accepted, understood and used by actors in the field(s) under study.

1.4.4: Energy in Everyday Life. The Use of Energy Related Technology. III

ICT and Energy Consumption the Experience of Pioneer Users

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In the countries where the use of ICT is most advanced, it becomes increasingly clear that the development of households' ICT use requires much energy. So far, however, few studies have explored the relationship between the use of ICT and the energy consumption of households. On the one hand, the ICT-related research is concerned with many other agendas related to the development and diffusion of ICTs in society, and on the other hand, energy research tends to concentrate on the consumption areas which have hitherto required most energy in households, such as heating and white goods.

Related to ICT, some studies have focused on electricity consumption in standby mode, which has turned out to form a considerable part of households' energy consumption, but little has been done to explore the background for and the importance of the increasing number of appliances and the new patterns of use. There is thus a surprising lack of linkage between two of the prominent social agendas - the development of the information society and the question of how to prevent man-made climate change.

The aim of this paper is to contribute to the exploration of the relationships between households' ICT use and their energy consumption, based on qualitative interviews with pioneer users. First, we highlight how ICT becomes integrated in ever more everyday practices. Just as the electromotor once became an integral part of a large number of domestic appliances (vacuum cleaners, refrigerators, kitchen utensils, tools), present-day innovators try to find applications for the computer and the Internet in all conceivable goods and services. For many users the computer and the Internet are now domesticated as ordinary elements of everyday life so the main attention of the study is the stability or change of the various practices in which ICTs become integrated. We study pioneer users as their experience indicates the possibilities that may diffuse to broader segments of the population.

Based on the study of changing everyday practices, we discuss the implications for energy consumption. Among the issues discussed are: the number of appliances (implying indirect energy consumption for production), rapid obsolescence and the coexistence of various generations of appliances, time use, freeing or appropriating time for other activities (that may be energy-consuming), reducing or increasing transport, freeing or appropriating money for other purposes, the use of ICTs with the intention of saving energy, behaviour with regard to standby.

Finally, we discuss how the insights can inform policies to promote energy savings.

1.4.4: Energy in Everyday Life. The Use of Energy Related Technology. III

Solar Energy in Everyday Life: Exploring
Photovoltaic Technology and its Users in the Domestic Sector

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Users' behaviour regarding energy use in the home has been the subject of recent debate in energy research amidst increasing concern over energy consumption in the domestic sector and its impact on sustainability and climate change. Given the potential of renewable energy technologies in reducing reliance on fossil fuels and decreasing carbon emissions, one area of relevance is the introduction of renewable microgeneration technologies into the home and the impact this will have on people's energy related behaviour and lifestyle. Taking the example of solar photovoltaics, this research examines two case studies involving the implementation and use of this technology in the UK as part of the government's photovoltaic domestic field trial.

Drawing on theoretical perspectives from STS on users and adopting qualitative methods in case study research, this paper approaches the implementation of photovoltaic technology by analysing the actor-networks surrounding its design and installation. The study examines the different roles that the actors involved play in shaping the design and implementation of photovoltaics in the domestic sector, and how this consequently influences the use of the technology in the home. It outlines how photovoltaics are appropriated within domestic spaces and the different types of users that we can think of in relation to the technology. This paper thus argues for the importance of situating the use of solar photovoltaics, and other related microgeneration technologies, within the wider sociotechnical landscape governing household energy consumption. This perspective can be helpful in understanding the embeddedness and use of microgeneration technologies as a negotiated process of actors' knowledge and expectations, the users' methods of appropriation, and the sociotechnical systems within which they operate.

ITALY by Design. How to Translate a Monopoly into a
Pluralistic Market through a Technological Innovation.
The case of the new electric counter.

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In 2001 ENEL, the Italian national electric company, former monopolist of the electric market, started to replace the old and traditional electric counters [Fig. 1] with a new electronic one [Fig. 2] designed by the renowned designer Michele De Lucchi. This has been an extraordinary endeavor: by 2006, 30 million counters have been replaced with an average of 40000 replacements per day. The new electronic counter counts the electrical consumption as the old one, but it also exchange those and other data about electrical consumption with a centre of calculation. This exchange allows managing the contract and the supply from distance.

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Taking into account the technical object in itself - the new electric counter -, my intention is to show how a close analysis of the object, which would considers all its aspects - from the way it works to the way it was designed by Michele De Lucchi - allow accounting for it, describing the way it rearticulates the relations between the electrical company, households and the recently liberalized electric supply market, by becoming a specific obligatory passage point.

The analysis is based on ANT's researches on technical objects and especially Madeleine Akrich's ones. The aim of the paper is twofold, analytical and methodological. On one hand - from the analytical point of view - I want to account for the way a specific technical objects, and its design, rearticulates social ties. On the other hand - from the methodological point of view - I want to dwell on the concept of "script", proposing an upgrade of it into a model for the analysis of objects developed within the semiotics of objects. This model tries to account for all relations that an object articulates, not just the ones towards its surroundings, usually considered by ANT and other approaches like workplace studies. I try, thus, to satisfy Latour's request [in Reassembling the Social, p. 233]: "when faced with an object, attend first to the associations out of which it's made and only later look at how it has renewed the repertoire of social ties".

Paradoxes of Design: Acting with Technology, Energy and Aesthetics in a Warm Bathroom

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This paper aims to contribute to the understanding of the co-production of technology with policy and consumption in relation to energy use in private bathrooms. We investigate the relation between energy standards and '"aesthetication"' with a focus on how the bathroom has changed to a "high-energy" room. We expect that energy use in households is characterized by a specific configuration of things, designers and users, in which the definition of an aesthetically valuable home is connected to ever increasing levels of energy consumption (Aune 2004, Shove 2003). What we set out to do is to carefully dissect how this exactly works.

Energy use is intimately linked to the probably most pressing environmental problem of all, the increased emission of greenhouse gases. Since energy saving and labelling has been discussed broadly, it should be a well-known concern to designers and consumers. Energy efficiency is an intrinsic and invisible quality of products. It shares this trait with many other dimensions of sustainability. Thus, findings about the relationship between energy concerns and aesthetics should be relevant also to a host of other issues of sustainability of consumption.

Energy users could do without the 'unnecessary' pleasures of our daily lives, such as a warm bathroom, but research indicates a surprisingly weak connection between sustainable attitudes and sustainable practices. Whereas there is research on sustainable production and (much less) research on sustainable consumption, virtually no one has explored the host of interrelated mediators which relate these to each other. Based on a relational ontology, we are not searching for sustainability as it manifests itself as characteristic of entities or practices. Instead, we locate greater or lesser degrees of sustainability in the respective

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ways in which entities are related to each other. This project does so by visiting locales and situations where aesthetics and sustainable production, distribution and consumption meet or miss each other. Thus, we seek to map and identify mediators and intermediaries which are located between production and consumption, to trace their shifting, multiple relations, to approach locales of production and consumption from their fringes. We argue for the need for research that reopens basic issues about the relationship between design and consumption, above all to investigate the role of aesthetics and the relationship between the concern for sustainability and the strive for beauty in modern products. We investigate how aesthetics, design, and sustainability can be related strategically to each other by focusing on how aesthetics is managed by designers, consumers, and the myriad of intermediaries in between.

Social shaping of aesthetics and actor-network theory introduce the notion that materiality (e.g. 'green' technologies) and ideas (e.g. 'sustainability') are relationally shaped and should therefore be studied as associations of human and non-human actors (Latour 2005). Actor-network theory argues that following the traces of this "becoming" of entities we will be able to open up for new understandings of how the triangle between designers, users, and objects works.

Electricity Use in Everyday Life Users of Electricity Dependent ICT as Innovators

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The starting point for this paper is that the introduction and use of Information and Communication technology, ICT in general takes place in interaction with other individuals, either in direct interaction or as a result of the interaction. From the very first stage of awareness to later phases of the domesticated use but also in new ways to use a specific technology or in new areas the social context plays a significant role. In the initial phase, social networks are often of big importance for how new technology or new use will be introduced. The technology is in this way embedded in differently social contexts. Without this connection to social contexts the use can become less important or even vanish.

The aim with the research project is to create new knowledge about users' creative and innovative use of ICT, how systems/networks for communication are created and how the users 'navigate' in the Broadband Society. The empirical data in this explorative research project is collected through interviews with households (all the members in a household are interviewed separately).

The term 'broadband', in this context, stands for several technical solutions (broadband ISDN, Bluetooth, wireless and satellite networks, IP datacast, etc.) either separate or in combination. How does potential users manage to find ways in which such technologies can be useful, worthwhile and attractive? Previous research has shown that the users are creative in terms of fitting ICTs into their activities or using them to find solutions to the everyday problems that they already encounter.

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Users' participation in the complex Broadband Society takes place through more and more mediated communication which in some cases leads to an increasing feeling of security. On the other hand the communications need a solid and always accessible supply of energy which means that there is vulnerability embedded in the system. Another aspect of the increasing use of ICT is its effects on the energy consumption - from production to use and in the end as waste disposal. Do the users find innovative ways to handle these issues?

1.4.5: Biomedical Technologies: Exploring Socio-political Contexts and Meanings, I

Knowledge, Biotechnology and Embodied Experience: Menopausal Women Encounter Gynecologists in Taiwan

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Menopause has never been seriously discussed before 1990 in Taiwan. However, as a result of the establishment of "Medical Association of Menopause in Taiwan", it was promoted as an accepted illness to be covered by the National Health Insurance. It indicates the shift from the 'natural' discourse to the 'medical' one. July 9, 2002 was a memorable date for pharmaceutical industry and medical professionals as well as women users. The US National Institutes of Health (NIH) abruptly ended the biggest study of 16,600 women of a type of hormone replacement therapy (HRT) for the last three years and announced that long-term use of the combination of estrogen and progestin significantly increases women's risk of breast cancer, strokes and heart attacks. The news broke the myth of 'HRT as panacea for menopausal women' and it also caused panics among women users and their doctors, including those in Taiwan.

This paper aims to explore the knowledge, biotechnology and embodied experience as the menopausal women encounter their gynecologists. It is dealt in two parts:

1. To understand the views on menopause held by gynecologists, their understanding, evaluation and learning of HRT, the process that they come to a decision in prescription, how they persuade women accepting HRT or not to take it. My primary findings are that the understanding and learning process of the knowledge of HRT among gynecologists are varied due to differences between gynecologists in teaching hospital and countryside clinics as well as their individual knowledge. In the daily diagnoses, their decision is mixed with biomedical knowledge as well as social values and personal tacit knowledge.
2. From women's viewpoint, what makes them to accept or reject HRT? What are their views on taking HRT with some risk? How do women mingle their embodied knowledge with their cultural believes? How do women view other biotechnologies with an image of 'natural ingredients'? How women users developed 'pluralistic strategies' based on their embodied experience and local knowledge on various biotechnology? What are the social-cultural conditions and mechanism for them to develop the 'user agency' which leads them to depend less on HRT.

Methods: I have interviewed 15 gynecologists and 20 menopausal women as well as consulted medical papers and local newspapers. I adopt triangle data examination methods, so that the interview data can be analyzed in a wider social-cultural and medical context. Actor-Network Theory (ANT) would be the theoretical frame of the paper in which biotechnologies will be the centers of the medical professionals and users.

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Framing Risk and Negotiating Order:
The Multiple Embryo Implantation Controversy in Taiwan

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Regulating the number of embryo transferred in IVF has become an important debate among the international world of reproductive medicine. While in the Nordic countries, one or two embryo transfers have been the norm since late 1990s, in Taiwan the average of embryo transferred is 4.07 and 66% of IVF cycles involve four or more embryos in 1998, ranked the highest globally, followed by the US and South Korea.

This paper examines why Taiwan reaches such a controversial practice in IVF for the past 20 years. In the late 1980s, practitioners of IVF in Taiwan defined risk in terms of pregnancy rates and live birth rates, rather than health risk to mothers and fetus in the late 1980s and early 1990s. Although the international debates on regulating number of embryo transfers brought sporadic academic discussion since mid-1990s in Taiwan, Taiwanese practitioners tend to individualize IVF centers and customize users, disclaiming a universal practice and the need to limit the number. Women who suffer from having under-weight multiplets occasionally revealed complaints to the media. However, it is their stories published in the newsletter of Premature Baby Foundation that lay people's form of defining risk began to gain credibility, and hence started a debate outside the social world of reproductive medicine, augmenting discussion among patients groups, pediatricians, and ob-gyns. Nevertheless, using US guideline - one of the most lenient one internationally - as a model example of scientific risk governance, Taiwanese Society for Reproductive Medicine lobbied for the five or less transfer policy in Human Reproduction Act in 2006, possibly the most permissive regulation in the world.

Through this case study, I argue that experts in Taiwan employ multiple resources of framing risk to sustain the efficacy of achieving pregnancy through multiple embryo implantation and thus transform little of their practice even facing international debates and local pressure for regulation.

Housewives as Kitchen Pharmacists: Dr. Zhuang Shuqi's Regimen
and Gendered Identity in Contemporary Taiwan

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It is well-known that when surveys find a gender disparity, invariably it is women who use alternative medicine more than men. Very little in known, however, about why there is such a strong correlation between gender and alternative medicine use. A good example to help one understand this phenomenon is that of Dr. Zhuang Shuqi (1920-), who arose as a popular and much admired practitioner of Chinese medicine in Taiwan since the 1980s. Her experiences and medical practices are important for at least three related reasons.

1.4.5: Biomedical Technologies: Exploring Socio-political Contexts and Meanings, I

First, against the background that Chinese medicine has been marginalized since the Japanese colonial rule (1895-1945), Dr. Zhuang was its first practitioner to win such wide popularity and admiration from the public. Given the widespread suspicion from medical elites and-to a lesser degree-from the general public towards Chinese medicine, one wonders how she managed to make herself credible and create a conceptual space for her Chinese Style Health Management in a field largely dominated by modern bio-medicine. In more concrete terms, how did Zhuang negotiate between two medical doctrines and thus re-configure the cause of illness, the constitution of the body, the site of medical intervention, medical role of the patient, and even the understandings of Chinese medical concepts such as Qi?

Secondly, Zhuang's regimen is a highly feminine one. The target audience and designated health-care providers are housewives. The major medical treatment is dietary therapy, thus the place of healthcare provision is the kitchen - a traditionally feminine facility. Zhuang herself demonstrates and self-fashions a caring female physician, a filial daughter, and a beloved wife. These gendered features are far from in congruence with the mainstream Taiwanese medical institutions, which-just like that of many other East Asian countries-has been largely male-dominated and focused, since it's inception during the colonial period. When considered conjointly, these two distinctive characteristics of Dr. Zhuang's doctrine invite the question: is there a functional alliance between gender and Chinese medicine which contribute to the re-emergence of traditional medicine in contemporary Taiwan?

The third question concerns the consequences of her gendered identity, both with the concept of family pharmacist explicitly advocated in her regimen, and with the role model she personally represented. Feminist studies of health services have criticized the medical establishment for "constituting women as patients while subordinating those occupations which are dominated by women" (Turner 1995: 130). These suppressive measures sometimes went to the extent of preventing women from fulfilling active roles in the production of health (Clarke and Olesen 1999). In contrast, Zhuang had become a role model for many female followers because of both her admirable character and remarkable career. Furthermore, by comparing food preparation to medical treatment, Zhuang significantly elevated the value and importance of women's traditional labor within the kitchen. The problem posed is whether or not Zhuang's alternative doctrine really does provide an alternative link, albeit not necessarily a liberating one, between medicine and gender?

These are the three sets of questions which this paper intends to answer.

Medicalizing Culture; Narrativizing Medicine: Physicians' Attempts at Cultural Competency in Primary Care in the US

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In response to a rapidly increasing population of immigrant patients in recent years, clinicians and public health advocates in the U.S. have taken great strides to implement a policy of "culturally competent" care. Healthcare professionals are mandated to be sensitive to the cultural backgrounds and life contexts of their immigrant and minority patients in clinical

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interactions as well as in clinical decision-making. This important and timely effort at incorporating patient perspectives into professional performances, however, faces a central predicament: medical professionals must rely on summaries about group cultures while at the same time avoiding stereotypes. Based on semi-structured, in-depth interviews with 25 physicians in the Sacramento area and the San Francisco Bay Area in California, this paper examines how practitioners in primary care address this tension. The analysis shows that these doctors resort to different narrative strategies in order to "co-author" with their patients the story of the illness experience, with varying degrees of success. At the group level, these efforts can be viewed as the profession's response to a long-standing critique of its non-reflexive subscription to an acultural biomedical universalism. Whether this response enhances the cultural reflexivity of medicine, and how, is discussed.

Scientification at Work.
The Quest for Science in Prenatal Cytogenetics Laboratories.

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Scientification is the process of bringing scientific knowledge and procedures from research to scientific professional practice. In healthcare field, scientificization is part of the wider movement towards standardization, laying the groundwork for clinical practice guidelines as the solution for the lack of scientific working habits. Adopting the STS approach to medical practice standardization, I turn my focus on highly technological workplaces, such as genetic laboratories.

This paper investigates a quadrennial quality improvement program promoted by the Italian Society of Human Genetics (Sigu) and remarkably entitled "The practices of prenatal cytogenetic analysis: from magic to a scientific-technological approach". A central part of this program is a course addressed to professionals, laboratory physicians and biologists.

Italian situation is particularly interesting because it is characterized by the presence of a large number of laboratories (more than two hundred) of small dimensions. According to its intriguing title, the program intends to replace idiosyntocratic, anachronistic and irrational practices with standardized scientific procedures. However, contrary to the expectations, local expertise and contingent practices resurface not only after, but also during the course itself. Furthermore, the program also have unintentional effects on laboratory work with respect to coordination and hierarchies of people and things.

Methodologically, I consider the program as a dynamic and collective process. In the first place, I followed each step of the program: from the moment of its design and in every phase after that. In the second place, I see it from the viewpoints of the different actors involved.

The data presented come from participant observations of a single course, a central part of this program, and of daily practices in three genetic laboratories, in-depths interviews with promoters and participants (both biologists and geneticists), and document analysis of old and new guidelines, protocols and nomenclatures.

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From a theoretical point of view, scientificization is conceptualized as an endless and partially unpredictable transformative process, in which, at any point of time, all actors have an active role to play. Furthermore, I argue that changes in practices and procedures need to be analyzed as a sphere of negotiation between abstract knowledge and local practice variation of the different actors involved in the field.

1.4.6: Health and Healthcare - Acting with Methods

Acting With, Against or Acting Out Practice: Changing Scales in Health Care (&) Research

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Acting with practice has recently been proposed as an analytical metaphor facilitating a move away from well-known debates on the preferred "normative" stance of STS researchers. Instead of neutrally describing practice or actively proscribing for practice, the researcher could choose to recognize his/her situation as constitutively performative; involved in ongoing relationships with the peoples and organizations that are the subject of study. Potentially this stance might open up for new ways of understanding engaged research. The research topology implied by the notion of "acting with" (proposed in Zuiderent-Jerak & Jensen 2007) also holds attention at this conference. It might, however, bear further scrutiny. First, the suggestiveness of the notion of "acting with" (although not necessarily its substantive elaboration) stems largely from the implication that the researcher and other actors can and should engage in constructive and synergistic interactions. But while this may an ideal, it is perhaps rarely reality. Researchers may find themselves in situations where the antonym concept of "acting against" practice might seem more pertinent. They are yet more likely to be enmeshed in situations in which they alternate between taking actions with and against their interlocutors. Additionally, there are situations where the very notion of acting with or against are undecidable, due to the unforeseeable consequences, which actions in the field and descriptions of the field give rise to, later and elsewhere, at different levels. The concept of levels, or scales, is central here, as the idea of "engagement with" is premised on the notion that certain kinds of action find their efficacy at certain levels of practice: the micro level of the hospital ward, the institutional meso level, or the macro policy level. Yet, following Strathern's analysis of fractal and partial connections between practices, this paper suggests that research interventions cannot be located at any particular level, since levels are part of what is generated in practice by researcher as well as researched. In turn, this suggests that the uselessness imputed to so-called descriptive STS studies is an artifact of an analytical perspective. In effect, scale-changing actions and descriptions are rendered invisible visible in optics using standardized scales to evaluate the importance of actions (Star 1991). By way of examples from studies of information technologies in health care settings, the paper argues for a fractal view of research practice, which, rather than endorsing the particular ideal suggested by "acting with" proposes to see researchers as engaged in ongoing efforts to act out the expectations that arise of the researcher according to various scales.

Acting with Medicine - How to Build Up and Maintain Relationships with Research Subjects in a Hospital Setting

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The presentation takes up the question of how to "sell" STS approaches to research subjects. It reports on an Austrian case study in a hospital setting: In three oncology clinics extensive ethnographic fieldwork has been conducted to analyze work processes with

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special regard to documentation and the corresponding artefacts and procedures. Comparisons were drawn between those using paper-based and electronic documentation systems. Although this was "only" a research project with no mandate to intervene the experiences made could be helpful advice for a more engaged endeavour (with active involvement of the researchers) in the health care setting.

The focus here is on the attempts that were made to give feedback to the medical and care personnel with the aim of enhancing a discussion that would provide further insight into the field. In reflecting these experiences some characteristics of medical work and the professional culture among doctors and nurses become evident. These have to be taken into account when organizing a research project (although of course they may not apply to all national settings).

Overall the experiences in this research project were positive in terms of access to the field. As soon it was made clear that there would be no interruption of daily procedures the researchers were welcome. Observations at all sites of the hospitals (ward, outpatient and day clinic) and informal exchange provided many insights. In fact the presence of "strangers" was not really uncommon in the setting with all kinds of people constantly entering and leaving rooms (as long as patient rooms were not affected). However more "official" and organized sessions of feedback and discussion turned out to be problematic. The question is how to ensure that the results are presented in a way that they are useful for the intended audience. In the presentation the following topics are going to be tackled:

▷ Doctors and nurses each have their own hierarchies - question of who to address, and of whether to address them together or separately
▷ Time pressure and hectic environment - question of how to frame the feedback and how to integrate it into the daily working routines
▷ Changing personnel and changing participants of meetings - question of how to inform the whole personnel and establish channels of communication over the whole time period of the research project
▷ Expectations - question of how to counteract fears of evaluation and how to introduce the perspective of ethnographic research

The presentation raises questions of establishing and maintaining contact to the research field of medical work with the aim of active participation of research subjects. The idea is to trigger exchange and discussion among STS researchers about their experiences of addressing and involving doctors and nurses as well as other medical personnel.

Maybe Tears Need not be Counted, but Wiped Away.
On Care for People with Dementia.

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There are many calls for reorientation in dementia care these days. The geriatric literatures now recommend that environmental approaches always be tried first. It is claimed that we have to go for the 'good alternatives', and that even if strictly speaking there is no evidence,

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in practice we know what works. But it is still debated what the contribution of such approaches is, and on what grounds they should be included. Symptomatic of this uncertainty, a reputed professor of geriatrics exclaimed: 'but what shall we do? Count tears?' This paper seeks to respond to this question by pointing to dementia care practice and investigating the employment of a combination of two forms of environmental treatment - the Marte Meo Method and Music Therapy - in order to improve the condition and everyday life of patients. It traces how carers mobilise tools and technologies; how they know and what the role of knowledge is; what they make of their objects; what is made available and possible; and how it is done and mediated. For this it relies on observation and fieldwork on two sheltered wards a nursing home in Norway. The argument is that efforts to document the contribution of such approaches in care should build on and strengthen practices already in place, employed for improvement of practice and patient condition, rather than aim at producing evidence that does not relate to and improve what is there. The paper's contribution to the discussion about how STS research acts with science, technology and medicine, is to develop an approach to dementia that does not start and end with biomedical approaches that focus on a brain that cannot be mended, but also follow care approaches that refuse to resign and abandon patients, and work on a broader set of interactions in everyday life.

Conceptual Designs as Tools for Intervention in the Field of Danish Maternity Care

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This paper reflects on an attempt to act with science, technology and medicine in a research project about current changes in maternity care. Part of the ambition of my project has been to participate in a reconfiguration of Danish maternity care by proposing conceptual designs inspired by techniques used within interaction design and experimental approaches in STS. The paper is based on ethnographic accounts from the field of maternity care. Instead of seeing such accounts as produced with the purpose of creating correspondence between account and reality the descriptions are regarded as tools for intervention. Like Foucault and Deleuze agree to regard theories as tools (in "Intellectuals & Power"), descriptions can serve as tools, which might be taken up and used in reconfiguring practices by members of the field that the scientist has engaged with. Anthropology has for several years discussed how ethnographic accounts can serve as tools for change (see e.g. Marcus & Fischer's "Anthropology as Cultural Critique"), but to a lesser extent how smaller descriptions can serve as tools for intervention during the research practice.

Inspired by techniques within interaction design (e.g. Løwgren & Stolterman: "Thoughtful interaction design") and experimental STS initiatives (Despret: "The Body We Care for: Figures of Anthropo-zoo-genesis", Stengers: "Power and Invention: Situating Science" and Latour: "A Well-Articulated Primatology: Reflections of a fellow-traveller") I have in collaboration with members of the field (pregnant women, midwives, obstetricians among others) created conceptual designs that describe the current changes in Danish maternity care. The concepts have been expressed graphically and use pre-eminently narrative and aesthetic techniques to describe as opposed to written language. In this paper I have chosen to go in detail with one of the concepts as an example of a tool for proposing theories and

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observations in the field. Specifically, I have chosen a concept called "The Contraction Meter", which allows pregnant women to monitor the development of the contractions and help her to choose when to go to the hospital. The concepts have been introduced to the field through various types interventions, e.g. through an Internet weblog and an open house event at a maternity ward at a hospital.

For the propositional description to serve as an intervention and thus allow the researcher to act with the field rather than acting on it, it is necessary that someone picks up the tool. The paper ends with a reflection on the extent to which the project succeeded in interesting members of the field. This paper seeks particularly to contribute to the literature within STS that deals with how to give a chance and to ask good questions to the object of study by offering an example of how participants in my project were made interested by the design (The Contraction Meter) that was developed in collaboration with the participants.

Action Research 'in the Making' :
Reflections on Conversations with Action Researchers

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Action-oriented research has increasingly become of great interest to Science and Technology Studies (STS). In this paper, we reflect upon a fairly recent STS literature discussing the emergence of action-oriented research and its impact on research practices, and contrast this with our own experiences conducting action research on technology implementations in a health care setting.

We will engage in critical discussions on the complex, and at times conflicting, methodological issues that are faced when conducting such research. Action research transforms not only the researcher's role but also the boundaries between the researcher and the participants in the study, bringing along new epistemological challenges. In such a complex and fluid landscape, the researcher's role, the participant's role and the research focus constantly evolve, and in this paper we discuss how this has an impact on our own stance towards action-oriented research. We will capture the way in which our views on action research evolved as we gradually became more critical and circumspect towards our own roles and research practices.

We will scrutinize our research process 'in the making' and articulate how we continuously reconstructed our roles and practices as the research unfolded. To do so, we follow a self-reflexive and critical epistemological stance, and reflect upon our experiences of actively participating in the implementation of a technology while simultaneously studying it. The two authors of this paper are both part of a larger Canadian research project, while each of us is involved in a separate action research collaboration with local community partners. One study takes place in a community health care centre and the other takes place in a children's emergency department in a hospital. Throughout our research, we had many ongoing discussions about our experiences, and began exchanging the strategies we developed to deal with the complexities and challenges faced in the field. We gradually noticed that each of us was so immersed in the field that we feared being unable to step out of the context and reflect on our roles and interventions. We therefore decided to critically challenge each

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other's practice as action researchers, and conducted several interviews with each other to capture our methodological discussions and how our positions towards action research transformed along the way. For the purpose of this paper, we will use these interviews, together with the ongoing memos we kept to encapsulate reflections of our experiences from the fieldwork, as well as copies of email communication we had with our community partners. This data will be used to generate thick descriptions and track the trajectories of the research collaborations, and our roles and positions during the course of the studies.

1.4.7: Shifting Involvements: Collaboration and Relatedness in Science and Medicine

Lost, and Found, in Translation:
Constituting Kinship and HIV in Botswana

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This paper examines what seem to be a series of 'working misconceptions' over how kinship - and relatedness in general - works in Botswana. Botswana's national antiretroviral (ARV) treatment programme, the first on the continent, is a network of heterogeneous institutions that relies heavily on foreign doctors and public-private partnerships to supplement the national public health system. These institutions, and the treatment programmes and research protocols they formulate, have given rise to attempts to document and standardize the ways in which people are related to one another, in terms of care-giving and sexual activities. Researchers and clinicians often attempt to pay close attention to a patient or subject's kin relations, as these are understood as integral to adherence to pharmaceutical-based treatments for HIV/AIDS. The labour of this attention, however, ultimately falls on to a cadre of largely Batswana nurses and research coordinators, who mediate between the 'local' population, and the increasing number of foreign, particularly American, medical personnel.

The question driving this essay is: What kind of social relationships are ARVs understood to require? Drawing on ethnographic and archival data from treatment sites and research institutions, this paper explores the ways in which forms of relatedness are deployed, translated, and contested. How are terms like 'mother', 'auntie', and 'unwed mother', as glosses of more complicated social forms, deployed by researchers, clinicians, nurses, patients, and research subjects alike? How do the clinical institutions in which research and treatment take place foster these glosses? What information is lost, intentionally and unintentionally, in these processes of translation? What actions or understandings do these glosses foreclose, and of what is this foreclosure productive? How do the understood requirements of HIV/AIDS treatment and research shape the ways in which kinship and relatedness are narrated and documented?

This paper thus explores how actors involved in HIV/AIDS programming conceptualize the desirability of some forms of relatedness over others, how this desirability is shaped by multiple forces, and how this is reflected in the ways people in Botswana talk about relatedness in the context of HIV/AIDS. This paper thus contributes to ongoing conversations in STS about the social forms attendant upon supposedly universally applicable technologies, such as pharmaceuticals.

In the Family of Drugs: Psychopharmaceutical Uses in India

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How are psychopharmaceuticals reshuffling family ties in India? Since the 1950s, the locus of mental health treatments has been shifting away from closed institutions towards flexible

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drug therapies. This change is usually seen as a great improvement, since patients can stay with family members and local socialities, that is, "in the community." According to the World Health Organization, non-institutionalized treatments set patients free from the shackles of asylums and ensure an "empowerment of people" (World Health Report 2001). This transformation would not have been possible without the wide-reaching availability of psychopharmaceuticals, not only in Europe and America, but also in countries of the global South. In India, there are now more than 80 brands of generic fluoxetine (Prozac) available, and the market for psychopharmaceuticals is expanding rapidly. Behind this expansion are not the handful of psychiatrists that exist in India, but general physicians and even untrained rural practitioners, who have become regular prescribers of antidepressants and tranquillizers.

Based on ethnographic fieldwork on psychiatric treatments in the Indian city of Kolkata, this paper argues that psychotropic drugs have unpredictable effects on Indian family relations. These side effects of psychotropic drugs will be described as sociotopic, in the sense that they constitute and reconstitute social spaces. Instead of leaving patients "in the community," drugs change domestic spheres, often to the detriment of patients. A persistent stigmatization of psychiatric drugs, which are associated with outright "madness," plays an important role in this. Yet the new co-constitutions of drugs and people are more complicated that that. Through a comparison of two case studies, the paper will show that the entry of psychopharmaceuticals into family spaces not only change social relations, but also threaten to "bring down the house" altogether.

Re-Forming Relatedness:
Sperm Donation in Mexico City Fertility Clinics

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In Mexico, infertile couples are increasingly using Assisted Reproductive Technologies (ARTs) to try to create "their own family." In this highly Catholic and so-called "developing" country, these costly procreative tools evoke myriad questions and controversies about kinship, bioethics, and life itself - profoundly moral issues that are negotiated on a local basis there, as elsewhere. In this paper, I focus on how infertile couples and fertility practitioners in Mexico City grapple with the highly stigmatized and emotionally difficult issue of sperm donation in cases of male infertility. In doing so, they often present and rationalize seemingly contradictory stances towards biological and social relatedness. Despite having a marked preference for biological kinship ties, many of them indicate that ancillary factors can also constitute legitimate kinship ties - such as physical resemblance, social and material exchanges, and God's participation. Through their words and actions, they reinstate culturally normative modes of relatedness while actively challenging - but not radically altering - these modes. My analysis of their experiences aims to extend inquiry into the cultural specificity of biological and social relatedness in, what has been called, the current age of "techno-kinship."

My paper draws upon 16 months of ethnographic fieldwork and over 80 interviews that I conducted in Mexico City fertility clinics. I worked primarily in one private clinic and one public clinic, where I got to know doctors, nurses, biologists, and over 150 infertile couples. I

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formally interviewed many of them, as well as priests, public officials, and numerous laypeople. Additionally, I conducted archival research at governmental and health organizations in order to situate my findings in their historical and public context. Ultimately, my project engages with ongoing work in Anthropology and Science Studies concerning kinship, relatedness, and the social constitution of science, technology, and medicine. It also contributes to recent studies, conducted in various countries, that investigates how social and cultural circumstances shape the local experience of ARTs, and inform discussions about biological and social relatedness, the manipulation and ownership of biological material, the inception of human life, and the moral duty to protect it.

Science, Technology and Health Innovation in Brazil: an Experience of Re-Organization of Scientific Work in Public Research Institution in Biomedicine

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Brazil has a low rate of technology exchange transfer between public research institutions and the productive sector (industries and services). Meanwhile, Brazilian health system is characterized by the increasing use of technologies that originate from biotechnological process and for the intensification of technologies that are incorporated to high pricing equipments. The raising cost of inputs and the dependency on licensing create access barriers to the public health system for over 30% of Brazilian population.

Furthermore, the health system also faces the challenge of fighting tropical diseases, for which there are no efficient drugs and are considered non-priorities to the pharmaceutical industry. In this scenario, the largest biomedical research organization in Brazil, Oswaldo Cruz Foundation (Fiocruz), an institution tied to the Health Minister, has been promoting since 2002, a change in its R&D policies.

The aim is to intensify the development and production of technologies that have a high potential impact for the national productive sector and, in particular, for the public health system. One of Fiocruz initiatives is the implementation of a program which mission is to induce the development of new inputs in health (known as PDTIS). PDTIS main strategy has been organizing the techno-science production in collaborative networks.

The collaborative network as an instrument of innovation policy is directly associated to the public policy makers' defense on organizing R&D in a non-linear manner. In addition, not only innovation has to be articulated to the industrial policy as well as science and technical artifacts have to be taken as an activity that can not be separate.

However, in Fiocruz, the concepts of networks and collaborative research applied to the re-organization of PDTIS laboratories are associated to hierarchical, bureaucratic, specialized and unlinked spaces of scientific knowledge production.

Our study aims to understand Fiocruz innovation policy by describing and analyzing the collaborative networks as a mode of organizing biomedical research. We investigate how the

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actors' positions inside the networks are organized (general coordination, project managers and technical chiefs). How the networks and the spaces of interaction are associated with the spaces and flows institutionally established by public administration?

How the association between a research coordination instrument (networks coordination) and instrument for organizing collective research (collaborative research) become an instrument for public policy that intend translate institutional priorities, centenarian, to attend the state demands of new health inputs?

PDTIS general coordination is using innovation economy theories to trace their strategies and objectives. However, qualitative analysis based upon articulated set of critical observations on everyday practices and on the forms of collaborations established between the research's actors are absent.

As Fiocruz researchers influenced by STS literature, we adopted a socio-anthropological approach aiming to: a) contribute for the improvement of Fiocruz innovation policy by studying the practices and strategies used by PDTIS coordination and researchers; b) analyze the limits of the strategies that have been adopted to induce innovation; c) gather information and empirical data about different social processes of science, technology and health innovation production.

Relating Images:
Surface, Substance and Collaboration in a Digital Age

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The notion that entities and qualities are produced in their relatedness can be considered a staple of certain kinds of STS. Insofar as this inverts the assumption that entities with inherent qualities give rise to particular relations - and thus challenges essentialism - it also directs attention to 'inherence' and 'essence' themselves as concurrently produced with specific (scientific, technological or medical) arrangements. This paper turns the metaphysical distinction between surface and substance into a topic for ethnographic inquiry by examining relations in medical imaging software development.

Once considered akin to photographs, digitization appears to endow traditional X-ray images with an additional 'layer'. Underlying a familiar visual appearance is now a data core that makes them into more complex informational objects. By looking at how, in practice, the image assumes its dual identity of 'picture' and 'data' and how its surface/appearance is made to relate to its substance/core, we gain a richer picture of how digitality affects the very nature of what 'a medical image' is considered to be, and of the ramifications for collaboration through image-based encounters.

The paper starts by briefly revisiting dominant approaches within social and cultural studies of medical imaging. Their overwhelming focus on reference and mediation is contrasted with the possibility of understanding images as complex material objects with surface and depth. An ethnographic demonstration of this possibility is then attempted on the basis of materials from a twelve-month ethnography with a British spin-out company specializing in medical

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imaging software. The work involved in bringing new software from the research laboratory to the market was central to the ethnography; particularly the question how such work 'performed' digital medical images as particular artifacts with particular capacities, thereby making available appropriate roles for relating to and through such images (Grint and Woolgar 1997).

At the heart of the paper are three stories about the coupling of image surface and image substance in encounters between the company's scientist-entrepreneurs and other constituencies. Each story recounts a different way in which the digital nature of the image and the relations constitutive of software development are co-produced. Surface-substance performances of the image had a direct bearing on collaboration in the sense that they invited the engagement of a broad and fluid array of stakeholders, yet also structured the way in which stakeholders could perceive and access value, ask questions and ventilate criticism.

The paper concludes by questioning the widely held expectation that the relations that matter vis-à-vis medical imaging are those of reference and mediation. Its contribution to the STS literature lies in demonstrating how the production of distinctions, delineations and ordering is not necessarily situated in the relation between image and reality, but can occur at the level of the image itself - in the space between surface and substance.

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1.4.8: Different Kinds of Translation: How Genomics Challenges Health Care

Health Care in Transition:
Why Genomics Implies a Reorganisation of User Involvement

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Adequate user involvement increases chances of successful innovation. Elsewhere we have presented a purpose-based typology of user involvement and argued how different types of involvement relate to particular phases of technology development, particular characteristics of technology and particular forms of demand. An empirical investigation of these types and their main conditions in food innovation showed that effective involvement requires adequate user representation and alignment of visions of the future in the R&D phase, and empowered lead users, prototypes and demonstration sites in the application phase. The displacement from laboratory to first use thus involves more than merely translating technological functionality into user needs: the conditions for new types of involvement need to be shaped.

The emergence of genomics challenges the organisation of health related innovation in both phases. This paper argues why and how genomics put new requirements to the organisation of user involvement. Based on literature review, the emergence of genomics is characterised by three trends: i) from cure to prevention (more emphasis on diagnosis), ii) from relatively homogeneous demand (illness) to personal needs (predispositions), and iii) from specific products to customisable therapies/diets. Experience from ICT suggests that such trends lead towards a shift to other types of user involvement: in addition to representation, vision sharing and demand articulation, emphasis should be put on user innovation, innofusion and domestication. Accordingly, the role of users changes from important informants to active agents in the process of innovation. Regarding health care, this claim is perhaps too strong. Nevertheless, the trends could lead to increased importance of intermediate users like clinical practitioners. Genomics thus challenges the health care system to organise an infrastructure for intermediaries that are sufficiently empowered to adjust innovative products to the specific needs of individual users.

The paper presents some first signs derived from case studies that point to a transition in this direction. In conclusion, in genomics-based innovation processes different types of interaction are getting more important. Realising the conditions for these types of user involvement implies a transition of the health care innovation system.

The main contribution to the STS literature is that the paper opens the black box of user involvement. It demonstrates the usefulness of differentiating between different types of involvement and of investigating the systemic conditions under which these types of involvement are most effective. Another contribution is the application of user oriented theories in the domain of health care innovation and genomics.

From Basic Science to Clinical Medicine:
Reflections on Stem Cell Translational Research

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The prospects for a regenerative medicine industry built on human embryonic stem cell technologies is invariably based on a linear model which sees stem cell science leading to cell transplant medicine. We outline a four stage model of translational research (from molecules/genetics, to animal models, to experimental medicine, to clinical trials) as a prelude to our discussion of the complex nature of this rhetorical health related research pathway. Drawing on sixty interviews with scientists and clinicians, from leading labs and clinics in the UK and the USA, we discuss the problems within and between basic science and clinical medicine and we highlight the social complexities of the translational pipeline. For example, we illustrate the tensions between the two cultures of medicine and science, where basic science is often seen as of no relevance to clinical medicine and where medical science is often viewed as lacking the rigour of basic science. We also explore the contested nature of various genetic engineering strategies to make both cells for transplantation and disease in a dish models of disease, drawing on our fieldwork in the lab and the clinic in the areas of embryonic stem cells, diabetes, liver disease, and neuroscience. We contrast cell culture, promoter genes and oncogene approaches to making cells insulin producing cells. We also compare therapeutic cloning, pre-implantation genetic diagnosis, and knock-in genetic strategies as scientific ways to study neurological disease. In conclusion, we argue that translational research inevitably entails a struggle for power between the variegated social worlds of rigorous science and relevant medicine.

Demand Articulation in Emerging Genomics Technologies:
the Role of Patient Organisations

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Emerging technologies are technologies that are in the early phase of their development. A lot of aspects remain uncertain, abstract and 'fluid' in these early stages. At the same time, these technologies attract a rather large share of attention. They are eye-catching and through projections involve great expectations, promises and even beginnings of hype. These technologies involve two major translational processes as they emerge: from bench to bedside (or from basic to clinical research), and from unarticulated to articulated.

During these changes user involvement can be beneficial as is now widely acknowledged and has led to a broad and diverse range of user involvement literature in science, technology and innovation studies (Geels, 2002; Smits, 2002; Moors et al., 2003; Oudshoorn and Pinch, 2003; Jelsma, 2005). In the context of emerging technologies these users are engaged in demand articulation processes. This paper contributes to these studies by investigating demand articulation in emerging technologies over time by using a process

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methodology called the event history analysis.

Within the health care and pharmaceutical sectors users can play a beneficial role (Smits and Boon, 2008). At the same time, 'users' in these sectors form a rather heterogeneous group of actors, of which one important type is put to the fore here: intermediary organisations.

This paper explores demand articulation processes inside intermediaries, as well as the interaction of these organisations with other stakeholders over demand articulation. In line with this, the central research question is: How to understand the demand articulation processes of intermediary user organisations in the context of emerging pharmaceutical technologies? Related issues are how these organisations should organise their demand articulation and how they engage in debates about new technologies with other stakeholders. An analysis of demand articulation processes in intermediary organisations imposes the importance of time-ordering and changing entities that are studied over time (Van de Ven and Engleman, 2004). These processes are marked by so-called 'events'. We used the 'event history analysis' based on Poole, Van de Ven, et al. (2000) to study these processes. We present the findings of three case studies on three intermediary organisations in the Dutch pharmaceutical and health care sector dealing with emerging genomics technologies: the Steering Committee on Orphan drugs, the Breast cancer Association, and the Neuromuscular disease Association.

Seeing What We're Talking About:
Anticipating Translation Issues using Path Creation Studies

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With non-linearity and ambiguity being acknowledged characteristics of present-day innovation in the medical sectors and elsewhere, the future of genomics enabled innovation will likely not unfold in terms of the most prominent expectations (such as 'personal health') - but neither can there be endless possibilities. Rather, genomics can enable a number of possible paths from fundamental exploration to application and societal embedment. How these paths unfold is a matter of activities as much as actor arrangements.

One possibility of articulating the potential of genomics as well as its issues is to model path creation (involving primary stakeholders) and subsequently assess the impact of secondary stakeholders on path evolution. Entrance points are the actual state of articulation of gene-disorder and diet-gene-disorder relationships, and knowledge about primary actors and functions linked in innovation chains (fundamental exploration; application oriented exploitation). Secondary stakeholders benefit from innovation, provide additional knowledge, support the various activities of knowledge uptake and invest in them, or voice their ethical concerns. Any evolving path has to overcome 'translation' issues related to the stages of articulation of particular genomics knowledge, while as it evolves, can compete with, constrain, and eventually displace another possible path. These paths can be at the level of scientific and technological paradigms of doing research (such as the increasing 'geneticization' of the life sciences), but also at the level of products (such as functional food

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vs. personalized nutrition).

Thus a number of possible innovation chains can be populated, which are virtual with respect to their reality status but real enough with respect to the robustness of knowledge about actors. The discussion and assessment of these alternative futures of genomics, rather than a 'one-size-fits-all' approach to ethical, legal and societal concerns, will result in different sets of most likely problems and issues for primary and secondary stakeholders. This greater attention to possible details will not offend but incorporate the expertise of experts.

Lost in Translation: Clinical Utility, User-Producer Links and the Socio-Technical Shaping of Novel Therapeutics

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This paper will consider why a number of important novel genomic, genetic and biological therapies are having difficulty being successfully adopted in the clinic, despite high expectations that new scientific knowledge can be rapidly translated from 'bench to bedside'. In a number of examples new diagnostics and therapeutics have been launched by firms, but have not been adopted into routine healthcare, highlighting difficulties with the process of translating radical new innovations. Data from three empirical case studies (pharmacogenetics, haematopoietic stem cells and tissue engineering), based on detailed qualitative investigation, will be drawn on to explore how novel biotechnologies enter the clinic.

The analysis will bring together ideas from STS, organisational studies and medical sociology to frame a better understanding of the dynamics of translation. In particular, we will argue that: a) establishing clinical utility (CU) is a key step determining the success or failure of a novel technology; b) CU has to be understood in multi-dimensional terms that relate to the embeddedness of medical practice in complex institutional structures and socio-technical regimes; c) successful therapeutic technologies are socially shaped during clinical development to embody key aspects of CU. As a consequence, different forms of medical knowledge need to be draw on during the specification, design, and testing of new clinical technologies. This requires active collaboration between innovators and clinical end users. Unlike other forms of technology, there is relatively limited room for users to reconfigure/ reshape these technologies once manufactured, as they are constrained by both regulatory factors and the complexity of biological systems.

In conclusion, we aim to contribute to STS debates on medical innovation and the social shaping of technology by outlining a more robust framework for understanding the dynamics of clinical adoption and the key role of users in medical innovation.

1.4.9: Ethics as Practice in Science and Technology, III

From White Canvas to Mystery Paintings: Scientists' and Laypeople's Practices and Understandings of Ethics in a Public Engagement Setting

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Ethics today as a political means to govern technoscientific innovation processes is dominantly an expert domain practised by institutional bodies or in academic contexts granting a delimited role to the public. On the other hand, public participation received increased attention from science policy in current innovation regimes. The relation between expert ethics and the public appraisal of science and technology however remains unclear.

In a STS research project in Austria we brought together both strands of discussions by organizing a long-term public engagement setting in which laypeople and genomic researchers met in order to discuss ethical aspects of genomics beyond expert-dominated framings to allow for a more bottom-up ethical debate.

In my presentation I will address how ethics as a discursive practice was performed between scientists and lay people within our public engagement setting. While in academic ethics the "strength of the argument" and a strict separation between facts and normative analysis prevails, our discussions between scientists and lay participants followed an alternative logic and thus hint to the difficulties of ethics in societal practices. The way "ethics" was understood and practiced was closely linked to the participants' concepts of scientific practices as well as to wider notions of the political. In doing so, ethics was practiced through a series of rhetorical means that drew boundaries between what counts as an object of ethics, who should be concerned with ethics, and when an ethical discussion should take place.

As an effect the participants opened-up fundamental ethical questions of science concerning innovation regimes as such rather than merely assessing potential applications of genomics due to their ethical acceptability. This, however, questions the practices of professional and institutional ethics.

Transgenic Silences

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In discourse analysis one of the most interesting themes is silences. In this paper, we would like to shed some light on the silences present in discourses on ethical and welfare issues concerning transgenic animals. With transgenic silences we mean issues that seldom or never get articulated - neither in animal ethics committees nor in laboratories. How can we understand that some dilemmas, like the pros and cons of methods used when genotyping transgenic animals, is constantly present in discussions, while other dilemmas, like unexpected effects of the genetic modification or killing of animals with the wrong genotype,

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almost never get outspoken.

The paper discusses how these and other transgenic silences become important for how scientists, animal technicians and members of animal ethics committees are doing science and what role the exclusion of some issues have in individuals' and groups' justifications of research on genetically modified animals.

This paper is based on an ongoing research project, Dilemmas with transgenic animals, in which notions of culture and nature, risk and safety, innovation and organism, science and technology, are investigated in the scientific production, use and ethical evaluation of transgenic animals. The project is built on case studies in two different contexts; the laboratory and the animal ethics committee. The methods used in the two case studies are interviews and ethnographic fieldwork. By combining these methods discourses on animal ethics are related to the practiced ethics in animal ethics committee meetings and in laboratories.

Producing Vulnerable Subjects: Ethics-as-Boundary Work in US Social Science Research or Towards an STS Approach to the Practice of Ethics

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The goal of this paper is to explore just how messy the ethics of advocacy-oriented social scientific practice can be, the broader politics that compound, respond to, and feed that messiness, and their implications for ethnographic research in the United States. More broadly, this paper considers how research institutions regulate what, how, and whom we study and the fields of power enmeshed in and produced by the bureaucratic processes of social science research, particularly research conducted among "vulnerable populations." I begin by re-examining often glossed over elements of the Belmont Report, the 1979 document that guides institutional management of human subject research in the United States and, increasingly, research accountability systems worldwide. The Belmont Report is an exemplar of what sociologist Thomas Gieryn calls the "boundary-work" (1983) of hegemonic science. I argue that the bureaucratization of the research review process-the residue and continued labors of late 20th century sciences' boundary-work-reduces "good ethics" to a function of "good science" and infuses prescriptive norms of "science" with heteronormative moralism. I use my IRB application process for a study of rural youth sexuality and digital media environments to examine how "ideological efforts" (Gieryn, 1983: 782) to shape "good science" embedded in the IRB process legitimize tight regulation of sociological studies of sexualities, particularly ethnographic work. As IRBs increasingly set the terms for social studies of sexuality and digital media, they transform not just these two areas of research but the sociological study of a litany of sensitive subjects and vulnerable populations and, arguably, short circuit critical analysis of "good science." itself. I end with a call for social science researchers to rethink the role we play in research review and compliance and consider a more collectively managed system akin to the peer review process for refereed journals. Beyond this, I argue that the social sciences should lobby for and contribute to a revision of the Belmont Report that draws on the sociology of science and

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an STS approach to the study of ethics as practice to expand our notions of what constitutes "good science" and, therefore, "good ethics."

Cows Desiring to be Milked: Dairy Farming Ethics and the Development of Automated Milking Systems

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Over the last few years the automated milking system (AMS) has been spreading rapidly over dairy farms in many Western and some Asian countries. The AMS relieves the farmer of the twice a day milking routine, leaving it to the cow to decide when to be milked. The adoption of this device implies a significant change in the practice of dairy farming. Where in a conventional milking parlour the farmer sees the cows come by twice a day, the automated system produces detailed information on the animals, offering new parameters to control and optimize the farm by. In this way the AMS is part of a development in which the nature of what it means to take care of livestock can be seen to change, just as the physical characteristics and required behaviour of the cows, together with the norms of good farming practice. For this paper we analysed the ways in which an ethics of dairy farming co-evolves with the integration of the new device into everyday practices and the organisation of the farm. Thereby producing an understanding of the way ethics can be part of technology development and knowledge production. Ethics is taken up to be in various ways enmeshed in material practices, rather than consisting of conflicting principles to be resolved in the abstract. It is studied whether after being made explicit, this ethics can offer a means for farmers to legitimate decisions and increase control over developments. The research was done in the Netherlands by taking a weeklong course in a practical training centre for dairy farmers, in both a conventional milking stall and an automated milking system. And by joining meetings of a network of farmers set up to develop a mobile milking robot that is to be deployed on pasture.

1.4.10: Bringing Technology Back In - The Socioeconomic and Institutional Repercussions
         of Technology, II

Where Technological Change Leads to
Institutional Innovation in Infrastructures

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Infrastructure belongs to the category of large-scale technological systems. Institutions remain critical components in their functioning. Indeed they are intertwined, interconnected with the corresponding infrastructure technology. The phenomenon cannot be approached from the man-machine interaction that characterized the pioneering of social studies of technologies. Moreover, most of infrastructures' components resulted from the co-evolution of technology and institutions over the long run. It requires therefore an analysis at an higher level than the one of individual micro-interactions, which should not be discarded but rather included in the broader picture. This paper makes a critical assessment of some analytical concepts and explanatory theories available to interpret the effects of technological changes on the institutional components of large-scale technological systems. It will particularly attempt to draw some generic comparisons between telecommunication, electricity, energy and sewer infrastructures. All these utilities have the properties of network industries. Technological innovation changes the interconnection between components, the topology of branches, the position of nodes and the capacity of flows in these networks. Every of these changes suppose new institutional arrangements for the proper functioning of infrastructures according to the perception of infrastructure regulators, operators and users. These infrastructures all have long enough history to allow an examination of the co-evolution of technology and institutions. Several levels will be distinguished to assess where technological change leads to institutional innovations. The first one relates to the models for the organization of private and state companies, those that operates large-scale technological systems. The second is the model of the nation-state, with its laws and regulations arranged in policies. The third has to do with the banking and financial institutions that provide the resources needed to build and operate infrastructures. This paper will conclude by making distinctions between the different configurations of technology and institutions interactions in infrastructures.

The Energy Sector Coping with Institutional and
Technical Dynamics - Municipal Utilities at the
Outset of Structural Transformation

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Since the 1990s, the German energy sector is subject to profound changes in institutional settings as well as in the technologies-in-use for generating and distributing electricity. Market regulation fosters the change of value-added chains and promotes specific forms of generation. At the same time, innovative technologies enter the market giving rise to new paradigms in energy supply. Being bound to long-lasting supply traditions and specific know-how in generation technologies in the past, especially the municipal utilities have to find a way to cope with these dynamics. In our paper, we take a look at the paths of transformation

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         of Technology, II

that these actors might follow to stay in the market. In particular, we look at the interplay between old and new technologies, market structure, and the change in management paradigms in the public sector. With an eye to the recent debates on defining the guidelines for reduction of carbon emission, we focus on strategies pushing innovative energy efficiency and climate-change mitigation technologies with regard to its socioeconomic, infrastructural and institutional basis.

Challenges for municipal utilities:
The energy sector changes due to market liberalisation setting up new forms of competition and environmental regulation promoting climate-friendly technologies via feed-in-fees. In the follow-up of these dynamics, institutions in the form of organizational norms may change as well as the technology-in-use and business models of the municipal utilities. Our paper will first try to identify relevant dimensions of socio-technical transformation and confront them with empirical data. In a second step, we focus on innovative environmental technologies c.f. renewable energies (RES) and micro-cogeneration (Micro-CHP). Here, we will identify critical factors for their diffusion such as new sector norms, new alliances and specific knowledge of municipal utilities which might push these technologies.

Varieties of Open Access: Explaining the Impact of Internet Adoption on Scholarly Publication

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I&C technologies and the Internet are widely adopted in the field of scholarly publication. Not only do scientists produce their publications more or less completely electronically, publications are distributed, stored, searched, and often used electronically as well. As a result, the I&C and Internet technologies have significantly affected the traditional model of scholarly publication. However, it is open to what extent the governance of scholarly publication will be transformed. As a framework of analysis we propose a model of the scholarly publication system. The model shows the specific interdependence of actors driven by the norms of science (scientists as authors, readers and referees; universities, scientific organisations, financiers and libraries) and activities of scientific publishers that are driven by economic rules. The adoption of I&C and Internet technologies affect this interdependence. The most far-reaching impact of I&C und Internet technologies on the governance structure of scholarly publication is the increasing importance of Open Access. However, there are different ways in which Open Access is realized (green road, golden road) with different implications for the governance of the scholarly publications system.

We will present results of a recently (2007) finished survey on changes in scholarly publication in Germany. The survey includes 1,800 scientists in more than 15 disciplines. The focus of the survey is on the impact of changing publication practices of scientists on the governance of the publication system. Open Access publications could be seen as the most far-reaching shift of governance as effect of the adoption of Internet technologies. In the survey we found that open access increasingly gains relevance in publication strategies and practices of scientists. As a result, governance structures of scholarly publication are shifting substantially. However, the adopted forms of open access (green road vs. golden road) and their diffusion vary significantly between disciplines. To explain these differences we will

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argue that the adoption of Internet technologies is shaped by discipline-specific publication cultures. Publication cultures are characterized by discipline-specific practices and shared norms (such as, where to publish [monographs, edited books, journals, proceedings], how to publish [e.g., is there a preprint culture?], and how to search for publications [e.g., print edition, library catalogue, online repositories, google]). Our empirical results show different adoption paths of internet technology for different publications cultures. Publication cultures are critical to understand repercussions of the successful adoption of internet technology on the governance of scholarly publication.

Challenging Incommensurability: What We can Learn from Ludwik Fleck for the Analysis of Complex Technical Systems

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The rising importance of Information and Communication Technologies (ICTs) has been a topic for years, and it has been proclaimed that this has led to profound changes in the organization of innovation. In particular, complex technical systems have been identified as a peculiar new form of technology, where a component and an architectural level of knowledge can be distinguished. As yet, however, innovation of complex technical systems is not sufficiently understood, especially in terms of related changes in the organization and dynamics of industrial structures. In this context, technological fields such as bio- or nanotechnology, augmented or virtual reality, Telecare and Smart Homes are striking examples, where long standing high expectations have not yet been converted into stabilized patterns of exploitation.

This paper claims that ICTs indeed have profound consequences for the organization and dynamics of industrial sectors. In particular, innovation processes have become common place that span distinct industries and R&D trajectories. As a consequence, new forms of coordination and collaboration of distributed innovation are becoming necessary, where the incommensurability of technological paradigms, in a strictly Kuhnian sense, marks a salient challenge for innovation (Peine, 2008). The present paper elaborates upon the notion of incommensurability in innovation processes of complex technical systems. Based on a number of empirical examples, it demonstrates that incommensurability indeed poses a challenge rather than a definite obstacle to innovation. In particular, the paper explores Ludwik Fleck's work on thought styles and collectives (Fleck, 1979) and its applicability to the analysis of technological change. It compares Kuhnian and Fleckian notions of incommensurability, and shows that the latter is a considerably "softer" version. This marks an important difference that allows for a definition of technological paradigms that uses the strengths of the Kuhnian perspective while at the same time transcends its limitations. Hence, Fleckian ideas of knowledge production provide a number of conceptual cues to understand the dynamics of industry structures around complex technical systems. These cues are conveyed into a conceptual framework for the coordination of and collaboration in distributed innovation processes.

1.4.11: Governing and Institutionalizing Genomics: an Interdisciplinary and
         Interorganizational Perspective, II: Large Scale Genomic Science: the Politics and
         Organization of Collaboration

What is a Laboratory? Work Practices in Large-Scale Virtual Genomics Organizations.

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In the last ten years, advances in molecular biology, genetics, and genomics have made it faster and cheaper to detect variation in DNA of humans and other species. Research following the mapping and sequencing of "the" human genome has used these new technologies to study the genetics of populations, some in search of disease genes, others in search of human demographic and evolutionary history. Although many of these projects were examining the genetics of difference, but not the genetics of racial difference, some geneticists framed their research conclusions in terms of "racial" differences. In addition, in all of these studies, "ancestry" and "ancestral differences" come into play in complex practices of statistically calculated genomic differences. In the context of American race politics and folk understandings of race, it is not surprising that members of the media and other publics read the genetics of difference as the genetics of race. This paper examines genome-wide association studies (GWAS), the genetic epidemiological method of choice developed during the last few years Science magazine recently named human genetic variation studies its "breakthrough of the year" for 2007. GWAS aim at casting a broad net to look for genetic markers or SNPs located in or near genes that might be involved in causing Type II diabetes, cancer, and heart disease. These studies involve statistical analyses of SNP differences between cases (those afflicted with a disease) and controls (those who are disease free). GWAS then are large-scale studies that collect and compare the genetics of diseased and healthy individuals. It is a new technology that takes place in large virtual organizations. The work organization includes but goes beyond the usual collaborations between smaller laboratories. GWAS projects involve collective and collaborative work performed by multiple teams that cross-cut laboratories, disciplines, professions, institutions, even nations. Large cohort studies collaborate with human genetics data analysis teams, which are themselves multi-disciplinary in methods. They involve large scale genotyping, methods for stratifying populations, "data cleaning," statistical analyses, and more. Do these multiple interactions transform meanings and practices? How does trust or mistrust play out in these interactions? What kinds of conflicts and new compromises arise between different disciplinary, methodological, political, and ethical commitments?

Hybridity, Interdisciplinarity, Inter-Organization, and Collaboration in Systems Biology

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'Systems biology' is not yet a coherent thing. It is a field or discipline or interdiscipline under construction. Some of its practitioners describe it as 'new way of doing science' which they think has the potential to dissolve existing disciplinary boundaries. They say that the field has 'no walls', but that it just draws on expertise from whichever area is most useful or appropriate at the time. The systems biologist is even said to require a particular 'mind-set',

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            Organization of Collaboration

and a particular type of personality, which, some argue, will eventually require a new type of training that will be more conceptual, and that will produce scientists who are integrators, rather than specialists. Aspirations such as these are being supported by universities, scientific entrepreneurs, and funding agencies who are currently investing heavily in multi- and inter-disciplinary approaches and institutions as the epistemological and institutional solutions to biological problems. The interdisciplinarity of systems biology does give rise to tensions, however, since scientists from different backgrounds have different ideas about what constitutes good knowledge. This leads to aspirations amongst some practitioners to make biology more similar to the 'hard' sciences of physics, mathematics and engineering, while others question the assumptions that the standards of these sciences are the standards by which we should measure the achievements of systems biology. This paper draws on interviews with scientists working in systems biology, attendance at systems biology conferences and workshops, and extended stays in systems biology laboratories to examine the ways in which systems biology is being constituted both epistemologically and institutionally.

Matchmakers and Speed-Daters: Cross-Collaborative Arrangements in Proteomics and Bioinformatics

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The mapping of the human genome was a significant technical event that gave birth to a number of contemporary scientific communities. This historical and celebrated scientific achievement helped harvest (i) a number of new emerging 'omic' disciplines, (ii) various innovative high- throughput technologies and (iii) diverse embryonic scientific communities, each with their own individual identities. Two of these so-called post-genomic communities have been coined proteomics (referring to the study of the proteome) and bioinformatics (referring to the practice of biological informatics). In this paper I highlight how the nature of contemporary science is often inter-disciplinary and involves actors, languages, technologies and techniques from heterogeneous disciplinary backgrounds. These knowledges and practices need to be translated across 'old' traditional disciplinary boundaries in order to forge the 'new' collaborations that are the heartbeat of the new biology. Using data gathered from interviews with thirty one scientists working within post-genomic communities in the United Kingdom (UK), I stress the importance of (i) innovative architecture, (ii) face-to-face contact and (iii) 'boundary people' as media for translating and transferring newly emerging knowledge between different scientific disciplines. In turn, these techniques help to produce new inter-disciplinary collaborations and promote inter-language comprehension. In the research areas of bioinformatics and proteomics, these particular techniques have proven indispensable when attempting to make sense of new science(s) and bridging the certainty/uncertainty precipice that exists in cutting edge scientific practice. To summarise, the main argument in this paper is that propinquity and 'scientific matchmakers' are integral to smooth knowledge transfer, especially within research areas that attempt to generate knowledge through inter-disciplinary collaboration.

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International Regulatory Networks: Integrating Global Microarray Standards

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The analysis of standard-setting initiatives focuses simultaneously on scientific expertise and experimental practices while raising questions about the nature and forms of amalgamated knowledge and objectivity. Following the standardization processes of a scientific instrument involves examining the interaction and organization of individuals, institutions, documents, materials and ideas. The ultimate success of a genomic instrument seems to lie in the degree to which it can be applied to clinical settings in a reliable and replicable way. This paper examines how a technology reaches such a stage via the operations of organized international networks. The DNA microarray is a biomedical tool maintained by a range of socio-technical arrangements, on an interesting route to clinical transfer. Work practices and knowledge dissemination in science are shifting toward collaborative processes and the questions posed here concern how new forms of collective agreement are evolving and currently achieved in the context of microarray development. Task forces are assembled which commit industry, academics, and governments to each other, all with overlapping interests to increase the use-value of this tool. Objectivity is structured and reinforced by the work of these assembled intentions, which in turn provides experiments with meaning and legitimacy. Standards and regulation work more efficiently if they complement and are compatible with one another, which is why groups like the Microarray Gene Expression Data Society (MGED), the FDA, and the External RNA Controls Consortium (ERCC) have voluntarily meshed their standards together. Once established, these players build upon existing ties in order to fill regulatory gaps. For example, MGED has pioneered several standards initiatives, including standards for experimentation and annotation through task groups like the MGED ontology group which develops policies through the Functional Genomics Investigation Ontology group (FUGO) that optimistically aims to develop an ontology with universal terminology for the global genomics community. The FDA has set up the Microarray Quality Control Project (MAQC), which aims to measure platform strengths and compatibility, and the ERCC has suggested universal controls for extracting RNA from the sample. The translation of a laboratory innovation such as microarrays into a clinical tool is dependent upon the development of regulatory arrangements designed to ensure that a new technology can be employed reliably and consistently. The methodology for this study involves participant observation with microarray users and standards developers as well as a social network analysis of the field of microarray standards and regulation.

Translating Molecular Tools: Large Scale Clinical Trials of Genomic Signatures

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Collective configurations of work, such as clinical and research networks and consortia, play an increasing role in the production of biomedical knowledge. This 'collective turn' is

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especially visible in two domains, namely genomics - where the production of knowledge relies not only on very large scale collaborative projects such as the Human Genome Project or the HapMap project but also on a motley of cooperative groups specializing in a given pathology or specific genes - and, more traditionally, clinical trials, in particular in the field of oncology, where new protocols and therapies emerge from large scale, multi-center clinical trials performed by long-established cooperative groups such as ECOG, in the US, and EORTC in Europe. In this paper we will examine a new kind of large collaborative clinical trial that emerges at the intersection of these two domains. Its goal is to validate, for clinical purposes, the use of a new type of molecular tool - called 'genomic signatures' or 'gene expression profiles' - that should allow clinicians to predict both the risk of cancer recurrence and response to therapy. Two ongoing, large-scale genomic signature validation trials focus on breast cancer: the first, called MINDACT - for Microarray In Node-negative Disease may Avoid ChemoTherapy - to be carried out in Europe, plans to enroll 6,000 patients in 11 participating countries, while the second, called TAILORx - for Trial Assigning IndividuaLized Options for Treatment (Rx) - will be conducted in North America and plans to enroll 10,000 patients in 900 participating centers. MINDACT is presented by its promoters as the 'first trial truly based on biology', and relies on MammaPrint®, a 70-gene breast cancer signature developed by a Dutch company co-founded by two researchers of the Netherlands Cancer Institute, while TAILORx relies on Oncotype DX©, a 21-gene breast cancer signature developed by a US company. Both trials raise problems for such collective undertakings that fall under the general heading of regulation (or, more precisely, of what we have called elsewhere 'regulatory objectivity') and that range from seemingly narrow technical questions - such as how and how fast tumor specimens should be taken from patients and kept until analysis (MammaPrint and Oncotype DX lead to different socio-technical circuits) - to questions concerning therapeutic protocols, the complex modalities of informed consent to be obtained from patients, as well as to 'broader' questions concerning the redefinition of national and international collaborative links between clinicians and researchers from different disciplines and between public research organization and biotechnology start-ups.

1.4.12: Constructing Science - Policy - Public Relations

Participation and Governance of Fishing in the Baltic Sea: Conflicting Knowledge Systems between Science, Fisheries and NGO's

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The governance of international fishing management is often referred to as a typical case of a "tragedy of the commons". Due to continuous overexploitation of fish stocks in the Baltic Sea (BS) by all bordering states, certain species like cod have already fallen out of safe biological limits. Constant disagreements between the main parties involved (scientists, fishermen and NGO's) pose serious challenges for future sustainable fishing management.

As the main responsible actor, the European Commission (EC) recognized a need for significant stakeholder participation and has therefore established Regional Advisory Councils (RACs). The RACs are charged with providing (preferably consensus) advice to the EC regarding fishing quotas and consist of fishermen's representatives (two thirds) and the rest of NGO's.

All parties in the BS RAC are obliged to consider scientific data on fish stocks and prognosis for the fisheries. These data are collected and provided by scientists from the International Council on the Exploration of the Seas (ICES) and national research agencies. As observations from the BS RAC meetings reveal, the fishermen's communities, the NGOs as well as the scientists have different objectives concerning the methods to assess fish stocks, as well as to forecast the allowed amount of fishing. Due to mixed interpretation of the scientific recommendations, the RAC's reports often state disparate voices instead of consensus about e.g. fishing quotas for cod.

The study presented here investigates the role of science within the international governance regime for fisheries management in the BS. This regime is based upon the scientific advice given from ICES, the BS RAC's obligation to provide consensus reports and the policy concerns of the EC. By analysing policy documents and materials from observations of the RAC meetings and in-depth interviews, I focus on how the scientific data provided by e.g. ICES is communicated, valued/understood and used by the different stakeholders. This investigation draws methodologically on regime theories like the 'institutional model' and the concept of 'epistemic communities' and contrast these with approaches from STS, like the concept of co-production of science and policy and boundary work. In doing so the project contributes to an increased understanding of the role of science in participatory settings of environmental policy regimes. Since this study is part of a larger project to improve communication among stakeholders in the BS fisheries it also adds to the discussion about interventionist approaches and respective outcomes from STS research.

1.4.12: Constructing Science - Policy - Public Relations

Pitfalls of the California Effect in EU's Biotech-Policy

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The California effect suggests that, even in the context of economic integration governed by free trade disciplines, stricter environmental standards of minorities of greener nations might become the norm for a majority. The European biotechnology policy lends itself for an illustration of this effect. There is strong evidence for both its workings in the recent evolution of EU product and process standards in food labelling and biosaftey, and EU leadership in the international biotech arena. Thus, California effects seem to operate at regional and even global levels. Yet, it is the liberal basis of EU and global biotech governance that also qualifies and circumscribes the "trading up" of biotech regulations. This can be illustrated at the EU and the global level: At the intra-EU level, we observe that even tightened standards cannot solve fundamental legitimacy problems linked to the commercialisation of agro-biotechnology. At the international level, EU biotech-leadership proves channelled by underlying free trade principles. Free trade principles favour narrow definitions of the precautionary principle and channel permissible arguments over the desirability of GMOs into scientific debates on physical risks Thus, science is assigned with the central task of resolving trade disputes, which, however, overstrains its capacities. The proposed paper will draw on pertinent literature and materials on recent developments in the EU (in particular, the EU's reception of the WTO ruling and ongoing internal contention over GMO bans) and in the global regulatory arena. Its purpose is not to falsify the California effect but to point at some of its constraints and dilemmas caused by its liberal foundations.

Acting with Science, Policy and Publics

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The paper explores the interface between science innovation, policy processes and multiple publics with respect to three different forms of science and technology innovation in Australia and New Zealand - wind energy, GMOs and genetic testing. It is based on investigative work using a variety of research strategies, including interactions with scientists and policy advisors, as well as dialogic interventions with scientists and community activists, deliberative forums, online discussions. A core focus is critical discussion of the concept of 'dialogue' and the possibilities and limitations of creating negotiated spaces for conversation about controversial science and technology issues.The paper is informed by in-depth textual analysis of policy documents, work in agencies set up to regulate the importation and use of genetically modified organisms, membership of new institutional forms established to 'engage' the public in discussion of biotechnologies as well as contract work by STS scholars for science policy agencies. It explores a variety of actions with scientists, policy makers and publics and addresses the challenges facing social scientists who are involved in collaborative relationships with scientists and state actors. The opportunities for these forms of 'acting with' scientists and policy analysts are explored as features of particular contexts and especially the dense web of overlapping networks that occur in small social democracies

1.4.12: Constructing Science - Policy - Public Relations

like New Zealand. This paper contributes to STS scholarship relating to issues of public participation, dialogue, and science and technology policy. It aligns with a range of work that investigates whether strategies to engage the public have just involved 'public talk' as opposed to a significant shift in levels of public input into decisions about the development and use of new science. The authors offer a multi-disciplinary approach traversing environmental policy analysis, management, communications and sociology while reflecting on the different ways in which they have acted with science and science policy makers while also sustaining critical engagement with science institutions and organisations.

Experts' Understanding of the Public in the Climate Science Area: Tensions between Popularisation and Scientific Consultation?

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Climate science has demonstrated that global warming probably will have consequences that will challenge the performance of critical social functions and structures. This raises a series of important questions about how effects of climate change are interpreted and perceived by relevant audiences. The effects and problems identified and diagnosed by climate scientists should be brought to and used by decision makers, industrial actors and the general public. The challenges of integrating knowledge about future consequences of climate change into relevant practices in European societies would commonly be seen as a communication problem. According to this perspective, the challenge is, bluntly put, to get the world of science and the world of users to talk to each other. The outcome is often interpreted as a knowledge deficit of users. From a communication theory perspective the response would be to detect and amend possible weaknesses in the sender apparatus (i.e. the researchers), to look for weaknesses in the receiver apparatus (i.e. user mistakes) or to discover weaknesses in the media. However, claims about knowledge deficits tend to be simplistically misleading. The problem is rather about providing dialogue and making knowledge, for example about climate change, relevant to decision makers.

Seemingly, climate science faces obstacles when it comes to translating knowledge about climate effects to potential users and the public. This calls for more research on the experts' understanding of the public and/or the users of climate knowledge, drawing upon insight from the SSK and PUST literature. The paper addresses questions regarding how Norwegian climate scientists understand and frame users of climate knowledge. How are 'users' and 'the public' constructed by the climate scientists? What kinds of translations of knowledge are viewed as necessary and why?

The paper is based on qualitative interviews with climate scientists and relevant policy and public management actors. The analysis reveals that while climate scientist view popularization (simplification) as their core strategy to meet the public/users, thus suggesting a knowledge deficit model, most users demand more specific information that would be crucial for taking action or developing measures.

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The Autonomy of Science and
Networking of Critical Scientists in Environmental Issues:
a Case of the Nagara River Estuary Barrage Dispute in Japan

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This paper explores the hitherto neglected social conditions in which the technocratic-democratic dichotomy comes to the forefront of environmental issues, with a particular focus on the autonomy of science and networking of "critical" scientists who hold opposing views and provide a scientific basis for environmental movements. How do the forms of environmental conflicts, seen within the broader interactions between science and society, differ according to the actual degree of the autonomy of science in the academic fields involved? In environmental issues concerning large-scale developments by the complex of the government and large companies, it is vital but often difficult for environmental movements to establish and utilize a network of critical scientists, because some scientists hesitate to cooperate with the movements because of political reasons and some take little interest in addressing one particular local issue. If the movements succeed in making science engaged, the conflict takes a form of scientific dispute. If not, the conflict takes various forms of socio-political struggles, which tend to converge on whether decisions should be made in technocratic or democratic manner. This difference reflects the ways the autonomy of science actually works in the academic fields engaged.

This paper deals with the case of the Nagara River Estuary Barrage in Japan. The barrage was built at the mouth of the Nagara River in 1995 for the purpose of flood control and water supply, after prolonged conflicts among the government, local fishermen, and environmental movements. In the early 1990s, the Nagara River issue attracted nationwide attention in terms of nature conservation and became a turning point in the history of the Japanese environmental policy. Partly in response to the issue, the River Law was revised in 1997 to add "environmental conservation" to the aims of river administration.

Based on a document analysis of primary historical materials and in-depth interviews with the people involved, we will show a striking difference between scientific fields in terms of the roles played by heterogeneous agents involved. In limnology, both the government and the citizen movements intended to conduct scientific investigations, and the research results of both entities respectively affected the environmental policy implemented by the government. In ecology, the citizen movements conducted scientific investigations, with the results having an influence on the environmental policy via public opinion that was roused, whereas the government was reluctant to set up committees of scientists to carry out investigations. Unlike these fields, the movements were unable to establish a network of critical scientists in river engineering because of the strong connection between the government and scientists, though the government justified the construction of the barrage based on the field. In public economics, the scientific framework for the discussion was being developed at that time. In these two fields, environmental movements could not appeal to scientific validity and instead the importance of democracy, self-governance, and local knowledge came to the forefront.

1.4.13: Publics Acting with Science: Constructing Multiple Meanings in Citizen Engagement Projects

Public Engagement in Nanotechnology in France: Uncertainties and Construction of Meanings

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Nanotechnology is an important topic of public discussion in France. Since 2005, multiple public engagement mechanisms have been implemented, some of them inspired by already existing participatory procedures (for instance the consensus conference). National and local administrations appear as sponsors or commissioners, while social scientists and NGOs participate in the organization of specific mechanisms. Various publics are involved, which do not necessarily share the same vision of "nanotechnology". In some instances, anti-nanotechnology activists blame participatory attempts for trying to sell new products without questioning global nanotechnology programs.

This paper explores the meanings of public engagement that are constructed by actors who participate in, sponsor, organize or critique participatory procedures. I will first describe different visions of what "public engagement" implies, based on different meanings granted to nanotechnology and citizenship in various participatory mechanisms. Drawing on empirical studies of nanotechnology-related participatory mechanisms in Grenoble and Paris, I will analyze how social scientists, activists, officials and industrialists articulate different (and sometimes antagonistic) definitions of what "engagement" means, while being involved in the very same participatory procedures.

After having sketched the main uncertainties about the meaning of such terms as nanotechnology, citizenship, and the engagement itself, I will turn in a second part to the example of Vivagora, an NGO that organizes public debates on controversial themes, especially nanotechnology. The trajectory of Vivagora since 2005 is a good example of how public engagement can be reconfigured: I will show how this NGO managed to introduced new meanings of public engagement through increasing contacts with the French administration. Through an exploration of the evolution of public engagement in nanotechnology in France from the viewpoint of Vivagora, I will show that alignments among meanings, albeit difficult, can happen in specific cases.

Public Engagement in Science and Technology: Reflections on the Meaning of Participation and its Negotiation in an Interactive Technology Assessment

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In Belgium, the Flemish government is presently funding a four year interactive Technology Assessment (iTA) project, entitled 'Nanotechnologies for Tomorrow's Society' (NanoSoc), which brings together natural scientists and technologists, social scientists, stakeholders, and interested citizens in an effort to collectively construct socially robust nanotechnology trajectories. NanoSoc is inspired by the idea of upstream public engagement, broadly

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understood as the involvement of publics in issues of science and technology before and during, rather than after, the process of technology development. As NanoSoc provides a major, institutionally sanctioned opportunity for the involvement of outsiders in nanotechnology governance in Flanders, it is publicly met with approval and enthusiasm. Yet the question as to what public engagement - and more broadly, participation - implies for the actors involved and how they value it is less unequivocal, as participants struggle to negotiate its meaning from often contending viewpoints, interests, and expectations.

This paper draws attention to the various ways in which actors in NanoSoc frame issues at stake such as 'the public', to how they attribute certain roles to one another, and to how they make use of discursive repertoires as creative resources to fit their perspectives. It then raises questions as to what these findings imply for the realization of participation in practice, and to how they call into question the theoretical conceptualization of participation in iTA as a consensual process of rational deliberation between equals, ideally devoid of both conflict and power relations.

Interpretive Patterns in
Citizen Assessments of Emerging Technologies

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Numerous public engagement activities have been organized in a variety of countries to assess emerging nanotechnologies. In Switzerland, a citizen panel has been held to involve the public in the deliberation of such technologies with the aim to inform policymakers on citizens' opinions and attitudes.

Based on an ethnographic study, this paper analyzes the arguments participants of the citizen panel called "Publifocus on Nanotechnologies, Health and the Environment" made when assessing the emerging technologies. First, it looks at how participants construct multiple meanings on the issue at stake when negotiating the definition of nanotechnology. It then explores how the involved actors cope with the epistemic uncertainty that is characterized by a lack of individual and stabilized scientific knowledge that accompanies any early stage of scientific and technological innovation. By drawing on the theoretical work of Pierre Bourdieu, the paper shows how actors develop a strategy to handle this situation: analogies, such as to other risk technologies or "nature," and personal experiences as patients and consumers are used as interpretive patterns and serve as tools to cope with the unknown.

Taking up the sessions' topic, the paper finally argues that the multiple meanings and interpretations that come into play can be understood as results of the heterogeneous interpretive patterns of the citizens involved in a public engagement project.

Scientists Reflect on an Engagement World

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Scientists' attention to public engagement is now advocated, funded and expected by funders, and can be rewarded with awards and prizes. Within this context, we have conducted interviews with scientists in the UK who have participated in deliberative forms of public engagement, and scientists who have policy and management roles alongside their lab responsibilities. In this paper, I consider the understandings and constructions of scientists themselves with respect to four issues.

1. Relationships between science and the public. Here I discuss the ways in which assumptions associated with the infamous deficit-model feature variously feature in our interviewees' discourse; I also discuss the prominent role that other actors have in scientists' constructions of this issue.
2. The role of public engagement in these relationships. Here I emphasise the extent to which all forms of public engagement (both communicative and deliberative) are constructed in support of a social order in which the public is supportive of developments in science, technology and medicine. We draw upon Mary Douglas' concept of purification here.
3. The place of public engagement in the professional life of the scientist. Here I focus on the complex system of incentives and disincentives to public engagement that are experienced by scientists, alongside pressures to publish, to obtain funding and to do science (which are rewarded within more formal structures).
4. I comment upon the ways in which participation in deliberative forms of public engagement appears to affect positively the views of scientists with respect to public capabilities. In conclusion, I will briefly comment on the broader context of the multiple meanings of public engagement.

The Rules of Engagement:
Flexibility and Struggle within the Practice of Dialogue

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Public engagement is now widely considered to be an essential element of science-society relations, in both formal policy-related contexts and more generally within civil society. In the UK, the science communication community has taken up the notion of 'dialogue' and made it an integral part of its activities (Smallman and Nieman 2006). Despite the increasing numbers of these kinds of activities, relatively few analyses have intensively studied the form and content of such events. In this paper I discuss one case study, London's Dana Centre, and describe my analysis of the public engagement events held there. Using tools from the ethnography of speaking (Hymes 1974), I perform a detailed analysis of the interactions that take place and the meanings created.

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I find that even within a single event, a variety of - at times conflicting - framings can be applied to the engagement process. Thus the activity in which lay and scientific participants are engaged in may be constructed as a public lecture, a traditional debate between expert panellists, or a 'dialogic', multi-way engagement. Similarly, a diverse range of purposes and desired outcomes are present in the talk of Dana Centre events, and interactions may be organised through drawing upon one of several different genres. Thus, I argue, the practice of dialogue is contested and multiple, even on the most detailed level. The meaning of dialogue - and what it is to be involved in it - is flexible and may shift from moment to moment. My findings mirror, on the scale of individual event processes, what others have argued for the movement as a whole: that tensions and strains between older and newer modes of science-society relations are borne out by 'discursive struggles' within the language of those relations (Irwin 2006).

1.4.14: Engagements with Applied Science: Nutrition and Health, II

Food, Technoscience, the Media, Risk, and Government: Natural vs. Artificial Foods?

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What is natural or artificial in terms of foods are not simple any more. The public's expectation from natural foods is becoming complicated in the current society. The currently working definition of organic, natural or more ethical foods are neither universally supported nor trusted. To analyze this unique and historically-specific complication of naturalness, I suggest taking the existing "debatably-natural foods" seriously rather than dismissing them as commodities for a consumer "dupe". In other words, the technoscientific, discursive and political processes producing the hybrids of natural-artificial foods need to be analyzed thoroughly.

Empirically, I focus on an emerging food category, "functional food" as an example of the hybrid foods that are becoming popular since the late 90s. As the term is loosely defined, the category includes natural whole foods with health benefits, dietary supplements and some fortified foods altogether. I argue that three actors collectively construct a socio-active assembly for the emergence and popularization functional foods: biotechnoscience which provide the information of "bioactive components" in natural foods, the publicly-held idea that mass-production and industrialization have caused health risks, and the neoliberal mode of governmetality urging individuals to take care of their own lifestyles. The press articles, governmental health policies and bioscientific research products are followed and analyzed in their relation to "nature" being complicated. In conclusion, I argue that as the interactive assembly of the media, technoscience and health governance continuously intervenes in natural foods, the boundary between natural and artificial foods becomes less significant. Functional foods represent an extension of biosociality from human nature to food chains.

Explaining Failed Biogovernance: Federal Nutrition Guidelines and the Noncompliant Citizen

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Failures in science have usually been understood by STS scholars the perception that machines, environmental systems, and engineered structures perform in ways that their creators and managers did not intend and deem problematic for the tasks at hand. Analysts have drawn two major conclusions: perceptions of failure are situation-specific, such that organizational contexts, epistemic cultures, disciplines, and goals shape scientists' and others' interpretations; and socially organized sensory perceptions (visual, aural, tactile) mediate what constitutes failure. Less well-understood, however, are perceptions of failure when humans, not machines or the environment, are the subject of scientific study, and the processes through which "failures" are perceived and integrated into new research or ignored.

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Drawing on research by Diane Vaughan, Matthias Gross, Georg Simmel, and Michel Foucault, this paper examines how American nutrition scientists have perceived the supposed failure of citizens to comply with U.S. nutrition guidelines. It does so by examining debates around the development of three major revisions of the guidelines, in 1958, 1980, and 2005. The sources of "failures" were hotly contested in these debates, offering a window into understanding the genealogy of interpretations of humans as actor-subjects in large-scale biogovernance experiments. "Failures" were accounted for in three ways: as cognitive failures-the supposed complexity of the guidelines-; as cultural failures (Americans' supposed hostility to science); and as the result of "natural" appetites of the human body, and the poor, minorities, and men, more specifically.

This paper offers, first, an analysis of how the cognitive, cultural, and the bodily are differentiated and joined in explanations of human failure in large-scale biogovernance projects, and secondarily, how organizations process interpretations of failures and when and how such "failures" are reintegrated into ongoing systems of biogovernance.

Will the Entire Population be Overweight by 2230? :
The Co-Production of Scientific Knowledge about the
'Obesity Epidemic' and Health Care Policy

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Science and technology studies (STS), has the potential to generate useful critical analyses of the public health discourse surrounding the 'obesity epidemic'. However, STS scholars have not yet fully engaged with this body of scientific knowledge, apart from an analysis of the development of scientific consensus around the harmful effects of dietary cholesterol (Garrety 1997). The global increase in the prevalence of obesity is seen as having profound consequences for both individual quality of life and health care structures (WHO 2000). Widespread coverage in the scientific and popular press has established as common sense the ideas that the prevalence of obesity is increasing rapidly; that this increase will have detrimental effects on morbidity and mortality rates, and that healthcare spending will increase greatly as a result. Using a theoretical approach derived from the work of Sheila Jasanoff on the co-production of knowledge about the natural and the social (Jasanoff 2004), my research aims to address this largely ignored body of scientific knowledge. This paper explores the development of the obesity epidemic as an example of co-production involving the simultaneous development of scientific knowledge about diet, nutrition and health, and the development of institutional structures in the attempt to deal with a pressing new social problem.

The World Health Organisation (WHO) played an important part in the development of this new understanding of obesity with its consultation on the subject in June 1997 and the publication of the resulting widely cited technical report, Obesity: Preventing and Managing the Global Epidemic in 2000. As part of my ongoing PhD research I am investigating the recent history of the WHO, especially its European Office, in order to describe the processes that led up to this consultation, and the changing understandings of obesity that were mobilised during this period. One of my ultimate aims is to describe how this changing understanding of obesity became incorporated into the making of health policy in the UK and

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the EU. Previously, I have used document-based research methods to trace the growth in use of the term 'obesity epidemic'. My current work, which I discuss in this paper, analyses writing about obesity in the UK medical press in between 1995 and 2002 and British government reports on the subject produced between 1976 and 1996, in order to further elucidate the underlying changes in the understanding of obesity.

1.4.15: Bastard Texts: a Renewed Inquiry into the Illicit Textual Affairs between
         Technoscience, Policy and Literature

Fictionality or Non-Fictionality?
The Special Reality of Scenarios about Nanotechnology.

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My presentation links the discussion on nanotechnology to the discussion on fictionality. Relations between nanotechnology and fictionality are discussed by reading documents from STS and the philosophy of science. These documents argue more or less explicitly about fictionality if they talk about visions, scenarios, imagination or Science Fiction and last, but not least, about the future. Defining fictionality is not restricted to the literature department. Terms like imagination, virtuality, reality, "truth" and rationality are discussed in epistemological, ontological and / or aesthetical context in philosophy. Fictionality in the context of law specifies a legal principle that treats a "not-fact", a "not factual situation" as factual. Fictionality does not just appear as an important principle concerning strategies of nanotechnology communication processes. Both, nanotechnology and fictionality can be regarded as terms that mark a general challenge for thinking about the future.

A wide range of scenarios is developed to "gain knowledge" about alternative futures and to inform decision-making on developments in science and technology and their far-reaching societal implications. Scenario-building can be understood as "storytelling with a certain purpose" (David Wright), as inventing the future within a realistic context. Taking a look at the discussions about nanotechnology, we observe that the conceptualization of scenarios as fictional, known from literary studies, gives way to an understanding of narrative scenarios as a form of non-fictional story-telling. It will be discussed how explicitly non-fictional scenarios about nanotechnology relate in a highly complex manner to real developments in science and technology and to societal processes of negotiating science and technology futures.

The main part of my talk presents three documents from STS and the philosophy and history of science: "Teaching the Societal and Ethical Implications of Nanotechnology to Engineering Students through Science Fiction" (Schummer and Berne, 2005), "Converging Technologies in Science Fiction" (Michaud, 2007), and "Faut-il avoir peur des nanotechnologies?" (Should we be afraid of nanotechnologies?) (Bensaude-Vincent, 2006). Choosing documents from STS and the philosophy of science can help us understand the relationship between fictionality and nanotechnology as part of recent political debates. In addition to that, fictionality with respect to the GMO debate is mentioned. The conclusion of my talk will be a suggestion: thinking about simulation is the necessary third element.

The Fate of Future Scenarios on ICT in Strategy Debates at the Norwegian Research Council: an Example of Contested Futures

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Future scenarios can be powerful tools for decision makers. Scenarios can be more convincing than detailed scientific checklists of possible outcomes, because they can tell

stories about what kind of world we might live in some day. During the last decade an increasing number of STS studies have explored future negotiations (Brown et al, 2000, Borup et al, 2006, van Asselt and van't Klooster, 2007), underlining the need for investigating how these negotiations are performed, thus not looking into, but looking at the future. The main emphasis in these studies has been on the processes in which these scenarios are produced: how breakthrough motifs, thought experiments and Foresight tools organize visions of the future. Less attention has been given to the actual impact of these textual constructions on decision making in policy arenas (but see Rappert 1999, Brown et al 1999). It is in these arenas that the content of those scenarios is tested for whether they provide decision makers with "better informed" images of the future.

In my presentation I want to trace the later fate of future scenarios for ICT which were developed in a participatory Foresight process at the Research Council of Norway in 2004. I will apply the idea of qualculation (Callon and Muniesa, 2003) used in STS to discuss the impure relations between economic calculations and qualitative judgment. I will present the discussion of the completed scenarios texts in strategic meetings on future research priorities and show how meticulous engineered ICT research priority lists competed with scenic imagery of new social worlds in which ICT had retreated from the surface of human networks and become completely emerged. Priority lists thus became the defenders of calculated futures, whereas the scenarios represented possible future values in contrast to present truths (Latour, 1996, Brown, 2007).

My participatory observations as a form of 'acting with' will be presented as 'a collection of relevant ethnographic moments' (van Asselt and van't Klooster, 2007). I am aware that merely referring to the "collection of ethnographic moments" does not exclude the problem of 'losing scientific objectivity.' My own background is language and literature studies with its strong reliance on a hermeneutic approach. Using this as a starting point, I see the need to argue that I chose "ethnographic moments" which are indicative of competing accounts or contesting values (Herzfeld, 1997). I want to argue that it is the researcher's relation to these ethnographic moments which become the basis for STS analysis.

Facts of Flu? Expert Observations meet Filed Work Findings in Turkey.

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The contributors in this session talk about scenarios, fiction and visions, the appreciation of imagination and creativity in descriptions of (possible) present and (possible) future technologies. The texts I want to talk about however are more likely characterized as non-fictional texts.

My point of departure is outbreak reports evaluating incidents of avian influenza H5N1 (HPAI) at various places in Turkey. In short the reports can be summarized as reasoning on past events, describing and evaluating present actions, and guiding future strategies. The texts can be seen as representing an effort to bridge local particularities and experiences and the global concerns. Reporting experts' observations and laboratory findings these texts, commonly assisted by illustrations, constitute political technologies that are part of the global

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machinery currently running to increase the knowledge base and thereby contribute to combat one potential world risk of today - high pathogenic avian influenza with the potential to cause a human pandemic.

Contrary to future scenarios these expert documents report evidences in order to guide the future of present technologies and technologies of the future to control nature and to combat avian influenza and other global crisis.

Comparing expert documents to my field work findings, I will ask what "evidences" are taken into account, what is excluded, and how is nature performed through these documents?

On the Epistemological Consequences of Science Popularization

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This paper weighs the possibility that ideas that originate in science popularization efforts can actually be turned into epistemological tools in the natural sciences in their own right.

This paper is an invitation to think about the relationship between science popularization and the scientific activity itself in a different way. Specifically, it is an opportunity to consider the ideas developed in the science popularization process as epistemological resources for doing research in the natural sciences; in this way, science popularization itself could be considered, under this particular optic, a type of scientific activity.

This is in contrast with the usual science studies approach to discussions about popularization in terms of the establishment of power relations, allocation of funding, or legitimization.

The present paper consists of two parts. The first part analyzes a case study from the history of physics and tries to generate a debate on how the popularization practice can actually have an impact on the way we represent nature and think about her; this part is based on Morus' insightful study on Faraday.

A second part attempts to use this debate to articulate a frame on which popularization ideas can become epistemological resources for natural scientists.

To be sure, the relationship between science and culture has been the subject of intense study over the last fifty years by several generations of researchers in the fields of philosophy of science, sociology of science, and, more recently, science and technology studies.

Even though this article can be considered to belong to the last tradition, its second part has a twist not typical of science studies papers. The reason might be that the author is a practicing scientist and has a more practical, or applied, approach to these matters.

Nuclear Power and Public Opinion

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Nuclear power production is probably the technology that has been most disruptive for societal consensus. Ever since its first conception by the end of the 1940s, the technology has been the object of heated debates. To understand the dynamics of these controversies, the concept of interpretative package was introduced by Gamson/Modigliani (1989). An interpretative package does not focus on items as such, but relates items to a wider storyline at the landscape level. Analysis of these interpretative packages is a powerful means to interpret the formation of public opinions.

This paper aims at interpreting public opinion formation on nuclear power in the Netherlands. It does so by first making an analysis of public opinion polls between 1974 and 2006. It then analyses the interpretative packages by analyzing the coverage of this issue by public TV channels in the Netherlands. Media are not independent reporters of the controversy, but part of it. They can promote certain interpretative packages and neglect others. This does not mean that they are necessarily supporting one of the contestants. It means that they might be one-sided in their choice of interpretative packages and thereby also in their choice of news issues. To check this, the paper compares the TV coverage with the main documented events ("protest" events, "controversy" events as well nuclear systems "progress" events and "negative" events).

The paper focuses on the period between 1973 (first oil crises) and 1986 (Chernobyl disaster). In this period, the general public became aware of contesting views on nuclear power generation, and gradually became more negative towards it. After 1981, it turned its position to become gradually more positive towards nuclear power. In 1986, the Chernobyl accident swept away every support for nuclear power. In its analyses of the competing interpretative packages, international comparisons are made. The paper will analyze the dynamics of interpretative packages and compare it with rational (in regard to energy prices, risk, etc) models of citizens preferences. It will reflect upon possible future developments of interpretative packages and their consequences for debates on nuclear power generation.

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From Local Politics to Local Public Interests:
Participatory Decision-Making of Nuclear Power Plant Sites and the Reframing of Social Agendas in Japan

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This sociological analysis examines the social decision-making processes involved in a nuclear power plant siting in Japan. This case - the cancellation of the nuclear siting after two

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referendums in the local area (Maki-machi town, Niigata prefecture of Japan) - has been considered as a "success" example of citizen initiative and participatory methods in that time by mass media and not a few experts. STS studies (especially Japanese one) also have seemed to be focused the discussion about the way of application of participatory methods to technological controversies after this case. But, here we would emphasize the importance of the local contextual factors which are critical to the consequences. Especially, we would illustrate the mechanisms which could transform the local social agenda from local politics to local public interest issues.

In this case, the siting plan had provoked a long-term serious conflict in local area since 1970s, and residents had thought the main point of dispute - we would call it "social agenda" - had been the political fight inside the local community. But voluntary trial of local referendum ("citizen referendum") in 1995 by a citizen group could change the framing of the social agenda. Before it, for ordinary people, since the siting issue was bundled with local politics and was steeped in the limitations defined by the boundaries of traditional, social relationships, they could not discuss it explicitly; nor could they express their own opinions about it. They had voted not for policy by their own will, but for person by their social relationships. In that sense, the nuclear siting was the issue of local politics. However, by the referendum, the nuclear siting was unbundled from the traditional contexts. They could deal with it freely as an issue involving local public interest. The social agenda was reframed from an issue of technology and local politics to one of technology and local public interest. This transformation could make people express their own will clearly, and give strong legitimacy to the result of the referendum though it had no legal basis.

We would also discuss why the citizen group could produce the very important event: "citizen referendum". We propose the concept of a "relevant marginal actor" to characterize their position and role in the whole local decision-making process. They had deep understanding on the local situation as long-standing local residents, but were not a traditional key actor (for example, local politician or anti-nuclear activist). They could differentiate them from traditional anti- or pro-nuclear activism as brand-new, politically neutral movement.

Based on this interpretation, we would argue that those consequences and/or results should not simply be regarded as success outcomes of application of participatory processes, nor examined in terms of the particularity of technological issues. But rather, they should be discussed as the matter of decision-making process on technology and public interest under particular context of each case. Finally, we would like to discuss on the possible contribution of the sociology of science-technology and public interest in the STS field.

Challenging Nuclear: the State and
Anti-Nuclear Movements in Post-Authoritarian Indonesia

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In the mid 2006, the Indonesian government announced that it is going to build a nuclear power plant to meet soaring demands for energy. As stated in the 2005 National Energy Policy, Indonesia will have a nuclear power plant within 10 years. It is a resurrection of an on-off program that has been around since early 1970s. After prolonged procrastination, this

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time the government feels determined it is timely for Indonesia to go nuclear. The National Nuclear Power Agency (BATAN) under the Ministry of Research and Technology is responsible for formulating a comprehensive planning through which Indonesia will pursue its nuclear power program. According to BATAN's roadmap, in 2008 the government will invite foreign contractors to submit tenders to put up the Muria plant. The construction will commence in 2010. By 2025, four nuclear plants will be operating commercially expected to produce up to 4,000 MW. However, while nuclear power is steadily gaining currency among high officials and political elites, it is simultaneously being contested by grassroot movements motorized by environmental activists and local anti-nuclear groups. The opposition towards the nuclear policy is largely driven by the fact that for the past few years the Indonesian government has fallen short on public safety issues. As a result, a nation-wide anti-nuclear alliance constituted by environmental activists, religious leaders, local communities, students and scientists, and business groups has emerged to respond the government's nuclear program. While safety concerns are emphasized, these groups question the capacity of the government to handle high-risk technology. Situated within this uneasy clash between the state and civil society groups, this paper seeks to explore the possibility for the democratization of nuclear power in Indonesia. As democratic technoscience is an emerging discourse in the STS scholarship, this paper is intended to probe democratization tools developed by a number of STS scholars. It examines how these concepts could be appropriated so as to fit the complicated situations of a new democracy in Indonesia in which the state and civil society are in the search process for a mutual relationship. The paper's substance is divided into three parts: (1) historical account of Indonesian nuclear program, (2) the emergence of anti-nuclear alliance, (3) democratic concept of science and technology suitable for Indonesia. The paper is drawn from a multi-site ethnography conducted in several locations in Indonesia including Jakarta, Serpong reactor, Bandung, and Jepara, Central Java (the future site of the nuclear power plant). By examining the case of Indonesia, the paper contributes to enriching the STS literature on democratization of technoscience in new democratic societies.

Technologies and Topologies of Nationalism

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The role of print media has been well documented in the generation of national imagined communities. This technology generates a sort of homogeneity - a literate public united by a standardized language - that many scholars regard as an essential feature of true nationalist movements. The very idea of nationalism has become a site of negotiation and translation as we enter the early 21st century. In West Papua, the half of New Guinea under Indonesian administration, surprising political results are being achieved by a nationalist movement without literacy and other sorts of cultural homogeneity. Here over 270 distinct indigenous groups have dreams of forming a new united nation. The Single Side Band radio, a communications technology that does not depend on literacy, actively generates cultural and linguistic heterogeneity in West Papua even it is used to popularize dreams of national independence from Indonesia. Multiple partially-overlapping transportation infrastructures also help channel the flow of freedom dreams through West Papua. In the face of failing national projects throughout the world - in the face of neo-imperial schemes and postcolonial suffering in many corners of the globe - potentially sympathetic policy makers are grappling

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with very serious questions when confronted with demands for recognition from emergent nations. New independence movements must convince the world that there is substance to their claims. Annemarie Mol and John Law have illustrated how a single phenomena can inhabit network, regional, and "fluid" topologies. Their work offers a way of thinking about the forces that generate national integration amidst cultural and linguistic heterogeneity. Departing from their work, I suggest that the nation of West Papua is a networked place, a region, and fluid space.

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Agricultural Biotechnology's Pro-Poor Narrative, Ten Years On

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In the late 1990s and early 2000s, a storyline was woven around GM crops as a pro-poor technology that would help boost development and alleviate rural poverty. This narrative claimed, for example, that GM technology was easily adopted and scale-neutral because 'the technology is in the seed'; that the adoption of GM insect-resistant crops would reduce pesticide applications and incidents of pesticide poisoning; and that the higher up-front costs of GM seeds would be offset by savings in other inputs as well as yield improvements. These claims shaped the expectations and actions of many people in relation to this emerging technological field.

In the immediate aftermath of GM crop adoption by smallholders in China, India and South Africa, empirical studies quickly emerged which appeared to endorse the 'pro-poor biotech' narrative. Meanwhile, however, many critics contested the narrative; more recently, dissenting empirical studies have emerged, which point to the contingent, dependent nature of the vaunted benefits of GM crops.

The paper will draw on the sociology of scientific and developmental expectations (Brown et al. 2000) to trace and explore the evolution of the pro-poor biotech narrative from the mid-1990s to the present day. It will explore how the major claims originally emerged, the arguments put forward to back them up, and how and by whom they were promoted. Through a narrative analysis (Roe 1994), the paper will explore the emergence of different policy positions on pro-poor biotech and examine the politics of knowledge-construction in biotechnology and development policy (Jasanoff 2005).

The paper will argue that the attempt to frame GM crop technology as a pro-poor, developmental technology has been challenged by a range of social, political and ecological factors that have resisted falling into place around the pro-poor biotech narrative. In particular, the paper will argue that GM crops themselves have performed in some unruly and inconsistent ways in different socio-technical settings, thus confounding attempts to control or predetermine the developmental meaning and value of the technology.

Seeds and Hands: the Materiality of Plant Improvement

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Over a hundred years ago the Durkheimian school offered an approach to making as efficacious action. The focus on materiality was lost in the Durkheimian turn towards religion. The group never produced an account of the elementary forms of technique to match Durkheims magisterial Elementary Forms of Religious Life. Many social scientists have since fought shy of materiality, fearing an implication of technical determinism. Recent studies, however, have revived empirical sociological/anthropological interest in processes of making

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(e.g. Dants technographic study of car repair workshop practices). A focus on elementary forms (an ambition voiced in the present paper) requires a universal/comparative technographic approach. Plant improvement offers some intriguing research possibilities. Plant improvement is a global practice, associated with all forms of agriculture (from peasant to high tech). Furthermore, plants have life of their own, and respond to the process of making in complex and unexpected ways. Better understanding of the ways in which seeds and hands cooperate offer insights into strategies through which humans incorporate living materials into technological cultures. The present paper offers a sketch of a technographic research approach to plant shaping processes in rice agriculture, built on systematic comparison of peasant and scientific practices of plant shaping. The central importance of performance, and performability is stressed.

Better understanding of the ways in which seeds and hands cooperate offer insights into strategies through which humans incorporate living materials into technological cultures. The present paper offers a sketch of a technographic research approach to plant shaping processes in rice agriculture, built on systematic comparison of peasant and scientific practices of plant shaping. The central importance of performance, and performability is stressed.

Rethinking Regulation: Addressing Diverse User Realities in the Governance of Risky Technologies

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The variety of dynamic environments in which potentially risky agricultural and medical technologies are being used is increasing, and this diversity of user contexts within poorer communities is becoming an ever more important development concern. Regulation remains an important device for controlling the risks of technologies. However, harmonised attempts to regulate technology use struggle with informal practices, complex and diverse socio-technical contexts, and the variety of cultural perspectives held by people on the ground. In our paper, we are interested in how regulations and agricultural and medical technologies are co-produced within specific socio-technical contexts. Whilst the international harmonisation of regulations serves to limit certain prescribed risks of new technologies, and thereby facilitates technological diffusion, it does so by making assumptions about the ability to control and "formalise" patterns of technology use. Harmonising assumptions are reproduced through capacity building initiatives and OECD-style regulatory frameworks transposed across countries (including developing countries with weaker regulatory institutions).

We report research on the regulation and use of Bt cotton and antibiotics, for which certain practices carry social and environmental hazards. By employing a backward mapping methodology in two diverse contexts - Hubei, China and Chacos, Argentina, we contrast the way poorer communities actually experience these technologies in practice (in terms of how they are accessed, used and understood) with formal regulatory framings of ideal drug and seed use adopted by international, national and sub-national policy-makers. In contrast to top-down harmonised regulations, we thus begin with informal technology practices and associated expectations on the ground, and use those insights to interrogate policy-making

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back up the regulatory chain.

We discuss the ways in which current harmonisation processes struggle to address the 'regulatory' issues and framings associated with agricultural and medical technology use in these poorer communities. Drawing on these STS-informed insights from the case studies, the paper closes by considering how policy-makers and 'capacity-builders' can "rethink regulation" in order to develop more flexible, inclusive approaches, that are adaptive to local conditions.

Impact of Gender Dynamics on Agricultural Technology Development and Dissemination: the Case of the Forage Chopper for Smallholder Dairy Farmers in Uganda

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It has been argued (Balakrishnan, 2000) that technology development and transfer processes overlook the needs and realities of rural women. However, Doss (2001) states that consideration for women's position is not sufficient in the development of technologies. The combined effects of social and technical change poses a bigger challenge to an understanding of the dynamics of gender relations. It is difficult to predict, a priori, what the dynamics of technology adoption will be within households and communities. Some feminists have argued that technologies are gendered (Cockburn, 1992) and embody particular assumptions about social relations, patriarchal values (Wajcman, 1991) or power relations (Grint,1995).

To produce a full account of technology, we need to move a step further from just looking at the social constructivism of technology approach to the approach focusing on technology-in-use (Edgerton, 2007; Richards, 2003). This can only be achieved by opening up the technology development and dissemination processes for social evaluation, leading to a more complete picture of how elements combine.

In this paper such an approach is applied to animal forage processing in Uganda. The activity has dominantly become a women's job, often assisted by children. Forage materials for zero grazing animals require chopping for ease of consumption by the animal and increase palatability of the forage. Hand chopping is the common practice by most farmers. Besides its low output capacity and lack of uniformity in length of cut, the method is tedious, time consuming and quite dangerous to the operator. In an effort to address some of these constraints the National Agricultural Research Organisation (NARO) developed two types forage chopping technologies, manual and motorized. The forage chopper has been extensively tested and evaluated with the farmers for its technical performance. But, like most agricultural engineering technologies, the impact of the forage chopper has not been evaluated from a gender perspective for the gender-related effects of social and technical change. This paper presents first results of a technographic study of different forage chopping technologies from a gender perspective.

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Stratification of Technological Adaptation: Flexibility and Malleability in Technological Trajectories

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Appropriate biotechnology development requires awareness of local circumstances and may benefit from user involvement in technical design. But a more profound understanding of the appropriateness of technologies requires us to go beyond this pragmatic level, and to consider the modernization trends they are part of. This paper takes up that challenge by presenting three case studies of 'appropriate technology development', and reflecting upon the ways in which technology had been made 'appropriate'.

Modern plant biotechnologies - like marker assisted breeding, genotyping, or transgenics - may provide important ways of improving crop varieties, and thereby contribute to international agricultural development. However, as is widely acknowledged, the advances in modern plant breeding cannot simply be parachuted into the context of developing world agriculture. Instead, a notion of 'appropriate technology' has become central in the discourse on international agricultural development.

This notion of appropriate technology generally hinges upon the adaptation to local circumstances, the use of local knowledge and expertise, and participatory methodologies. But adaptation to local circumstances also requires human agency and flexibility in technological design. However, depending on the scale of analysis that is taken, different perceptions emerge with respect to this flexibility, and the scope for user/designer agency in adapting technological trajectories (Edwards 2003). On a case study level, Science and Technology Studies (STS) have frequently indicated flexibility, contingency and agency in technological design. However, critical discourses on international biotechnology development have generally pointed out meso- and macro-level trends of industrialization, commercialization and globalization of agricultural production. Can we bring these different levels of analysis together in the empirical analysis of technological trajectories?

The paper elaborates three case studies in which the adaptation of modern breeding technology to the needs of resource poor farmers is central. They include the development of transgenic cabbages in India, improved potato varieties in Peru, and the efforts of the Generation Challenge Programme to develop pro-poor plant genomics information. In each case study, technicians have to deal with contradicting interests and perceptions concerning the technology, forcing them to redesign the technology in a variety of ways. The paper analyses which aspects of the technological projects turned out to be flexible, and which dimensions are more resilient to change. The underlying aim of this analysis is to indicate how technological development cannot only deal with the tensions and particularities of a specific project, but can more profoundly challenge the modernization trajectory that it is part of.

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Socio-Technical Networks and the Shaping of ASI Rice Thresher in West African Irrigated Rice Systems

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Technology and social change in rural Africa is generally considered the work of formal-sector institutes, like the so-called CG centres and national research centres. The underlying assumption is that improved and sustained agricultural production is only possible with scientific input in technical innovations, released as final products ready for use. To distribute the optimized techno-scientific products, centers put quite some effort in instructing and engaging users with the new technology.

The activities of these centers can be well understood with the help of Actor-Network Theory (ANT), where new technology replaces and redefines (translates) human activity, resulting in renewed relations between human and non-human actors. A problematic element of ANT is that it tends to look at users' (here: farmers') activities as a series of responses to the transalation process. In this paper we want to reverse that order and look at 'network-building' activities of African farmers, creating local networks together with artisans, farmer organizations, and service providers. We then ask the question how formal-sector researchers, engineers and extension workers can respond to these activities and become active 'users' within the local networks.

Using anthropological tools in a case study, the socio-organizational context and mechanisms have been assessed of post harvest rice threshing technology as it emerged and was promoted along the Senegal River valley and Office du Niger. The paper analyzes the outcome of institutional partnership and learning process in technology development, adaptation and dissemination. A string of innovations and adaptations were put in place by local actors, to support the technical innovations in a self-organizing manner with or without formal-sector support. Both on the long and short term scenario, rigorous collaboration with formal institutions on the one hand and between informal local networks of actors on the other, as well as a functional services and output markets appear a prerequisite for successful development. It was observed that respective social and technical innovations at local level at various stages of the innovation process were not well recognized and supervised by formal institutions nor used in a way to enhance further learning within these centres. However, autonomous and non-standardized practices consequently arose. The implications of these for further expansion (up-scaling) of these local networks and the threats to its resilience are be discussed.

1.4.19: From Bench to Bedside: the Role of Evidence-Based Medicine, II

The Strength of Trials

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Researchers are increasingly interested in exploring diverse evidence-based medicines as they emerge at specific geographical and political sites. This paper addresses some recent arguments about evidence in medicine in the UK and US, starting from the observation that these have largely moved away from set-piece battles between advocates of clinical trials and of clinical experience. Where these turned on a distinction between a 'strong' and a 'weak' programme for the randomised controlled trial, a more diverse range of positions have been opened up around this technology as its importance in healthcare has grown.

The paper argues that there are now at least two 'strong' programmes for trials, used by different groups at different times. An understanding of the trial as a proof of protocol, assumes that benefits for a particular intervention can only be gained in clinical practice by remaking that practice in the pattern of the original trial (i.e. looking for the same patient groups and using the same drugs and doses). This speaks to the emergence of new relationships, objects and archives that serve administrative as well as scientific ends, as concerns with replication and reliability in clinical studies merge with regulatory impulses in health care organisations more generally. However a second 'strong' programme for trials may also be articulated, in which the trial becomes the foundation for new physiological or pharmacological theories: a proof of principle. This second reading allows clinicians to reassemble arguments for clinical autonomy and expertise in sites that become self-consciously professional and political. Unsurprisingly however the relative 'strength' of the two positions turns out to be highly context dependent.

The deployment of these different programmes is explored through case studies from attempts to evaluate key cardiovascular interventions in the UK and US, using a combination of textual material (professional literature and policy / regulatory documents), interview data and ethnography from a larger study. By drawing explicitly on older STS literature on health economics, the paper looks for ways to bring recent work on medical technology into current conversations about market devices. These theoretical points and the stories of the specific cases are set against the longer history of techniques of clinical experimentation and evaluation, particularly meta-analysis.

From Dirty Data to Scientific Evidence: Some Practices Used to Render Large Randomised Clinical Trials Accountable

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Studies in the history of science have emphasised that large scale randomised clinical trials emerged after 1945 in response to a lack of trust. Theodore Porter underscored that the use of an experimental design and statistical techniques was a reaction to a lack of trust in practising physicians and pharmaceutical companies (Porter 1995, 202-209). Harry Marks,

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on the other hand, contended that use of procedures such as standardised protocols, untreated control groups, randomisation, and blinding are to be understood as techniques reflecting a lack of trust in the patients, researchers, physicians, and nurses participating in the trials (Marks 2000). Today the randomised controlled clinical trial (RCT) is the most trusted method for gaining knowledge on the effects of treatments. Yet, in more recent decades there has emerged procedures and organisations under the banner of evidence based medicine that aims to critically scrutinise the results of clinical trials before validating their results as important to the practices of health care (see, for instance, Timmermans and Berg 2003). The practices and results of large clinical trial are both thus intimately entwined with concerns of how to produce proper knowledge.

This paper takes as its topic practices used within clinical trials to produce and clean data to make a trial accountable. This includes practices of duplication as can be illustrated by the frequent use of two experts to independently render a judgement on what happened to a patient based on the patient's records. Another practice of duplication is further seen in the regularly used technique to record the same data in two different forms and to later verify the data by comparing the two records. Another kind of practice used to make trials accountable are techniques of distancing, which again can be exemplified by the use of remote experts making critical assessments of the 'dirty data' rather than relying on the judgement of the physician having met the patient.

The paper will analyse a number of such practices and pay particular interest to the following intriguing tension: The techniques and procedures used to make data clean and the trial accountable involves practices of the very same kind that can make data dirty. It involves being pragmatic when recording and verifying data as well as relying on personal judgments. In short, data is in a sense made clean by the very same means that made it dirty.

The material for this paper has primarily been gathered through participant observation at different sites involved in a few different large randomised clinical trials testing pharmaceuticals. This includes work at clinics, at offices of CRO companies (Contract Research Organisation), and clinical laboratories.

Embedded and Encoded Knowledge in Practice: the Clinical Interpretation of Health Outcome Measures

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Throughout western biomedicine and healthcare there has been a systematic attempt to adopt evidence-based medicine and to standardise treatments. The promulgation of guidelines and protocols to regulate clinical decision-making has intensified the development of codified knowledge. What remains unresolved is how that encoded knowledge is generated, and the extent to which such encoded knowledge is routinely used and applied consistently by medical practitioners. As SSK studies have shown, what constitutes scientific evidence is partially the result of social processes of negotiation within the laboratory and beyond, and is actively re-interpreted through experience. In the field of medical sociology, it is well-established that the exercise of clinical judgement entails reliance on tacit knowledge in applying rules and guidelines to individual cases. The 'facts' of a case are themselves

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(partly) socially-constructed and the product of interactive experience. As Berg (1992; 1997; Casper & Berg, 1995) has shown, medical work comprises a 'moulding' process from diagnosis to treatment, in which patients are rendered manageable and adjusted to fit organisational routines and explicit criteria.

Numerous writers have identified the salience of tacit knowledge in professional practice. This paper explores the distinctions made by previous scholars (Blackler, 1995; Collins, 1993, 2007; D'Eredita and Barreto, 2006; Lam, 2000) between 'embrained', 'embodied', 'embedded' and 'encoded' knowledge to examine the dynamic relations between tacit and explicit knowledge as used by health care professionals. To illustrate this process, qualitative evidence is drawn from an ethnographic case-study of the clinical uses of health outcome measures in a specialist Neurorehabilitation unit within the English National Health Service. The paper shows how so-called health outcome 'scores' for patients with highly complex conditions are produced and debated within a multi-disciplinary team, and how tacit knowledge is intrinsic to this procedure. While the scores have been formalised in terms of technical measurements of patients' capabilities on different criteria, health professionals' interpretations of their meaning invoke other taken-for-granted knowledges. Clinicians adjust individual patients' scores in the light of their clinical judgement and other specific circumstances. Encoded knowledge is explicated and supplemented - and sometimes questioned and even displaced - by embedded knowledge. The findings are used to challenge the assumption that evidence-based medicine involves an unproblematic translation from rules and protocols to standardised practice.

Systematic Reviewing as a Topic for STS Analysts

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In the 1970s, the volume of research on a number of topics in psychology and education had grown to the point, many social scientists felt, where findings could no longer be reliably summarised through literature reviews of the traditional kind. Hence meta-analysis was invented, a statistical technique by which quantitative data from multiple studies can be combined. Adopted by medical researchers, this technique subsequently spawned the method of systematic reviewing. Systematic reviews, most of which include meta-analysis, are now emblematic of evidence-based medicine (EBM). The procedures by which data are being synthesised have grown ever more sophisticated, addressing complexities and uncertainties of many kinds. In this process of expanding an increasingly fine-grained system of rules, guidelines for synthesising even ethnographic and other kinds of qualitative data are being developed. Through the introduction and refinement of formal tools, the domain of rule-bound behaviour in research synthesis appears to be continuosly expanding while the space left for judgmental decision-making keeps shrinking.

The gut reaction of STS analysts witnessing such a development seems to be to discredit any claim to the effect that robust evidence is being produced. The Wittgensteinian view of rule-following underlying Collins's distinction of an algorithmic versus an enculturational model of science, and the related notion of tacit knowledge, provide well-known resources for critical work. Basing analyses of the expansion of systematic reviewing on such ideas means

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supporting the resistance to this development, and to the EBM movement more broadly.

In this paper, an alternative line of argument is proposed. Following Timmermans and Berg, it will be suggested that investigating what rules do may be more productive than postulating a priori that they cannot be observed. Rather than setting out to demonstrate that claims to objectivity and replicability are misguided in this area, too, we ought to investigate possible effects of the expanding rule system on the nature and perceived status of medical facts, as well as how such changes, in turn, may affect practice and policy decisions. This need not involve rejecting the normative turn in STS, but again, more than one option is open to analysts. Encouraging certain forms of resistance to the established methodology of systematic reviewing is a legitimate goal, of course, but taking our cue from Collins and Evan's third wave, we may also wish to acknowledge and encourage expertise in research synthesis. Medicine, after all, is by no means the only area in which useful overviews of current research are needed. Indeed, there is a need for reliable reviews in every academic discipline, and as any reader of the latest edition of the Handbook of STS may confirm, our own field is no exception.

1.4.20: Skills and Styles in the Culture of Design
How Important are Skills and Styles of Operation in the Design of Devices?

The BlackBerry and the Abacus:
Design, the Body, and the Evolution of Techniques

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The study of technology has been mainly a study of the design of devices rather than of their use. But many important technological changes have been innovations in technique. Users have developed new ways of using technology, not foreseen by designers and manufacturers. They have sometimes developed skills much more rapidly than inventors had expected; they also have experienced more persistent difficulties. New generations of users have revived old designs with new styles of operation. Elite users have skills representing thousands of hours of investment, a physical-mental capital that an innovation may either increase or threaten. Changes in pedagogy can also transform the applications of existing equipment. Examples from the arts, medicine, and sports suggest that focusing on of the use of the body can be valuable for both field work and historical research.

Let's Make Things Better:
Persuasive Technology and Material Morality

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Information Technologies have come to play a pervasive role in our daily lives. In many discussions, these technologies are either seen as functional extensions of human faculties or as threats to the quality of our lives. They help us to do things better, or they form a structure of surveillance and impoverish the way we communicate and experience reality. What usually remains out of sight here is the kind of subjects these technologies produce. Rather than merely facilitating or oppressing human beings, information technologies generate specific forms of subjectivity. They change human practices, experiences, frameworks of interpretation, and moral decisions. The newly emerging field of Persuasive Technology adds a new dimension to this. Rather than shaping the subject implicitly, these technologies are explicitly designed to respond intelligently to human behavior, applying sophisticated techniques of persuasion. Such technologies challenge predominant approaches in ethical theory. They reveal a moral significance of technology, and replace the autonomous moral subject with a technologically mediated one. By linking a post-phenomenological account of technology to Michel Foucault's ethical approach, the paper will develop a conceptualization of both the moral significance of technology and the technologically mediated subject. Moreover, the paper will address how practices of use and design can anticipate and stylize these technological mediations.

1.4.21: The Applied Politics of Deafness: Acting with Deaf People in Science, Technology and Medicine

What Does 'Informed Consent' Mean in the Internet Age? Publishing a Sign Language Corpus as Open Content.

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Between 2006 and 2008, a large video corpus of Sign Language of the Netherlands has been created with support of the Dutch Science Foundation. While the original goal of the project was to create a large research database for linguistic investigation irrespective of the location and institution of the researcher, early on in the project it was decided to make the data publicly available as open content. Long before its actual publication, various parties in the Netherlands have expressed considerable interest in these data, including interpreter trainers, sign language teachers, and interpreters.

Of the 100 participants who were recorded for the projects, each person signed a consent form indicating they agreed to online publication. This paper raises several issues relating to 'informed consent' as it applies to the publication of sign language data as open content on the internet. First of all, to what extent are deaf people with varying levels of Dutch literacy aware of the status and impact of a consent form? Although the statements on the consent form were explained to them in sign language (when needed for the first half of the subject group, and systematically by prerecorded video clips for the second half), one may wonder to what extent this counts as a voluntary and well-informed decision.

Secondly, is it possible at all to agree to online publishing given the rapid technological developments as we have seen in the last decade? Just as few people would have foreseen the venue of Google Earth, we cannot predict the impact of new technologies. Will face recognition on the basis of movie sbe built in to every operating system in ten years time? These are new types of considerations that all touch upon the 'well-informed decision' that is inherent in informed consent. This paper will characterise the current developments in this area on internet, including new licenses to protect the use of data. Specifically, the utility and restrictions of the Creative Commons licenses are discussed, which are used for all of the Corpus NGT data.

Medical Signbank - Bringing Deaf People and Linguists Together in the Process of Language Development

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In this contribution we describe an Australian project in which linguists, signed language interpreters, medical and health care professionals, and members of the deaf community use the technology of the internet to facilitate co-operative language development. A web-based interactive multimedia dictionary and database of Auslan is being used to create an effective, accepted and shared sign language vocabulary for the discussion of medical and mental health issues by deaf clients and health professionals, mediated through Australian Sign

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Language (Auslan) interpreters.

This technology enables the direct participation of deaf people and medical practioners in a project managed by linguists, sign language interpreters, and language service providers (e.g., the National Auslan Booking and Payment Service, and the New South Wales Interpreting Health Service). The dictionary and database (called Medical Signbank) is a means of monitoring Auslan vocabulary use and innovation by interpreters, and for providing an explanation of basic medical and mental health terminology to deaf people with limited English or literacy skills. In preparation for interpreting assignments or medical encounters, interpreters and deaf people can search for appropriate established Auslan vocabulary for medical terms. In reporting on assignments or service encounters (with doctors, nurses), interpreters and deaf people can quickly and efficiently report on terminological areas that posed problems (i.e., the existence of, or the acceptability of, vocabulary in specific areas). Medical Signbank will use the interactive possibilities of the internet, plus the ability to share digital video over broadband connections, to enable interpreters and deaf people to see - on demand - video clips of Auslan vocabulary and to provide feedback on sign neologisms variously suggested by community members, interpreters and linguists.

We intend to 'turn the tables' on language planning and standardization - from 'top down' to 'bottom up' - and, by so doing, to encourage an organic and natural process of language development. In addition to the Medical Signbank site we use deaf community focus group meetings, face-to-face and on-line questionnaires to solicit further feed back from deaf stakeholders. The effect of acting with deaf people in this way is will be a process of 'standardization' and/or development that is ultimately more acceptable to and successful in the deaf community. We do this by using scientific, technological and linguistic expertise to facilitate deaf people sharing linguistic innovations. Language, cultural and educational impediments in the effective use of signed language interpreters in medical and mental health service delivery have been identified by Australian researchers (Cornes & Napier, 2005; Napier & Cornes, 2004; Napier & Johnston, 2005).

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"A Five Star Hotel in the Desert"... with no Water or Electricity: Cochlear Implants Among the Negev Bedouin

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This presentation considers the introduction and compliance to Cochlear Implants (CI) among the Negev Bedouin, based on ongoing anthropological fieldwork among Bedouin families with deaf members. The native Arab inhabitants of Israel's southern arid district - commonly referred to as Bedouin- suffer from severely inadequate health, education and

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welfare services. This is the case also when considering the services facilitating deaf children (with or without CI) and their families.

Cochlear Implants (CIs) have been the object of fierce ideological and professional debates . Ignoring, for the moment, such controversies it remains evident that intensive auditory training is necessary to obtain any of the promised results from this surgical intervention. In the absence of any such training services it would seem unlikely for CIs to gain any popularity.

However, often exposed to no other authority than the privileged expertise of medical professionals, Bedouin parents increasingly opt for CIs for their deaf children. The high incidence of congenital deafness among the Negev Bedouin has been identified as a promising pool of potential clients for implantation and an increasing number of competing medical institutions promote CIs and bear considerable pressure on (hearing) Bedouin parents to comply with this medical procedure as a necessary medical/technological "solution" for deafness. It is no news that the appeal of medical technology is not necessarily grounded in its results but in the promises and hopes evoked . I here wish to further complicate this argument by alluding to another factor which frames the lives and choices of many members of this marginalized minority group.

I suggest that in order to understand this compliance to CIs among the Negev Bedouin, the notion of medical technology as ultimate progress needs to be considered in the context of cultural and political domination. The failure of existing facilities to provide deaf students with a proper level of (bilingual) education or literacy, has lead many Bedouin parents to perceive CIs not as aid to the acquisition of hearing, but as a means of total transformation, to overcome deafness altogether.

In this context, the appeal of CIs increases not despite but because of the lack of supporting services. Their absence prevents full consideration of the technology and feeds the illusion that the alleged progress medical technology is perceived to embody is closer than ever. Many Bedouin seem to consider technological innovations to contain the promise of some abstract 'universal progress', which is perceived to lie beyond local political constraints and discrimination.

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Acting with Attainments: What Intervening with Social Science Technology Does

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Social science should rightly concern itself with the question how understanding derives from what people do. But that question is not so easy to respond without also facing what we think people do with that understanding; this forms a hermeneutic circle that seems best addressed in toto. The first part of the question is the one that motivates this conference. In this paper deaf education is the topic, so that the first question can be phrased as, 'What does it mean to act with performance measures in search of a better educational experience for deaf pupils?' The second part of the question has been considered, in turn, by Mills (1959), Giddens (1993), Mesny (1998) and Fuller (2006) and asks what sociological understanding 'is for': what results are obtained by acting with anything at all? This latter question gains momentum if it should be conceded that more and more social science involves the use of new technologies (often set up to serve other ends), and consequently sooner supports empirical and normative than emphatic or interpretative approaches. This concession points to acting with objects (Knorr Cetina 1997) but also draws on recent work in sociology that finds cause to position science and technology outwith social institutions, beyond reach of politics or economics (Schroeder 2007); the latter presents a case of objects acting as such. This additional dimension to sociological imagination leads to a more holistic question, in situ: 'What results obtain from acting with monitoring technology in search of a better educational experience for deaf pupils?'

The paper accounts a case study of acting with social science technology in tracking the educational achievements among deaf pupils, and details present moves to establish similar technologies in other countries. At this time both sides of the hermeneutic circle of understanding are uncertain, so that there is good cause to consider social science, technology and social change.

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Full Access for All Team Members?

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In deaf and hearing mixed teams it has been documented that a positive attitude towards the use of sign language is one of the most important aspects in creating a positive collaborative environment (Young, Ackerman & Kyle 2000). Van Herreweghe (2002) has shown that in mixed deaf-hearing professional meetings the information flow and working conditions improve if a deaf person chairs that meeting in sign language with interpreters. However, awareness of linguistic and cultural differences and (varying) signing skills in a team do not guarantee that all team members have equal access to the information they need in order to do their jobs to their own and their employer's satisfaction.

The policy for language use amongst the teams is as follows: during informal settings, for example in the teachers' room at coffee breaks, in the corridors or at social events, NGT or sign supported Dutch is used. During more formal settings, Dutch or NGT are used with interpreters, depending on the chairperson's preference. In practice, the languages used during official meetings are spoken Dutch, written Dutch (through the work of a speech-to-text interpreter), NGT and sign supported Dutch with highly varying degrees of fluency. The dominant language in which information is provided in general is written Dutch.

Considering the above, most conditions for successful collaboration and full access seem to be met. However, through new technologies (cell phones, texting, msn, internet, and intranet systems like First Class Client, SharePoint or Blackboard) face to face contact in the team is decreasing. This can prove to be an extra threat to the accessibility of informal information exchange between team members.

The Deaf Studies research team, also consisting of deaf and hearing members, is interested in how the team members of ISLD actually experience the multilingual environment and the bicultural collaboration. We will conduct an explorative study on how the deaf, hearing and h-o-h members of the bachelor and master programs, and in the research team itself, experience the working conditions in this bilingual educational and research environment. We will discuss the data, gathered through a questionnaire, presented in Dutch and NGT. The main questions will focus on the personal experience of the team members on issues like job demands and control (Karasek 1979) in relation to the languages used.

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1.5:   Subplenary: STS in Pharmaceutical Research
The Introduction of New Medicine is Big Business. Is STS Well-Suited to Critically Comment on the Research and Development in the Pharmaceutical Industry?

Merging Trials and Publicity:
a STS Perspective on Commercial Clinical Trial Research

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A considerable number of studies have been published recently arguing that clinical trials financed by pharmaceutical companies generate more positive results for new medicines than independently-funded trials. Immense interests are involved in clinical trials today as the pharmaceutical stock market soars or plunges on the basis of even interim test results. As a consequence, pharmaceutical companies increasingly turn to commercial research organizations (CROs) that are dependent upon their clients for their very existence. The mission of CROs is not to control pharmaceutical companies, but to serve their interests. As I will demonstrate, their endeavors to get new drugs through the licensing process brought about changes in the methodological protocols of clinical trial research. In addition, CROs are now merging with professional marketing companies. This enables pharmaceutical companies to deal with one and the same firm in order to have their new drugs both tested and advertised. With marketing companies opening clinics for conducting trials, the distinction between testing and selling is completely blurred.

This paper also asks how we can deal with the commercialization of clinical trial research from an STS perspective, namely taking into account that financially-independent academic research is also inevitably 'interest-driven'. Should we, and most importantly, can we criticize the clinical trial business while we know that knowledge can never mirror nature?

STS and the Making of Pharmaceutical Futures

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High hopes surround the role of the pharmaceutical and biotechnology industries in improving health and creating highly skilled jobs. The promise of novel drugs, and therapies based on genes and stem cells, has prompted a range of policy initiatives including public subsidies for R&D, a liberalisation of the drug approval process and a reorientation of academic and clinical research in the name of improving knowledge translation. This presentation will take a critical look at these promises and the underlying assumptions that support policy and argue that they are based on a series of widely held myths about the nature of drug innovation. In particular, it will be argued that the promise of a 'biotech revolution' has been greatly overstated and that the pharmaceutical industry is far more dependent on the public sector as a source of new medicines than is commonly believed. Based on a series of interventions in UK policy debates which question these myths, I wish to explore how STS might critically engage with the making and unmaking of 'pharmaceutical futures'.

1.5:   Subplenary: STS in Pharmaceutical Research
The Introduction of New Medicine is Big Business. Is STS Well-Suited to Critically Comment on the Research and Development in the Pharmaceutical Industry?

Ghosts in the Machine: Medical Publication Planning.

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Publication planning is the organizational and practical work that shapes pharmaceutical companies' data and eventually turns it into medical journal articles. To gain the largest scientific impact and market value from research, articles are often written under the names of independent medical researchers or "key opinion leaders." Pharmaceutical company statisticians, reviewers from a diverse array of company departments, medical writers, and the publication planners themselves are only rarely acknowledged in journal publications, and company scientists only sometimes acknowledged. Even sponsorship, the company funding of the trial, is omitted from many meeting abstracts. For this reason we might see publication planning as the "ghost management" of medical research and publication.

I report on a conference of publication planners. I focus on three themes. First, I am interested in the insights that that allow planners to be successful at placing research in medical journals: Given STS's emphasis on the importance of expertise in science, we should ask what forms of expertise planners have or employ that allow them significantly more success than independent researchers in placing articles in medical journals. Second, I examine publication planners' understanding of ethics, for that was a central theme of this meeting. On both of these themes, we see a corporate understanding of practices, which allows them to be successful and seen as ethical. Finally, I discuss my role as an STS researcher in exposing the ghost management of medical research and publication.

2.1.1: Race and Ethnicity

Genetic Discourse, Modern Medicine, and Ethnic Politics

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Taiwan as an island country is a migrant society where interethnic marriages have been common. In the past centuries, it has been not unusual that people in Taiwan change their ethnic identities for various reasons. This is true especially for the Hoklo and Hakka, the two major ethnic groups of Han origin in Taiwan. The now popular ethnic categorization of the people in Taiwan, "four great ethnic groups," which refers to the Hoklo, Hakka, Chinese Mainlanders, and the aboriginal people, is socially constructed and emerged only after the late 1980s in a particular political-cultural context. In 2005 a major research project supported by the government, "Taiwan Bio-Bank," was organized by a group of biological scientists and medical doctors who took the ethnic categories for granted. The purpose of this project is to collect the genetic data of the Taiwanese people in order to build a database by drawing blood from the "four great ethnic groups." Taking "Taiwan Bio-Bank" as a case study, this paper analyze how and why biomedicine based on new genetics has developed in Taiwan since the 1990s and the influence it has produced on medicine, especially the health care of the aboriginal people. I argue that the development of biomedicine based on new genetics in Taiwan has been contingent on Taiwan's particular ethnic politics, state hegemony, medical power, and globalization. I point out that the rapid development of biomedicine based on new genetics in Taiwan has been leading to the "medicalization of ethnicity" and "ethnicization of medicine."

The Changing Logic of Ethnic Classification in China

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In the mid-1950s, a gathering of preeminent Chinese social scientists and Communist Party cadres was given the task of partitioning China's diverse population into distinct ethnic categories using explicitly non-biological criteria. The result of this initial project was the assignment of all Chinese residents into one of 56 ethnic groups. Yet less than 50 years later, the initiation of the Chinese Human Genome Project has spurred a flurry of medical, physical anthropological and genetic research on ethnicity in China, and offered a new means of categorizing ethnic groups in China. First, I seek to demonstrate how changing social, political and economic conditions have shaped the logic of ethnic classification in China and resulted in new tensions in ethnic categorization. Second, I examine how this shift in the logic of ethnic classification has led to new understandings of ethnicity in China.

I explore the importance of these two ethnic classification projects and the "modernization" of scientific practices more generally, in building and shaping the Chinese nation, and in shaping contemporary ethnic relations. I pose several interrelated questions: why was (and is) it necessary for the Chinese government to distinguish between who is and who is not Han Chinese? Why has there been a move towards justifying ethnic categorization in biological and genetic terms, and away from social science ones? How are the resulting

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tensions between the two logics of ethnic classification to be resolved?

My research paper analyzes the complex relationships between ethnic inequality, scientific practices of classification, nation building and modernization through 1) archival research of available documents relating to the more recent turn towards genetic understandings of ethnicity and motivations for this turn (as witnessed in scholarly journals, government issues, newspaper articles, policy documents); and 2) in-depth interviews of scientists and politicians who broadly do current research on ethnicity or utilize ethnic categories in their research today.

Ethnic classification in China highlights several important and exciting avenues of research in the field of science studies, particularly in relation to the development of the field of genetics. China offers an interesting case to explore the importance of racial and ethnic classification projects in modern state formation and nation building, the connection of such projects to the modernization of scientific practices more generally, and in how these projects shape systems of racial and ethnic domination.

Legally Mandated Group Consent in Genomic Research? - Institutional Opportunities and Challenges for Aboriginal Participants.

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With the development of genomic medicine, gene's function and its marker has become the focal point of biomedical researches. Researchers invite participants to provide blood or tissues so that they can compare and single out genes or markers that can identity risk or even control risk to health or diseases.

Under this backdrop, aboriginal people with unique genetic makeup became heavily pursued. Nevertheless, because aboriginal people also tend to have lower social and economic status, they are vulnerable to undue solicitations to participate in genomic researches. Moreover, since human genome are permanent and are also similar with members of the same family, tribe, and ethnicity, genomic researches associate with disease that are expensive to cure or socially burdensome could be stigmatizing and seriously damage relevant individuals' personal and social lives. Hence, Universal Declaration of Bioethics and Human Right of 2005 promulgated by the UNESCO requires that, "In appropriate cases of research carried out on a group of persons or a community, additional agreement of the legal representatives of the group or community concerned may be sought."

To provide better protection for aboriginal people, the Legislature of Taiwan passed the Fundamental Law of Tribes in 2005 to require any government agency or private person conducting research in tribal territory must consult and acquire tribal consent and participation. While this empowers aboriginal people as a group and provides them legally protected right to review the research protocols, as a legal requirement, its institutional implication requires further clarifications. For instance, what does it mean for individuals within the group, in terms of their identity and their individual right to participate in the research? Second, since even the ten tribes recognized by the Law do no have legal

2.1.1: Race and Ethnicity

representatives or legally recognized governing bodies, whose consent or what form of consent fulfills the legal requirement? Third, although the law itself provides no punishment for the very requirement, those who fail to observe may fail in IRB reviews. Hence, despite its lack of clear guidance, researchers are forced to rethink and reshape their relationship with aboriginal participants. How would this affect current practices in genomic research involving aboriginal people?

Enhancing more public participation in the production of science technology has been a tradition in the studies of science and technology. With a legal mandate behind, Taiwan's requirement for group consent in genomic research surely provides an opportunity to realize this goal. Through case studies in Taiwan from a legal perspective, this paper wishes to shed light on the opportunities and challenges of making group consent a legal requirement in genomic research to promote more public participation in the making of science and technology.

2.1.2: Science and Art

Constructivism and Psychology

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In a paper called "The promises of constructivism" (2002a) Bruno Latour argues that although everything is wrong with constructivism it is our only defense against fundamentalism "defined as a tendency to deny the constructed and mediated characters of the entities whose public existence have nonetheless to be discussed". In a book published the same year called "Jubiler ou les tourments de la parole religieuse" (2002b) he asks: "Is it really indispensable, for to talk about religion, return to the terrible difficulties of the little verb: 'to fabricate'? Alas, yes!" And a bit later: "Can someone be a constructivist, that is, a realist, concerning religion, as one can be (as I learned to be) concerning science?" The general proposition that can be deduced from these quotations is that what is wrong in politics, religion or science is the modern separation of construction and reality. The aim of this paper is to evaluate how psychology, especially social psychology react when faced with those questionings, how both react when approached from the point of view of a network of articulations that fabricate the reality in which the individual, the society are points of arrival and not of departure. It will be argued that in psychology emotions, cognitions, learning or therapy models are those "entities whose public existences have nonetheless to be discussed", instances of a process of negotiation that is indispensable to be described. This non modern version of psychology poses the problem of how in this field provisory stabilizations are fabricated, how it is indeterminate and open to risk, how it constructs scaffolds (Latour, 2002a) rather that closed theory models.

Psychologies Across the Circulatory System of Sciences; a Multiplicity of Visions and Subjects

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Bruno Latour, trying to understand the work of sciences, beyond the internalists and externalists views, propose a Circulatory System, composed by a series of circuits, such as: 1) World Mobilization, 2) Autonomization, 3) Alliances, 4) Public representation, and 5) The Bonds and conceptual Knots. How would psychologies circulate in these circuits? As per the World Mobilization we might say that the inscription techniques of this knowledge would produce (or extract) testimonies not from objects anymore, but from subjects. Even when it is verified that these inscription techniques are, in general, captured from other sciences as physics, chemistry or biology. In what concerns to Autonomization, among the psychologists we have a fragmented geopolitics, like the Russian or Yugoslavian. Regarding alliances: these have been ambiguous. Because if an, each time higher, interest of the private, governmental and even military sector is registered, this interest is not comparable to the one entrusted in other scientific sectors. If this interest was initially centered in the selection field for a determined aptitude or skill, today it fills other functions, such as health field. In all ways, these interests are anchored in what Foucault named as bio-power. But these operated alliances ignore the complexity and plurality of our field, keeping some faith in our presumed

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knowledge about human nature. A faith which is much wider in the field of Public Representations, even with some distrust kept. Here we can recognize the big strength of psychologies, because, more than to produce free testimonies from subjects, they extort testimonies, manufacturing more than revealing our self/ego. At this point, we can say that psychologies produce immovable (because they only circulate in the interior of certain guidelines) mutable (transforming and manufacturing the subjects' experience). Producing versions that changes in what Vincenne Despret call visions; without few possibilities of recalcitrance.

The Performativity of Demonstration:
on the Afterlife and Disturbances of Experimental Psychology

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The two, quite different scientific psychological experiments of Stanley Milgram, on 'obedience of authority', and Wilfred Bion, on 'group realities', have become notorious as production apparatuses of disturbing psychological phenomena. As such apparatuses they have been so extensively replicated that they should be considered more than simply scientific experiments. While initially gaining recognition for delivering empirical grounding of social psychological and psychoanalytical theories respectively, their status as methods for generating scientific evidence became later much contested - especially the moral and ethical aspects of Milgram's experiment. Despite this contestation, however, they have both become widely circulated as materials and templates for various types of re-enactments in, for example, educational settings, theater plays, and TV documentaries. In this way they both seem to be remarkably resistant as experimental devices.

In the paper, I explore this ability to survive as experimental devices and keep attracting volunteers and spectators. I argue that it stems from the arrangements' ability to simultaneously work as generators of predictability and surprises. To a large extent the experiments are designed so as to make their participants confirm rather than challenge the underlying hypotheses of the experiment. In this way the experiments have a strong demonstrative dimension, which simultaneously give rise to terrifying fascination and to concerns about the scientific fineness of the experiments. However, as socio-material responsories they also allow a certain amount of variance and novelty to be produced, which stimulates interest in and closer analysis of the way 'psychological phenomena' emerge from specific constellations of experimental set-up and participants. This double capacity makes the experiments effective as educational or therapeutic devices by their simultaneous performance and disturbance of the psychological. However, the experiments of Milgram and Bion are also very different on a number of issues.

By analyzing the differences in terms of material set-up, role of the experimenter, and recruitment of volunteers, I show that the two experiments are not equally open to improvisation and recalcitrance of the participants. This feature, I argue, is of special importance for the 'afterlife' of the experiments, that is, the way the experiments constitute either good or bad disturbances of human life.

2.1.2: Science and Art

Science, Politics and Materiality: Israeli and Palestinian Psychologists' Construction of the Separation Barrier

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The construction of the Separation Barrier in the Middle East has given rise to debates about the economy, politics, and national security, but how do the psychological sciences narrate the consequences of this contested divide? This paper focuses on how a material object - such as the Separation barrier - can become part of knowledge production in the psychological sciences and how its use is influenced by a particular political and cultural context. Juxtaposing Israeli and Palestinian constructions of the psychological meanings of the barrier reveals how various scientific communities can use it as a conceptual tool to understand, visualize and make sense of wider social phenomenon. Indeed, various scientific narratives can confer certain meanings to this division and consequently construct it as a problem that is relevant to a particular social group. For instance, while Israeli psychologists have called the barrier the virtual embodiment of the Israeli psychic make-up and as indicative of Israeli's personal disengagement with political conflict, Palestinian psychologists argue that the wall's impact on people's mobility, livelihood, and social networks has deleterious psychological consequences, destroying Palestinian communities and their social welfare. Hence, as the barrier is constructed, it becomes discursively built into the scientific and everyday discourses of these divided communities. The politics surrounding the barrier's construction hereby becomes reflected in the often-diverging social and psychological meanings that are imputed to its existence. At the same time, psychological accounts of "the other" frequently become intertwined with relations of power within the region. Such diverging interpretations reveal that the meanings of places, walls and barriers reside in and are largely determined by communities of interpreters that draw on available public discourses, scientific narratives, and people's everyday practices.

2.1.3: Technology and Perception of Risks and Diseases, I

Envisioning the Invisible: the Silent Epidemic of Hepatitis C

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In Western biomedicine diseases are often conceived of through the visual, classified based on visibility, and explained through images. But what does a disease look like that has little or no physical and social visual perceptibility? How do you envision a disease that can exist without symptoms or obvious public presence? This paper investigates the role of visual representations in science and medicine through the emergence of the Hepatitis C virus in the United States. HCV, though one of the most common blood-borne pathogens, is still considered a 'silent' epidemic and I argue is what could be called a 'remnant' disease. Accordingly, as I explore how images are used in the definition of disease, I expand STS discussions around visual representations to include the notion of visuality in general, not just what can be seen in an image. In order to explore how disease is envisioned, I layer and contrast different assemblages of histories so as to make tangible different ways of knowing. I overlay general forms of visuality linked to social, economic, political practices that surround medicine and health in order to uncover the ways in which HCV is made visible. I explore ways in which popular discourse adopts medical imaging technologies, communities gathers around a disease, disease is made present in news media discussions, and federal funding is made accessible. Specifically, I examine HCV's historical emergence as an illness and virus. This history is in direct conversation with AIDS; the networks and practices around the two cannot be isolated from each other. I continue my discussion by examining HCV's presence in public discourse and the rhetoric of 'invisibility' that surrounds the disease. I thread throughout issues of government planning, funding, and planning recommendations. Finally, I examine visual advocacy campaigns to see who and what is being imaged in order to create public awareness of HCV.

Of Hearts, Souls, and Brains: the Wandering Site of Personhood

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How do innovations in medical technology change public perceptions and discourses about personhood? Where are notions of personhood lodged in human bodies? In this paper, we compare two case studies of innovation in biomedical technology to track the changing locus of personhood within the body and attendant cultural meanings. In the first instance, heart transplantation helped spark a public dialogue about the procedure and its implications for the soul, and about our technological future. An analysis of these discourses reveals that, prior to the advent of heart transplantation, it was commonly believed that the heart is the person. With the first successful heart transplant in 1967, the site of personhood was destabilized and began its journey upwards toward the brain.

The second case considers deep brain stimulation, an emerging biotechnology that combines electro-convulsive therapy with an inter-cranial device that is placed entirely within the body of the patient. Deep brain stimulators use electrodes that are implanted at particular

2.1.3: Technology and Perception of Risks and Diseases, I

sites within the brain, applying electric current in a more localized manner when compared to traditional electro-convulsive therapy. An emerging discourse of personhood is developing around this technology. This paper, therefore, tracks the intersection of public discourse concerning personhood and biotechnologies, both past and present. Using Foucault's genealogical method, we seek to understand the formation of personhood both through, and as a result of, advances in biomedical technologies. We illustrate the ways in which heart transplantation caused a crisis in the concept of personhood. This crisis caused the conception of personhood, and its site within the body, to change. We argue that, due to the routinization of heart transplantation, a new type of personhood was created - personhood sited in the brain instead of the heart. For example, notions of death were altered from "heart death" to "brain death" with the establishment of the Harvard brain death criteria.

The localization of personhood within the brain is still a work in progress, as public and professional actors debate the extent to which brain structures, "abnormalities", and neurons vie for status as the "cause" of personality and behavior. Public and professional discourses surrounding the cause of delinquency, crime, and other disorders such as depression, dementia, and schizophrenia, are all lodged within neuroscience and made concrete through technologies like MRI and fMRI. We also chart the ways in which bioethical discourses and practices emerged with each technological advance. In the era of the heart transplant, issues concerned allocation of resources and the definition of death. In the contemporary era of brain work, new fields such as neuroethics are emerging to consider the implications of brain imaging, brain-machine interfaces, psycho-pharmacology, and the neural bases of behavior.

Ethics in Ultrasound Scanning

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This paper originates in fieldwork and interviews done to research how midwives and obstetricians learn how to do and interpret routine ultrasound during pregnancy (week 18). I have in this research especially focused on how midwives and obstetricians learn to recognize the pathological or the deviant, and how they distinguish this from the normal.

I will in this paper through a STS perspective map how and where questions and discussions on ethics surfaced and further critically discuss how these instances can be understood in the framework of ultrasound being a fully integrated part of antenatal care in Sweden, as part of a institutionalized work organization and as part of what constitutes obstetricians, midwives and parents.

It seems like ethics in the educational situation can surface as personal standpoints where everyone can have their own interpretation and these can be discussed, often together with an ethicist. In doing the actual scans and finding something deviant ethics seems to transform into on the one hand (objective) information that obstetricians can give to the parents about the condition of the foetus and on the other into an individual (informed) choice for the parents-to-be. Thirdly, a more critical discussion on ethics surfaces in informal coffee break discussions among staff.

2.1.3: Technology and Perception of Risks and Diseases, I

I will explore the tensions that arise when on the one hand ethics is already decided since almost all pregnant women in Sweden do ultrasound scans, this is also one of two moments during pregnancy where the man is mandatorily present (the other is birth). And on the other when ethics is constantly made into an individual standpoint or choice.

Sarariman meets Japanese Genes (and then other Sararimen): Diabetes Research and the Politics of Men's Health in Japan

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Few diseases have pervaded the landscape of Japanese health care in the past fifty years as thoroughly as diabetes. It has transformed itself from an obscure and acute condition to one of the paradigmatic issues of biomedicine involving the interaction between state-of-the-art science and public health intervention on a massive scale.

Different facts and experiences that structure the knowledge about diabetes emerge within particular interferences between scientific and cultural attributions. Some repertoires invoke "Japanese genes," others inscribe a stereotypical male diabetes patient: the sarariman, or company employee. The puzzle is this: how do these different subjects of molecular biology and epidemiology come to stand for the same disease, if they do at all?

Taking a diabetes clinic as its point of departure, this presentation explores the mediation between such ontological variations. My aim is to highlight how facts of biomedicine and cultural meanings of gender and ethnicity are made to articulate each other in clinical practice and how, yet again, they are included in pharmaceutical marketing strategies and diabetes research. I trace the means by which social anxiety is naturalized and the "working man" becomes a marked subject of diabetes in the clinic and beyond. The ways in which such notions of gender difference are mapped onto a polarity of the Japanese versus the Western in genetic research and clinical trials reflect the differentiating implementations of endocrinology in Japan.

The analytic emphasis on differentiation inside medicine feeds into a fertile dialogue between anthropology and science studies about the embodied coproduction of ontology and politics.

Cyborg Women who Make Women Beautiful: Following Skin-Care Experts in Korea

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In Korea, cosmetic dermatology has been rapidly grown since the end of the 1990s with the introduction of new dermatologic technologies such as laser and IPL (intense pulsed light) as well as other cosmetic instruments into clinics. At the same time, massive numbers of

2.1.3: Technology and Perception of Risks and Diseases, I

Korean estheticians, who have long used skin-care techniques and apparatus that are now also used in dermatologist's offices, have tried to establish their own organization and professional status. These female skin-care experts neither fear for technologies nor undermine "natural" skins. These women are "intermediate" users who operate skin-care technologies and simultaneously lay end users who let their bodies be subject to skin-care technologies. Being proud of their jobs as female professions, they dare to transgress the boundary between the private and the public. Besides male doctors and female patients, these cyborg women are active actors in a skin-care technology network.

The relationship between body and technology, to which skin-care technologies are related, has been one of the main concerns in feminist STS studies where there have been tiresome debates on whether reproductive technologies and cosmetic surgery - bodily technologies in general - are liberators for or oppressors against women. In other words, it has been questioned if women have an ability to make their own choice over such technologies free from ideological/structural forces. This kind of dichotomist dispute has not yet finished partly because of the homogeneous categorization of women in socio-technical networks: Women are mainly seen as "lay" end users or consumers of bodily technologies whose biological bodies are objectified and fragmented by technological interventions.

This paper is to challenge this long-held view in feminist studies of technology that women are only lay end users/consumers whose biological bodies are subject to technological interventions. In this paper, I'd like to follow female skin-care professionals - women who have both expertise to control technologies and bodies controlled by technologies - in Korea, and discuss how they have been constructed by and constructing a skin-care technology network.

2.1.4: Challenging STS Concepts

Doing Science with Bourdieu Structure, Practice and Reflexivity

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In this paper we discuss Bourdieu's field theory and the advantages of using it to empirically study science, as me and my colleague have done so in our research study on a large Australian scientific organisation in quantum computer technology. Unlike the currently popular Actor-Network Theory, Bourdieu's approach has an empirical-theoretical integrity, methodological transparency and a critical dimension that make it a robust and highly effective approach in STS. We outline how we research and analyse our organisation to shed light on scientific practice, institutional organisation and the path of technoscientific development. We describe how Bourdieu's field theory has enabled our research project, bringing together focus on structure, practice and methodological reflexivity in a way that post-structural approaches have failed to do. It is this last reflexive quality that brings Bourdieu's approach closest to answering the thorny question of how to ethically 'act with science'. However even his approach cannot entirely overcome the political economy of current research funding and the political question of whose interest a particular study serves. Yet Bourdieu can help researchers conceptualise and articulate the connections between underlying values in research, methodology and the ethical-political perspective of the researcher.

Enrolment for Innovation? Analyzing the Lactobacillus GG Innovation Process from the Point of View of Conceptual Blending.

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Within STS, and especially within ANT, the notions of 'interest generation' and 'enrolment' have long been central (e.g., Callon & Law, 1982; Latour, 1996). For instance, in their 1982 Note in Social Studies of Science, Callon and Law stated that their aim was "to discover how it is that actors enrol one another, and why it is that some succeed while others do not" (Callon & Law, 1982: 621). This phenomenon of "hooking" the interest of relevant actors has been important also for researchers inquiring into the appropriation and domestication of innovations (e.g., Silverstone & Haddon, 1996). Within yet another research context, the issue of how to best attain resources has been approached via notions such as 'legitimacy' and 'narrative fidelity' (e.g., Suchman, 1995).

This paper inquires into the more specific nature of such interest-generating "hooks," particularly of good ones. What are the general characteristics of "the ties that bind"? The paper explores this issue by comparing two events of the same case, that of innovation process of Lactobacillus GG (unfolding in the U.S. and Finland): the first one a failure (1990), the second one a success (1996). My analysis draws on recent research on the intricate workings of the human mind, that of conceptual blending (e.g., Fauconnier & Turner, 2002; Hukkinen, in press). Conceptual blends are cognitive structures that integrate existing conceptual content in a new synthesis that partially transcends the limitations of the

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previously given. Blending is, its proponents argue, the generic process for arriving at any novelty in the human mind. Thus, also the process of communicating that novelty implies a series of (re- and co-)constructions of blends, shifting with the audiences, that some actors then hook on to - while others do not.

Based on the comparison between the two events of the same case, the paper suggests that, from the point of view of conceptual blending, the issue of enrolment vs. non-enrolment depends on how well the constructed blends perform, in relation to specific audiences, with respect to three central dimensions: a) intelligibility; b) pragmatic utility; and c) normative fit (see also Suchman, 1995). The main methods used are interviews and document analysis, and the central contribution is a deepened understanding of the socio-cognitive mechanisms of enrolment for innovation.

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Digital Television on the Line the Story of HD-Divine

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There are many aspects and cases of demonstrations that have been studied in STS. Yet, little attention has been given to the role of (more or less) public demonstrations in the setting of technical standards. This is also a topic which is conspicuous by its absence in academic work discussing standardization and its implications for competition and industrial performance, including the rate, direction and character of innovative activities. This paper will help redress the balance by dealing with one particular demonstration: the demonstration of HD-Divine at the International Broadcasting Convention in Amsterdam in 1992 (IBC'92).

HD-Divine was born during a time when a 'race' or a 'war' and 'battle' was taking place over which international technical standards would ultimately carry so called High Definition Television (HDTV) and its market(s). HD-Divine was a Scandinavian research and development programme launched in 1990 to counter claims and strategies of the hegemonic Eureka EU95 programme for the introduction of HDTV in Europe. Through HD-Divine, people and 'things' were drawn together in joint action with an initial goal of demonstrating a working prototype of a new HDTV-system at IBC'92. If some of my

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interviewees are right, this demonstration is crucial for grasping some of the ways how digital technology has entered traditional (terrestrial) national television networks in Europe during past decades. They also say it meant the death-blow to Eureka EU95.

At the same time as this is a story about a specific programme and the different enterprises that collided with each other in a common terrain - television - I will use the case of HD-Divine to address a more general question: How can we understand the role and techniques of demonstrations in attempts to produce agreements over technical standards in the (re)creation of markets as part of contemporary technoscientific innovation? Attention is centred upon how the practitioners themselves define and yield meanings to such demonstrations. To what extent do the participants' own interpretations of demonstrations correspond to those we find in previous studies on science and technology concerning the concept and practice of tests, experiments and demonstrations and their proposed relations to other activites? Methodologically, the paper is based upon a range of heterogenous traces the different participants have left behind them, ranging from their own oral memory accounts and interlocutions (interviews) to specialist and popular publications, policy documents, popular media, memos, consultants' reports, correspondence, minutes from meetings, press releases and statistics.

What STS can Teach Computer Scientists about Design Metaphors

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This paper considers how the insights of constructivist technology studies can contribute to research on new approaches to computer system development, such as multi-agent systems. The idea of multi-agent systems has recently received considerable attention in Computer Science and related research fields. Computer scientists have proposed that multi-agent systems provide a powerful design metaphor that encourages developers to think of computer systems as comprised of a collection of interacting autonomous entities that operate in complex dynamic physical and electronic environments. This design metaphors offers an alternative to the more traditional models of computer systems that emphasize centralized hierarchical control and stable structures. The idea of multi-agent systems instead emphasizes local interactions, decentralization and emergent behavior (Zambonelli & Parunak, 2003). Advocates of agent-based systems propose that such an approach to computer system development offers the means to deal with increasingly large-scale and complex computer technologies. Envisioned areas of applications for multi-agent systems include medical and healthcare services, business services, e-science and manufacturing. However, the decontextualized and abstract accounts of the multi-agent systems leave unexplored the social, cultural and political aspects of the envisioned technologies. These accounts provide an insufficient basis on which to consider the possibilities, limitations and risks of these developments within sociotechnical systems.

The objective of this paper is to develop a conceptual framework that allows researchers and developers of computer technologies to critically reflect upon the normative choices that their models embody. Drawing on insights from constructivist studies of technology, the paper focuses particularly on the role of metaphors in research on multi-agent systems. The notion of design metaphors has been a topic of discussion and research in Computer Science and

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particular in the field of Human Computer Interaction. However, the explicit usages of metaphors in the design and development of computer technology often lacks reflexivity with respect to the context in which they originate and the normative assumptions that they are build on. The paper argues for agent researchers to adopt a more extended conception of design metaphors as discursive elements to bring these assumptions back into focus.

Descriptions for Reflections on the Reflective Turn in Design Research

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The Study
The presentation will report a case study of the development and design of a medical device - an epi-luminescence microscope for dermatological skin inspection. The device takes a digital picture of skin lesions to be magnified and displayed on a monitor as well as electronically stored and amenable to image processing and computer aided diagnosing. The project was carried out in a research organization. Various experts from the organization - physicist (project leader), mechanical and software engineers, etc. - and externals - dermatologist (inventor of the basic idea and client), industrial designer, etc. - participated in the project.

Methodology
Data gathering included participant observation and video recordings of meetings and design session, collecting drawings and other documents produced in the process, etc.

The study has adopted an interpretative approach and deploys concepts from design research and STS. Design processes are conceived as social processes of interpretation and are described in terms of interaction - between participants and between actors and non-human 'materials of the situation'. Design work in this view appears as interpretation and generation of design goals in sequences of context bound and context generating design moves. Analysis attempts to reconstruct how interpretation is achieved by designers/participants in the particular design process and to describe the (interpretative) practices and routines actors use.

In designing artifacts designers simultaneously affect, intervene in, or generate future contexts of production, assembly, etc., and contexts of use; it will be demonstrated in the presentation how mechanical engineers, for example, in designing the mechanics of the device also design strips of activities of the future users (dermatologists) of the artifact which in turn appear consequential for the relationship between physician and patient in the future diagnostic situation. Engineering designers are 'engineer sociologists' who also 'configure the user'.

'Acting with' results & the 'Reflective Turn'
An interpretative approach does not aim to add another more sophisticated method to elucidate the "true" needs of the users, etc. or to find general rules which could be hierarchically "applied" for the improvement of the design process. It aims to describe the (system of) frameworks and practices which serve as the background for interpretations in

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particular design processes. The researchers present the research results to the designer team of the investigated design process as a kind of 'mirror' to focus their attention on their background of interpretation, which is taken for granted, and the transparent routines of their everyday design work. Frameworks (in Bateson's / Goffman's sense), habits of perception, routines, etc. are made 'visible' through descriptions of the researcher and may stimulate designers reflection on the understandings built into the skillful actions of everyday practice. Research results may help designers / participants to notice how they actively construct the reality of their practice and become aware of their tacit frames and of a variety of frames which might be available for them. Reflective discourse opens up the possibility for 'context learning', that is, a change of frameworks which will also result in a change or innovation of designed products.

2.1.6: Cardiovascular Prevention on its Travels - from the Laboratory to the Kindergarten and back. Please put STS in the Overhead Locker or Under the Seat in Front of You!

Representing or Non-representing the Metabolic Syndrome? Possible Steps Towards an Ecology of Scientific Knowledge and Cardiovascular Prevention.

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The notions of construction and representation underwent a considerable change during the last decade. Scholars in human geography (see Thrift 2008 or Whatmore 2002) - inspired by research done in so-called STS-studies and other areas of research - outlined considerable criticism concerning the concepts of representation and construction, and pledged for a more situated and contextualised mode of investigating the complexities of scientific and everyday life in terms of an ecology of knowledge. Phrases such as ecologies of knowledge (Star 1995), relational understanding (Thrift 1999) or non-representational theories (Thrift 2008) emerged which criticise static textual models of the world as over-emphasising cognitive, contemplative and representational aspects. Concentrating on different encounters in a dynamic and lived-in world, ecologies of scientific knowledge and non-representational theories try to understand systemic properties of science through analogy with an ecosystem in order to reveal the linked interdependencies between science and its complex socio-natural environment. This paper draws on the 'purified' constructions of the Metabolic Syndrome (MBS) in scientific texts and contrasts them with 'unpurified' data taken from interviews with scientists in the MBS-arena. In doing so, it tries to avoid to separate the MBS in discrete dysfunctional parts and pledges for its messiness which calls for exploring new ways of acting with medicine in the area of cardiovascular prevention.

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The Population as a Laboratory: the Management of Complexity in Cardiovascular Epidemiology

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Probabilistic risk estimates are frequently consulted and relied upon in preventive medicine and in public health interventions. This part of the session will focus on the making of risk assessments in epidemiology. In particular, this paper looks at how population studies deal with uncertainty and complexity - before their results, i.e. the risk estimates, travel to other contexts, where they result in specific enactments of cardiovascular risk.

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In epidemiology, cardiovascular disease is studied as an outcome variable dependent on a host of other factors that are conceptualised as probabilistic determinants; the latter can include lifestyle, genetics, or socio-economy, just to name a few. In conceptual frameworks, these variables are conceived as 'webs of causation' and dealt with through multivariate statistics. This paper will present empirical material related to an ongoing large-scale study in nutritional epidemiology and ask for the productivity of epidemiological techniques in making connections from molecular to socio-economic variables at a population level. In epidemiological studies, the association between a matrix of risk factors and the disease outcome are investigated by interrogating the empirical data with statistical hypotheses testing. The particular assemblage of data and variables, such as lifestyle, nutrition, genetic polymorphisms and a host of demographic categories, involves an elaborate infrastructure of data collecting logistics, standardised information processing and professional networks. Focusing on the management of uncertainty shows how the knowledge infrastructures need to be constantly worked upon and stabilised. While much of epidemiology operates at the level of population health, assessments are increasingly aimed at providing subgroups-specific risks estimates, if not 'personalised' recommendations based on individual profiles. These group-specific probabilistic risk estimates travel to the clinic, to public health and much beyond; they co-shape our understandings of health and disease.

Prevention on its Travel: What Happens Insight the Negotiation Process between Patients and Physicians in Primary Care?

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German health authorities offer a preventive health check to detect cardiovascular diseases in early stages for patients above the age of 35 in primary care since 1989. General practitioners (GP) offer what is called the "checkup 35": a blood screening (blood sugar, cholesterol), a clinical examination and a talk about individual risk profiles, as part of this programme. This usually includes a social and familial anamnestic component, a discussion of the laboratory parameters and a section on lifestyle, exercise and nutrition. Twelve GPs were asked to audiotape these talks, which one might refer to as counselling sessions, with overweight patients, i.e. above a BMI of 25 as estimated by a nurse in the practice. All in all, 67 sessions varying in length between five and twenty-five minutes were recorded. In addition, fifteen interviews with GPs were conducted focusing on their understanding of cardiovascular risk, the preventive check and their own communicative strategies with overweight people. The work was conducted as part of the research cluster: preventive self and the material analysed collectively from different disciplinary perspectives, including general practice medicine, linguistics, social anthropology and social history. The results are discussed with respect to the importance of experiential, long-term knowledge in an increasingly evidence-based medical discourse, the role of social practice in negotiating interventions, the biographical context of statements about cardiovascular disease and GPs' assumptions about (self)discipline. The results are also contextualised with respect to "acting with" as a mode of collaborative research between medicine and social sciences. Here, disciplinary knowledge practices play as much a role as do institutional structures and requirements.

2.1.6: Cardiovascular Prevention on its Travels - from the Laboratory to the Kindergarten
       and back. Please put STS in the Overhead Locker or Under the Seat in Front of You!

A Thick Description of Fat
- Doing Cardiovascular Prevention between Lab and Kindergarten

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The alleged obesity epidemic has made cardiovascular prevention a priority in research, medical practice, business and politics across the Western World. A concerted effort is being made at all levels of society, including in many cases those of more voluptuous proportions, to reduce the amount of central body fat in people and populations. Alas, the spirit is willing but the flesh is weak - and resists its own deflation with an incredible pig-headedness. This paper reports on an ongoing ethnographic and interview study investigating how fat is positioned in a range of different practices, including clinical and general practice, health insurance and prevention programmes in Berlin, Germany. It argues that excess fat in humans may be obvious to the naked eye. Yet as part of different material-semiotic practices, it loses its clear contours to (re)appear as stigma, compensation, cost, risk, flabbiness, BMI, unemployment or dress size. Fat multiple, then, asks different questions about aetiology and intervention that do not readily fit into a (bio)medical paradigm. Acting with medicine and technology in a research mode thus becomes anything but straightforward.

Prevention of Obesity in Children: a Symmetrical Approach to the Everyday Life of People and Bodies in a Healthy Kindergarten

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Kindergartens have always been sites where all kinds of knowledge practices related to the 'future' of children have come together. The current international focus on overweight, obesity and cardiovascular risk has also reached the kindergarten. Thus increasingly, knowledge practices from medicine, public health and health psychology are entering the playground. Taking the question (a) "How are cardiovascular and social-scientific concepts translated and applied in the everyday life of children and how do they affect the lives of these children and the lives of their significant others?" as one's point of departure, one is easily led to a second question, (b): "What happens to Science & Technology Studies and Childhood Studies when STS enter the wonderland of the everyday life of people, bodies, organisms and societies outside of laboratory settings?" My theoretical argumentation on this question will draw on data from an ongoing ethnographic research into children obesity prevention practices. My research material includes field notes from eating and obesity prevention practices in a 'healthy kindergarten' and other settings of children's everyday life. It also includes data coming out of quasi-experimental settings where children express their representations and imaginations about eating and physical appearance. My research material provides the basis on which to bring together STS, Childhood Studies and Developmental Psychology, as well as to reflect on the possibility of a non-representational, symmetrical and relational approach to child obesity and its prevention.

2.1.7: Technology and the State

Technology Modernity and Historiography - Notes on Greece

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The general scope of this paper is to discuss the use of the STS notions to historiographical problems, on the basis of recent research conduced in Greece for the period early 19th century till 1940.Technology modernity and nationalism (the later being of the most importance in our case) are all linked in the scholarship but the explicit references to technology are very limited. The main problem we want to address is the combination of the micro character of STS to the macro character of history. It has been claimed that micro studies tend to emphasize the contingent character of the technology while macro studies show determinist tendencies. Our position is that concrete studies such as infrastructure systems, engineers formation, prison buildings, ideological appropriation of technology by central public figures and armaments procurements on which we base this presentation and all of them use the classic STS schemes can avoid both determinism, since they come to their conclusions through a study of the very actors involved, without presumptions on them, and also relativism since they provide historical narratives.

The inherently reflective-provocative character of STS helps to consider issues that are not addressed in standard historiography and thus we found most fruitful the companion of general historical works on Greece which avoid explicit categorizations. Development studies in general are not helpful, since Greece belongs to the global North but its social practices have a lot in common with the global South. We must also mention that the classical schemes STS which were inspired in western societies mostly civic, in state dominated environments must face the power relations of technology in an altered form.

The primordial category of technology in our case is mostly an imported agent.Its appropriation by the local elites has a black box character, which sometimes creates tense relation with lay people. Its also a common result in the studies that the elites were well informed on the latest technology available and made several technological attempts. However a certain type social selection functions in the macro level, so that in the end only certain forms of technology flourish. Situational analysis, where the context is not given but is part of the empirical study, could provide a promising methodology to examine the "non participating" relevant factors. The results obtained in our studies show that in most cases technological issues evade political and social barriers and that the weberian type of rationality of the technology in the West is "smoothed".

Innovations as Reality: Role of State and Business in the Russia Innovative Transformation

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With low level of innovation activity when it's share in industrial production sphere and in services is less than 10% role of state regulation in innovative transformation of the national

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economy grows. The state adjusted activity of two systems (science and national innovation system) may provide technological modernization and competitiveness growth based on advanced technologies, as well as on transformation of scientific potential into one of the main resources of the national economy innovative transformation.

The basic document which outlines aims, problems and directions of the Government activity is the Strategy of science and innovations development of the Russian Federation to 2015 (was adopted in 2006). Two main principles of this Strategy are the following ones: (1) concentration of the federal budget resources for research and development financing, (2) extension of public-private partnerships.

The suitable priorities form the basis for the Strategy implementation . For science and technologies these are the priority directions of science, technologies and techniques, and for innovation sphere these are priorities formed by the state in interaction with business in the sphere of researches and developments of the results of commercialization.

The instrument of the Strategy realization is the Federal Task Program "Researches and developments by the priority directions of the Russian scientific-technological complex development during 2007-2012". It's main functional blocks are the following ones: (1) Knowledge generation, (2) Development of technologies, (3) Commercialization of technologies.

In the field of state regulation it is necessary in perspective to work out differentiated forms of the economical subjects stimulation in dependence on their results of activities significance for society; to form the "portfolio" of complex projects; to stimulate development of cooperation forms between research organizations and organizations of real sector of economy etc. Important condition for innovation transformation of Russia is stimulation of partnership relations between science, state and business.

The structure of the presentation is the following one:

1. Innovative processes in industry;
2. Innovation activity mechanisms;
3. Mechanisms of the state scientific-technological and innovation policy realization;
4. Public-private partnership as an element of scientific-technological and innovation policy;
5. Basic approaches to evaluation the state innovation policy efficiency.

This research is based on analysis of the Russian Government measures on realization of scientific-technical and innovation policy, as well as initiatives of government and business on development of public-private partnership forms.

This report presents basic approaches and methods of scientific-technical and innovation activities state adjustment, including development of public-private partnership mechanisms. The provisions presented in this presentation may be of interest for researchers studying the state scientific-technical policy carried out in the developing countries.

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Governance-Building Beyond the State: Technoscience, Social Science and Neoliberalism

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In recent years, STS scholars have focused attention on the reciprocal relationships between technoscientific innovation and state-building, pointing to how each enables the expansion of the other. At the same time, social and political theorists have explored how nation-states interact with supra- and sub-national mechanisms of governance in the context of neoliberalism. Extending these two lines of inquiry, this paper investigates the role of technoscience in organizing new relationships between state institutions and governance beyond the state. In so doing, it argues that political sociologists and STS scholars must reconceive social science as a form of technoscience, and, as such, a powerful node in contemporary "post-welfare" neoliberal governance.

The paper explores this formulation of social science as technoscience through a case study of the Homeless Management Information System (HMIS) program, a collaborative project of the U.S. federal government, a research university, and a private technology consulting firm. The program is a response to a mandate that nonprofit homeless service agencies funded by the federal government collect standard data about the clients their agencies serve. In conjunction with private software vendors, social scientists involved with the HMIS program have developed a database management system that allows for unique and customizable computer platforms to collect commensurate data that can be aggregated at the national level.

Based on interviews with key informants involved in the HMIS program (including government officials, program managers, service providers, and agency clients) as well as analysis of primary documents (including Congressional reports, federal policy guidelines, and publications in professional journals), the paper argues that the HMIS program is noteworthy for several reasons: (1) More than simply amass data, it enacts a quantification or informationalization of homelessness that establishes "the population" as an object of knowledge and governance; (2) Within a neoliberal rhetoric of devolution and privatization, it concentrates federal authority across a wide spectrum of sub-national and nonprofit entities engaged in homeless management; and (3) It uses the state to extend governance beyond the state, allowing a networked form of governance that travels across the information networks of database systems. Thus, the paper argues that the HMIS program points to how the logic, methods and technologies of social scientific research functions as a governance-building form of technoscience. As such, social science allows for homelessness to be known and managed while facilitating a concentration and dispersion of governmental authority.

The paper therefore aims to contribute to STS efforts to theorize relationships between technoscience and governance. By focusing on social science as technoscience, it also aims to contribute to a critical, self-reflexive mode in STS that approaches social science as not only a method, but also an object of STS inquiry.

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Shifting from Data Base to Knowledge Base:
a Proposal to Enhance Science Studies and Science Development

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In order to identify developmental patterns in scientific disciplines, a systemic science of science research approach was conducted. It was carried out under the evolutionary paradigm. Psychology in Mexico was taken as the research subject. A concurrent triangulation method design was achieved, which included a quantitative methodology (scientometrics), and two qualitative ones (historiography and semi structured interview). 1130 indexed abstracts, authored by Mexican psychologists were analyzed. Nineteen prominent Mexican psychologists were interviewed. Results were searched and analyzed according to epistemological, economical, political, sociological and psychological dimensions, and were taken as an antecedent for designing an action proposal. A data base was constructed out of the indexed abstracts. It showed reliability to inform about productivity, impact, main research centers, main research teams, several kinds of collaborations, theoretical tendencies, some gender differences, types of: article, research, stage, instruments, methodologies, among others; as well as interrelation among variables which showed several kinds of patterns along the 55 years span under analysis Triangulation showed the need and pertinence not only of widening categories included in data base, but mainly the need and pertinence of shifting from data base to knowledge base, as a way to provide a scientific discipline with an instrumental capital to better self knowing and managing, aiming to propitiate: the reflexive acting of creating knowledge about knowledge, the application of scientific method to understanding of science behavior, and to induce science to develop aware of itself as a human enterprise. Knowledge base shall provide with necessary information to enhance decision towards new knowledge creation, thus, promoting collaboration and optimal use of academic infrastructure. Such knowledge base shall be useful not only to researchers, but to official sponsors in charge of deciding about scientific policies.

2.1.8: The Coordination of Expectations in Innovation Systems

The Cultural Construction of Transition:
Dutch Nuclear Development as a Socio-Technical Drama

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Socio-technical transitions are change processes in which modes of realizing some societal function through technological means (e.g. energy supply) are supplanted by new modes. Such transitions have been predominantly researched from a (quasi-evolutionary) perspective of technology, but I will study their cultural dynamics. Transitions can then be seen as outcomes of cultural action in which a technology's proponents and opponents struggle to bestow their perceived meanings of an innovation upon audiences of scientists, policymakers and/or the general public. To investigate these dynamics I will adopt a dramaturgical perspective. While methodological similarities exist with discourse analysis, the dramaturgical perspective suggests that the performance of a discourse can be as constitutive as its content. I argue that a dramaturgical perspective is more useful for the cultural examination of long-term processes such as transitions, which I consequently analyze as socio-technical dramas: sequences of contentious, multi-cast, multi-audience performances which play out on various stages (such as media, political debates and public inquiries) on which proponents and opponents perform their discourses before various audiences.

The development of nuclear power in the Netherlands from WWII to the present is used as a case study. Firstly, through quantitative analysis of all articles about nuclear power published in this timeframe in selected digitized newspapers, crucial periods or 'performances' are discerned. This constitutes a methodological innovation in the field of STS. Secondly, based on an analysis of this sequence of crucial performances and the stages on which they took place, the plot of a multi-act sociotechnical drama is reconstructed. This will shed light on the cultural dimension of this failed socio-technical transition. Sources used are interviews with key actors, articles from newspapers and popular magazines, brochures published by the anti-nuclear movement, educational material published by the pro-nuclear lobby, policy documents and transcripts of parliamentary debates. The dramaturgical perspective has previously been applied within STS as a tool to study the construction of (as well as resistance to) political power, resulting in a view of the 'technological drama' as a model of power circulation in technological settings. This paper expands the application of this perspective to the cultural dimension of transitions. Secondly, this paper will contribute to an ongoing interdisciplinary debate on transitions, especially regarding aspects such as culture, framing, discourse, performance and social movements.

The Role of Expectations in the
Protection of Socio-Technical Niches

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This paper explores the role of protection in niche development trajectories. Case studies of Dutch and Swedish biofuel development in the transport sector is analyzed by means of the

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Strategic Niche Management (SNM) perspective extended with insights from discourse analysis and political science. Our contribution is the definition of three protection types, which co-evolve with socio-technical dynamics along certain patterns. Expectations appear to be crucial as protective measures in early niche development, when product champions use them strategically for promoting the innovation in the policy domain and for finding suitable geographical locations for experimentation, while in later stages more durable mechanisms like laws and organizational routines play a role.

In the transport sector, attempts to introduce alternatives to fossil fuels have been on political agendas since the 1970s, but results are generally poor. The SNM explanations to such failures are several, including poor articulation of expectations, a lack of user and outsider involvement, and limited learning, focusing only on techno-economic optimization while neglecting other social and systemic dimensions. A general SNM policy advice is to give temporary financial incentives, such as subsidies, R&D funds, tax exemptions, to create protected spaces (niches) that shield radical technologies from harsh selection pressures and facilitate expectations, networks and learning furthering technology development.

While SNM defines one type of protection, we hypothesize that three types of protection are relevant for understanding transitions. These types are not external as predicted by SNM, but co-evolve with socio-technical niche dynamics. The first protection type is financial protection as explained above. The second is socio-cognitive, mainly referring to the expectations about the technology. The third is geographical, referring to the protective aspect of local resources like know-how and raw materials. Eventually these types may evolve into rules, normative, cognitive or regulative, providing a more durable and stable form of protection.

Qualitative case studies, covering the last two decades of biofuel pilot- and R&D projects in the Dutch and Swedish transport sector, show that all three types of protection play a role in successful alternative technology development. Moreover, protection co-evolves with niche development along certain patterns, e.g. expectations are crucial in an early stage of niche development, while financial means and local resources become more important in a later stage. Finally, we find that protection is neither temporary nor does it serve alternative technologies alone. Protection is continuous, maintained throughout successful development and implementation of technologies in society.

Acting with Expectations - Foresighting Transitions?

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Foresight can be viewed as the communication of expectations in a network of diverse actors. As innovation policy instrument Foresight aims at increasing the quality of linkages within innovation arenas and the ability to learn and respond to change with a long term perspective.

In addition, deploying the notion of "expectation management" some Foresights adopt a more normative orientation striving to orient actors towards certain policy goals such as

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sustainability ("soft co-ordination").

However, while the notion of Foresight as facilitator of innovation capability is underpinned by theoretical concepts from innovation studies, the ability of steering towards desirable directions remains rather debated, even though many recent "expectation studies" clearly point to a performative role of expectations and visions on innovation trajectories on various levels.

We suggest that "acting with expectations" could well be underpinned by STS insights on the role of expectations as interface between the levels of the selection environment within a multi-level framework of socio-technical co-evolution.

The three main conclusions investigated are differentiation, symmetry and reflexivity of visions.

Differentiation points to the need to diversify the notion of expectation management. STS scholars have proposed different expectation types, impacting on innovation journeys in specific ways. These insights can be used to tailor Foresight visioning elements to specific objectives in different phases of the process ranging from loosely connecting narratives without "predictive content" up to carefully built multi-facetted plausible future images aiming to guide policy decision making within given boundaries.

Secondly, for any kind of collective envisioning we stress symmetry with respect to various realms of the multi-level innovation framework in order to avoid linear or techno-deterministic visions and reflexivity i.e. recognition and deconstruction of all actors' (including Foresight managers') own scripts.

We conclude that while STS clearly confirms that "working with expectations" can be a powerful inroad for managing transitions and gives valuable hints on how it may work out, it also strongly points to the complexity such an endeavour. We propose that, if these STS insights are truly integrated into Foresight practice the resulting "reflexive" management of expectations may bridge between Foresight and more interventionist policy instruments like transition or strategic-niche management without giving up the Foresight specific emphasis on long-term perspectives and multiple futures. Foresight, so it is argued, may come in useful to prepare the ground for strategic niche management to identify potential niches or else within transition management to explore boundaries of "future" transition fields.

The Knowledge-Based Economy and the Triple Helix Model: the Construction and Reproduction of Technological Trajectories and Regimes

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In addition to the neo-institutional model of university-industry-government relations, the Triple Helix can be generalized to a neo-evolutionary model of how three selection mechanisms operate upon one another. This Triple Helix model can serve as an explanans of the knowledge-based economy as explanandum. For example, a co-evolution between

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two selection environments may lead to the stabilization of a trajectory in a process of mutual shaping. When three selection environments operate upon one another, a complex dynamics is shaped which includes hyper-stabilization (e.g., lock-ins), meta-stabilizations, and globalization.

A knowledge-based economy can be considered as an emerging regime at the global level based on these three selection mechanisms: (1) economic wealth creation using the dynamics of the market, (2) knowledge-based innovation dynamics upsetting equilibrium, and (3) organizational control mechanisms both in the public and the private sphere. The selection mechanisms operate as decisions among options with functionally different criteria. For example, prices are based on economic expectations, while price/performance relations take additionally the technological expectation into account. While the institutional version of the Triple Helix model focused on networks of relations, the evolutionary version analyzes how different control mechanisms are recombined and again differentiated by decision-making at interfaces.

Innovation systems (national, sectoral, regional) can be expected to vary in terms of these differentiations among expectations and institutional integration. The "Mode 2" thesis emphasized the (trans-disciplinary) integration in knowledge production and control systems; structural analysis using social network analysis can inform us about the historical constraints in the data at specific moments of time. From a dynamic perspective, however, the crucial question is whether the complex system under study is able to construct advantages by reducing uncertainty endogenously.

Reduction of uncertainty can be measured using entropy statistics. When a Triple Helix dynamics reduces uncertainty increasingly, trajectories can be expected to (co-)evolve into a regime. In the presentation, I shall illustrate these theoretical considerations with results of empirical studies about national and regional innovation systems. The conditions under which synergy can be expected to emerge at the global and/or local levels will further be specified.

Expectations in the Dynamics of Innovation Systems:
the Case of Mobile Fuel Cell Technology

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In recent years, a growing number of studies has been dealing with the role of expectations in shaping scientific and technological change. These studies are primarily located in social studies of science (STS), but also a wider range of other disciplines (e.g. history, economics and innovation studies) has been dealing with related issues. The emergence and shaping of new technological options and artifacts is regarded to be strongly influenced by future views, negotiations and interpretations regarding the societal and economic potential of possible technological outputs and impacts. Analyzing "expectations" (and related terms like "visions" and "scenarios") is therefore a key element in the process of understanding - and also influencing - scientific and technological change, and of the transformation of innovation systems in particular.

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Expectations are important for different actor groups within the innovation system and for public discourses on innovations. They can (pre-)structure innovation processes by helping to mobilize resources, by inducing policy processes, by shaping new or adjust existing institutions, and by enroling and aligning actors to engage actively in innovation processes and thus to influence the direction of search.

Conceptually, expectations can be linked to innovation system dynamics by referring to their impact on functions of innovation systems. They can support or hinder the development of particular technological options through positive or negative impact on the different functions that have to be fulfilled within innovation systems

The interactions of functions, expectations and the dynamics created can be captured in terms of "cycles", the dynamics of which could accelerate, or slow down or even stop technology development. In spite of the progress made recently in conceptual terms, few empirical studies are available so far to substantiate the interplay between innovation system functions and expectations for generating innovation dynamics.

Our paper aims to contribute to this ongoing debate by deepening our understanding of the interactions of expectations and the dynamics of the innovation system and its functions in the case of mobile fuel cell technology. This seems to be a promising case to examine: although innovative activities are in general characterized by risk and uncertainty, actors involved in mobile fuel cell technology are exposed to a particularly high degree of uncertainty regarding the future.

The functional innovation system approach will be further elaborated with respect to the role of expectations and their impact on innovation system dynamics. Furthermore, the use and definition of the term "expectation" is still ambiguous, which will lead us to the need for a more systematic way of defining this concept, taking the different dimensions and the range of expectations into account, e.g. expectations regarding a future market share in contrast to expectations regarding a technological vision of a future energy system. Finally, empirical findings from the case of mobile fuel cell technology, mainly in the German speaking environment, will be used to describe how expectation dynamics influenced the innovation system in practice.

Hopes, Hypes and Disappointments in the Stationary Fuel Cell Innovation System - How Different Actor Groups Respond to Collective Expectations

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Collective expectations, that is, expectations being part of a social repertoire shared or taken into account by a group of actors, play a significant role in all processes within an innovation system such as research, technology design, development of business models, financing, application and supporting policies. They motivate, legitimate and coordinate activities and they serve as a medium for contesting what might be more or less desirable directions to follow. These expectations are often subject to emergent social dynamics such as hypes and disappointment phases. Studies within STS have so far concentrated largely on expectation

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dynamics with regard to research and technology development, while other processes and the related actor groups have received less attention.

In our presentation we will analyze the collective expectation dynamics and the strategic responses of various actors to these expectation dynamics. Furthermore, we want to assess the implications for the structure and dynamics of the innovation system. The innovation systems approach will help us to identify the actor groups involved in fuel cell innovation and their specific roles in this process. Then, we will analyze to what extent expectations and expectation dynamics differ between actor groups and we investigate to what extent strategic responses differ based on either common or actor-group specific expectations and expectation dynamics. Diverging strategic responses depend on various factors. They are related to the specific role of an actor within the innovation system and the specific interests an actor holds with respect to the innovation, and they also depend on the specific conditions of an actor such as the breadth of the technology portfolio (resulting in divergent degrees of freedom to follow collective expectation dynamics), available resources and financing structure. Strategic responses will in return contribute to the dynamics of the innovation system, e.g. if actors 'join' or 'leave' the system, modify their role within the system or if institutions are set up or modified. Methodologically, we rely on discourse analysis of various types of sources (daily press, professional journals, financial press, policy documents) as well as on interviews with actors involved in fuel cell innovation.

2.1.9: Markets for Public Goods, I

The Social Marketing of Public Goods and Modern Subjects

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This paper will investigate the debate over the marketing of tangible vs. intangible public goods in past and current social marketing practices, especially in the arena of public health. From the very beginnings of social marketing in the 1960s debate has been cast in terms of which approach is best suited for transforming populations into modern, calculating subjects operating freely in a world ideally defined by market-based rationalities. Based on interviews and archival research, the paper focuses on marketing campaigns that have attempted to introduce family planning practices in industrializing countries, in particular condom use, in collaboration with the US Agency for International Development and local and national governments. As a modernizing project, by the 1990s social marketing became the media-based technology of choice for promoting international development and translating governmental and NGO agendas into community practices in a neoliberal policy environment that favored individualizing market-based solutions to governing populations (Barry et al. 1996, Dean 1999, Rose 1999, Reid 2005).

Since its inception social marketing has been rent by debates concerning the comparative advantages of marketing intangible vs. tangible goods, especially normative public goods, as reflected in US marketer N.D. Wiebe's early query, "Why can't you sell brotherhood and rational thinking like you sell soap?" (Wiebe 1952). It would seem that the debate has faded, ever since social marketing gained ascendancy in the 1990s in public health and other public and non-profit organizations and the selling of intangible behavioral and lifestyle changes to targeted groups dominated public health campaigns. Yet within social marketing today a tension still persists between those who do not doubt the practicality of selling intangible goods (changes in norms and behavior) and those, smaller in number, who do.

My focus is will be on the second group, represented by Philip Harvey, founder of one of the earliest leading US social marketing firms Population Services International and now president of DKT International in Washington, D.C. His school of social marketing insists on the necessity, first, of offering to the public a tangible product, in this case, condoms; and, second, of not giving condoms away but rather selling them (even at below cost) in order to induce a market/consumer relation with and within targeted populations that is both ethical and calculating in nature. These new social subjects in realizing their private goals would enhance public welfare. The recourse to a market-based relation would have the advantage of being more efficient (optimizing distribution of condoms throughout all sectors of society through the creation of a market), enforcing proper consumer behavior (the condoms won't be thrown away or misused [say to repair punctured bicycle tires]), and, finally, rendering possible a precise form of public health market calculation and evaluation (number of condoms sold).

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Transnational Networks, National Markets, and Techno-Scientific Innovation: Magnetic Resonance Imaging Development and Deployment in the United Kingdom, United States, and India

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The celebration of Magnetic Resonance Imaging (MRI) as a cutting-edge medical imaging technology during the second half of 1980s and thereafter, very often hides its difficult and prolonged birth. Even though the possibility of imaging using nuclear magnetic resonance was first proposed in the early 1970s, the history of MRI development from this point to its acceptance as a certified clinical tool by Federal Drug Agency in 1984, was not a straightforward translation of an idea into a machine. In several ways the development of MRI as a clinical tool during the 1970s was a distant dream. In fact, MRI was not even called as such until the mid-1980s. It got its name to drive home its advantage in relation to CT scanners, which were already accepted clinical tools by then. As late as December 1981, General Electric, which is the market leader in the manufacture of MRI at present, did not even think that a clinically useful MRI was possible. In this paper, I analyze the intertwined networks of development and clinical deployment of MRI in the UK, the US, and India. In none of these countries there was a ready-made market for MRI. In the US, for example, which was by far the largest healthcare market at that time, there were significant cost and safety concerns with regard to MRI. Development and deployment of MRI occurred at the intersection of epistemic/technical, business, juridical, and healthcare concerns. In this paper, I show how the "market" for MRI was (and continues to be) created through and within transnational and national networks and how the creation and stabilization of the MRI market affected the topography of techno-scientific innovations and research.

Resistant Bacteria, Reflexive Markets and Public Goods

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Can market reforms make bacteria more resistant to antibiotics? According to recent reports in Swedish media, a longstanding practice of restrained prescription of antibiotics can been changed through the introduction of market reforms. As a case in point, attention is drawn to a recent reform in one county council where patients have been told to act as consumers and choose their primary care physician in a market-like manner. The introduction of this reform, it is claimed, has made physicians more prone to please their new clients, which has led to an increase in the prescription of antibiotics.

The connection which is forged between a market reform and bacteria resistance is interesting, given that the expressed intentions of the aforementioned market reform is to realize values such as increased accessibility and more cost-efficient primary care. Framing the market order in terms of increasing accessibility and cost-efficiency is easily done with the tools provided by economics, and such reforms are regularly informed by such tools. Yet, the alleged link between market reform and resistant bacteria is clearly external to such a

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frame. It is an overflow realized by entities and representational practices that are not part of the (newly) established market frame.

The topic of this paper is precisely the tension between the stabilization of a market through particular frames and the de-stabilizing overflows caused by entities and representational practices that are not aligned with these stabilized frames. Whereas the former provides a working space for calculative agencies and makes market exchanges possible, the latter gives impulses for the changing of frames, for development.

Our working assumption is that such overflowing reflexivity - much like other market capacities such as calculability - is an achievement. Using examples from previous empirical research undertaken by the authors and others, we argue that a highly developed reflexive capacity is a marked characteristic of markets for "public goods". It is the constant production of overflows, rather than the stabilization of a particular market frame that characterizes such markets. Realizing a reflexive capacity, we further suggest, is aided by drawing on a multitude of tools and representational practices. The paper concludes by discussing how the notion of a reflexive capacity of markets might inform our understanding of different markets, and how the idea of market's reflexive capacity might expand our understanding on how theories from economics and other disciplines might participate in shaping markets and their actors.

Competing Markets for Medical Devices; Challenging Constructions of the Private/Public Divide

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With the construction of neoliberal policy arrangements throughout the governance of Western healthcare systems, policy makers seem to be increasingly convinced of the potential for aligning issues like access and quality improvement, with the aim of efficiency gains in healthcare. The critical responses to such policy practices have focussed mainly on claims about healthcare not being a market and therefore requiring a different mode of governance. This turns discussions on markets for public goods into stale debates between believers and non-believers. This debate can be empirically opened up by analyzing how markets for public goods are performed and what such alignments of market practices and public issues in practice entails. For such an analysis, the work on the performativity of economics by STS scholars like Michel Callon is relevant. Such researchers have argued that markets are being performed through the activities of (health) economists and through the construction of 'market devices' such as economic formulas, auction clocks or QALY's. As market laws are not 'uncovered' but performed by economists, market devices and policy makers, the question how they are constructed, what the consequences of such construction are, and how public issues and market mechanisms can be entangled, can be put centre stage.

In order to explore the entanglement of markets and public issues, we will focus on the construction of markets for emerging medical devices. We will show that around the introduction of such devices, different - often competing - markets are emerging. This construction of competing markets is not merely relevant for unpacking the normativity that

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gets built into the laws of the markets, it also offers a new potential for analyzing the multiple ways of constructing 'public/private' divides. Such divides are not given but are constantly refigured through the issues at stake and through the ways market devices and other modes of governance articulate them. The study of competing markets for public goods therefore further strengthens a real-time understanding of what 'public issues' are and how they may be addressed in market modes.

Such an analysis proposes refreshing acting space for the construction of markets for medical technologies. An empirical analysis of the performativity of such markets indicates that they can be seen as normative arenas in which 'public goods' are articulated and divisions between public and private issues are challenged. Thereby the study of markets as governance arrangements for addressing public goods affords in our view productive possibilities for entangling market devices, medical devices and public issues.

Orphan Drugs, Biopharmaceutical Markets and Health Care Rationing

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This paper uses the example of orphan drugs to consider the creation of a market aimed at the development of treatments or cures intended for persons affected by rare disorders. The paper will consider how a market for orphan drugs was created in the early 1980s through a combination of patient activism, congressional hearings in the United States, legislation, and a range of market incentives which were designed to encourage pharmaceutical and biotechnology companies to develop treatments for rare diseases. The paper will then move on to consider some of the qualities of orphan drug markets. Attention will focus upon how orphan drug legislation and regulatory agencies have played a key role in shaping the contours of this market. In studying the qualities of orphan drug markets, the business and marketing strategies of biopharmaceutical companies will be considered. In the context of orphan drugs, one of the unique features of this market is the high costs associated with many treatments for rare diseases. The paper will conclude by examining how the qualities of orphan drug markets are being shaped contemporaneously through practices of health care rationing and pharmacoeconomic assessment. Health care rationing poses some interesting questions with regard to the creation of markets for public goods such as rare disease treatments. This is especially the case since national health care systems from the 1990s onwards have been concerned with reducing costs. Orphan drugs raise the question of how to reconcile providing expensive treatments for a small number of patients whilst still trying to meet the general healthcare needs of the population.

2.1.10: Co-Production of Knowledge, Actors and Social Problems

Acting with Old Warplanes as a Reflexive Performance of Agency

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The experience of performing skilled work on a machine carries significant cultural meaning for Americans. Building on ethnographic research with heritage groups who rebuild and fly World War II warplanes (called warbirds), I argue that this cultural practice of agency-with-machines is not only pleasurable for its participants, but also reflexively meaningful. I explore how this agency is performed, attending to both the humans and the nonhumans. The pleasure derives in part from the experience of play, or "flow," the time-out-of-time when one is immersed completely in the doing of the moment, and it connects to what Florman called the "existential pleasure" of technological work. The meaning, in turn, derives not only from this pleasure, but also from cultural conceptions of identity - the American sense that you are what you do. Here the laboring, reflexively understood as "really doing something," connects with American understandings of personhood. For these mechanics and pilots, driving rivets, replacing cylinders, shaping skins, and flying relics are not only deeply fulfilling activities, but also activities they no longer perform in daily life. Where they used to perform a variety of maintenance tasks on their car, for example, they say they no longer can do that kind of work. Thus, we can think about the agency performed here as a kind of intra-agency between the humans and nonhumans in that the warbird aircraft afford the chance to do this hands-on labor. It is the materialized doing of this work that makes possible the culturally-constituted experience of pleasure and fulfillment that warbird mechanics and pilots espouse. While gender identity clearly plays a central role in this activity, I set that specific issue aside for the moment, along with the planes' synecdochic link to the "Good War" and its associated cultural politics, so that I might focus specifically on agency-with-machines. While most interactions with machines involve agency, in the sense of acting with intention, we see here that agency can also be meaningful as a reflexive, cultural objectification of the experience of that intentional action. Further, we see that such action has to be understood through not only the cultural conceptions of technological practice (i.e., that skilled work on a machine is constitutive of personhood), but also the materialized interaction of human and nonhuman (making it agency with machines rather than agency through machines).

Evolutionary Psychology and the Normalization of Behavior. About the Validity of Michel Foucalt's Ideas.

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In important parts of his work, Michel Foucalt shows how Psychiatry, since its origins in the 19th Century, establshed a close relation with Jurisprudence. Such relation has been oriented to establish what could be naturally considered as "normal" and "abnormal" human behaviors in order to carry out a scientific process of vigilance on the entire society and eventually a punishment over individuals that develop behaviors not in line of the hegemonic norm.

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Hence, the rising of the sciences of the mind, can be understood as playing a social role in the naturalization of human behavior in order to regulate them inside the capitalist power relations.

Two centuries later it is possible to show that disciplines like Evolutionary Psychology serves itself from the knowledge generated by Darwinist theory of evolution and of molecular biology in order to try to determine which of the human behaviors can be acccepted as "normal", according to the fullfillment with reproductive interest, which is conceived as the supreme interest of every living being. According to Evolutionary Psychology, behaviors that tend to increase individual and populational fitness, are normal ones, while behaviors that move away from this objective, can be qualified as "disfunctions" or maladaptations. According to a Darwinian approach, they are behaviors that would be eliminated by means of natural selection.

Evolutionry Psychology, very subtly, fullfills a similar function as that of Psychiatry. Covered with the veil of "objectivity" nad "neutrality", supposedly characterisitics of science. Is able to define the features with which nature has provided human beings in order to make them to function according to the needs that the same nature is imposing to them. The relation of Evolutionary Psychology with with jurisprudence is much more indirect that in the case of the Psychiatry of 19th century, mentioned by Foucalt. Nevertheless, it is possible to assert that Evolutionary Psychology plays an important social role in the construction of an hegemony in which human beings must increase their functional and effcientist role in detriment of their capacity of enjoyment. In this way, the "norm" of behavior becomes a naturalized form of autoritharianism that obstacle the functioning of human individual developing in conditions of true freedom.

From the Panopticon to the Prisoner's Dilemma

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This paper explores game theory as a technology that agents use to guide their actions in markets and other environments with like-minded rational opponents. Although purported to be a "value neutral," and transcultural, theory of instrumental reason, I argue that this theory of action embodies a distinctive logic premised on domination. Unlike the means-end, rule-following, purposive agency described by Max Weber, this new logic of action structures a regime of power that locates stability not in faithfulness to the ideal of law-abiding efficiency, but in coercive sanctions ubiquitously leveraged to counter innate criminality. The social world cast in the mode of game theory and expected utility theory, quite in contrast to the negative virtue minimal state of both Adam Smith and Immanuel Kant, mandates a "maximal security state" whose role is to threaten coercive sanctions on all transactions to forestall cheating.

This paper argues that our concepts and practices of instrumental agency are culturally-bound, and that rational choice theory celebrates individuals' inclinations to dominate outcomes affecting other agents. As a decision technology, rational choice theory has come to structure human relationships and interactions, fulfilling the prophecy that Prisoner Dilemma scenarios run rampant throughout the entire fabric of society (Game Theory,

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Hargreaves Heap and Varoufakis, 2004). If we take seriously Michel Foucault's depiction of modernity as inseparable from panoptic technologies of control through normalizing forms of knowledge present in institutions ranging from prisons and the military to hospitals, schools, and factories, then we must entertain the idea that rational choice theory represents a new technology of control that treats deviance and asocial behavior not as a pathology but as the norm.

Method
My method combines genealogical study with critical theory. I will engage primary texts in late eighteenth to twentieth-century economic and political science. I will address contemporary approaches to the history of social science, specifically those of Philip Mirowski, Simon Schaffer, and Michel Callon. Inevitably, I will also respond to Michel Foucault and Daniel Bell.

Paper Outline
1. Statement of the problem: how governmentality based on a Prisoner's dilemma model of action is categorically distinct from panoptic habituation devices; strategic dominance is not equivalent to instrumental efficiency.
2. Review of the evidence that modern governance achieves normalization using hierarchical feedback consistent with the traditions of republicanism and liberalism.
3. Discussion of Cold War (and beyond) models of strategic dominance that locate the regime of power in ubiquitously levied sanctions; this new model of action attends a break from classic liberalism and republicanism which ultimately is evident in the US Supreme Court's rejection of both private property rights (Kelo v City of New London) and categorical citizenship rights in favor of loyalty tests (Rumsfeld v Hamdi).
4. Conclusion: The price of viewing instrumental rationality as monolithic and culturally transcendent blinds us to the possibility that there may be varying instantiations of political economy, and that post-modern governmentality may draw on fundamentally different sources of power and normativity.

2.1.11: People and Technologies Mediating Health Information, I

Electronic Patient Record (EPR) as Sociomaterial Practice in the Hospital

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The electronic patient record (EPR) has been introduced in most hospitals in Norway. This is challenging existing and well established practices in the hospitals. In this paper I am exploring the sociomaterial practices involving EPR in a large Norwegian hospital. I am interested in how materiality is constitutive of everyday life (Latour 2005; Olikowski 2007; Suchman 2007) and how the social and the material are constitutively entangled (Orlikowski 2007) in a way where it is not possible (or fruitful) to distinguish one from another.

Based on semistructured interviews with doctors, nurses, physiotherapists and office staff, I am looking into how the introduction of EPR is changing and reconstructing the sociomaterial practices in the hospital. Among the changes expressed by the informants, are more time spent in front of the screen and less time with the patient, and changes in the relations between, and work assignments of, doctors, nurses and office staff. These changes in practices can not be understood as implications of technology alone or as social alone, and - more importantly - they can not be separated into technological and social factors at all. These practices are sociomaterial and should be understood as such.

Method: Semi-structured interviews.

Contribution to the STS-literature: STS-researchers have been criticized for overemphasizing the importance of the social in the construction of reality and ignoring the materiality of technology. Several researchers in and outside of STS (for example Latour and ANT) has responded to this critique, and I hope to make a contribution in this respect.

Health Intermediaries?
Positioning the Public Library in e-Health Discourse.

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This paper explores how public libraries function as intermediaries with respect to health information seeking. Public libraries have long been important sites for health information access and support and their role in this regard is increasingly being stressed by national and local government policies. As public libraries are also important sites of free internet access, it is envisaged that they may be expected to play a larger role as intermediaries in the health information-seeking practices of members of their local communities. Much existing policy and literature on public libraries and health information seeking is framed, implicitly at least, within the 'e-health' discourse, which understands health information as empowering and the internet as a tool for accessing that information. In this discourse, public libraries are understood as key intermediaries of health information, offering both specialist services in information retrieval and free access to the internet for consumer-citizens who are

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active and responsible information seekers. Drawing on an empirical study of health information seeking in the public library and employing STS theories and approaches, this paper will argue that the public library's role as intermediary needs to understood as not merely connecting people who have information needs with the relevant information sources but as key actors in a process of 'translation' which is, itself, constitutive of health knowledge and understanding. Second, the paper will argue that the internet is not merely a tool that library staff and users can choose to use or not use but is part of the 'sociotechnical ensemble' mediating health information and shaping health understanding.

Webs of Understanding:
the Impact of Mediators upon Accounts of Health Risk

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Health information is rarely presented in a straightforward, unambiguous format. It is also highly context dependent i.e. co-produced in local contexts by individuals with a broad range of interests and becomes transformed as it is passed from one context to another. This paper argues that the health information produced during health screening provides fertile ground upon which to explore the impact of mediators upon diverse accounts of health risk and uncertainty. An exploration of the socio-technical practices embedded within screening suggests that they are not neutral technological processes; they are also social interactions that include gendered narratives (Joyce, 2005). Gender is implicated in both the narratives that take place in the clinic and the ways in which individuals reflect upon the imperative to participate in screening to reduce health uncertainties. Exploring these narratives will enable us to examine the role played by medical technologies in defining degrees and forms of risk and uncertainty that are embedded within and generated by the screening processes themselves. Despite popular understandings of the technological imaging that takes place during screening processes as revealing the previously hidden 'inner body', an alternative account locates such imaging within a set of socio-technical practices that themselves produce the body. With the aid of medical technologies, medicine appears to have moved deeper and deeper into body structures (Brown and Webster 2004). However, it is not only knowledge about bodies that is produced within this process but the body itself that is re-configured with and by technologies. The technological images produced in breast and bone clinics are not neutral images that reveal objective knowledge about the state of breasts and bones. Rather, they are highly mediated representations influenced by the location and specific circumstances in which they are produced.

Drawing upon data from a recent study of health technologies adopted by midlife women and their health practitioners, this paper argues that the narratives employed in the clinic emphasize the authoritative nature of medical images and mediated interpretation and discussion of such images by health practitioners suggest that they are the key to certainty and knowledge about health risks. We will examine the impact of different types of mediation upon understandings of the health information produced by mammography and bone densitometry screening. The data set includes interviews with health professionals, clinical consultations and interviews with women patients, enabling us to explore different accounts of mediated health information.

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Converting Individual Patient Experiences with Care Provision to Collective Input for Policy Change: Examining "Share Your Experience" Websites as Locations of Mediation

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In 2006, two highly-publicized policy reports in the Netherlands highlighted the importance of encouraging increased self-management of disease, implementing healthy lifestyle education programs, and supporting the evolution of patients in a new "managerial" role for care. Both this notion of patients-as-managers and the centrality of information successfully fulfilling this role, continues to influence health policies and practices. Current research approaches the patient's managerial role as an issue of individual information management, with practical projects addressing challenges related to integrating different types of information from on- and offline resources. Much of this research has neglected to consider the fact that, increasingly, individuals are also expected to produce information. They are given avenues for reporting both information about their personal health situations (such as the results of self-tests) and information about the provision of care (experience with physicians, perceived quality of facilities, waiting time, etc).

On the web, new spaces are being created where individuals can share information and learn from one another. Well-known examples include the US site, patientslikeme.com and the UK site, patientopinion.org. Both social/collective knowledge production and sharing opinions and specific experiences with a given health service are encouraged in these spaces. Creators of such spaces propose (rather unproblematically) that these experiences, when collated, can be used to facilitate change on different levels. In a field where increasing attention is given to evidence-based policy formation, such spaces provide unique opportunities for individuals to produce "evidence" in the form of experiential information. By sharing experiences with a given hospital, physician, program or treatment, patients provide information that can be useful both for other patients and for policy-makers, care professionals and health care institutions.

The "managerial" responsibility assigned to individuals, thus, is not only to manage personal information, but also to contribute to the community by providing information for others. This active role expected from patients redefines understandings of information producers, users, use and management. Application users become information producers, creating room for new information users to emerge. How does this work in practice? Are individuals willing to assume the new role being prescribed for them? How is experiential information positioned among other accounts of reality, information forms and "evidence"? What work is necessary to collate and edit this information and translate it for use in other (policy, community, health care) contexts?

This paper examines questions related to new notions of patients as information managers, addressing the production of experiential information about the provision of care, rather than use of medical content information for different purposes. Using emergent results of a study into how different actors view/utilize these new spaces (and their information), I especially focus on locations and practices of mediation: new web applications as loci of action for recording (and, potentially, editing) experiences for public presentation; the transfer of information from online spaces to offline health policy arenas, where experiences form a

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"body of evidence" indicating areas in need of change; and practices for positioning various actors involved in these processes, where "spokespersons" or other mediators can emerge.

Information as Superhero: is there Anything it Can't Do?

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Western health care systems are smitten with information. The idea of providing "just in time" and (ideally) "tailored" information to health decision makers of various kinds is a major priority in health research, health policy and health care delivery in Canada. Entire fields of inquiry, and their accompanying resources, have evolved around concepts such as "knowledge translation," "evidence-based medicine," "implementation science" and "evidence-informed policy" not to mention "shared decision-making", "patient-centred care" and "patient decision aids" at the point of patient care. Beyond actual health care visits, patients/people are expected to know how to better look after themselves and make informed decisions to make healthier lifestyle choices. All of these processes seem to assume (and black box) a number of features about information and communication processes generally, and invest information itself (however defined - often vaguely) with near magical powers. This presentation will present some key aspects of the "information discourse" in health care, and, using data from completed and ongoing studies, focus on the claims made that information can inform, educate and empower patients. It will problematize the gap between the stated expectations of what information should do, and the emerging reality of what some people actually experience. It will also introduce the concept of "health info(r)mediation", which will be a main focus of the rest of the session.

2.1.12: New Perspectives on the Commercialization of the University

He Who Pays the Piper Calls the Tune:
Thinking about How Funding Shapes Academic Science

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In the last decade, many studies have looked at how industry funding influences academic science. But industry has never accounted for more than more than 7.4% of university R&D spending in the U.S., and that percentage has been decreasing since 1999. Recently, the proportion of industry funding has returned to its lowest point since the early 1980s, about 5%.

This paper draws on historical research on the emergence of market-oriented practices in U.S. academic science to argue that the time has come to focus on how federal funding shapes academic research agendas - not just because the federal government spends more than ten times as much on academic science as industry does, but because federal funding decisions are key to understanding the changing relationship between academic science and the marketplace. In particular, it suggests that NIH - whose budget increased from $9.6 billion in 1996 to $27.8 billion in 2006 - is an important site for thinking about what kind of science gets done and what kind is left undone.

Case studies of the emergence of university patenting, university-industry research centers, and biotech entrepreneurship all point to the critical role played by government in pushing universities toward the market. Policymakers interested in using technological innovation to spur economic growth created financial incentives for academic science to become more market-oriented. Essentially, what happened was not that private interests came to dominate the public interest in academic science, but rather that private interests were redefined as the public interest. It was argued that universities could best serve the public by embracing market mechanisms (like patenting) as a way of getting S&T into the broadest use, or by using S&T to stimulate economic development directly.

At the same time, these efforts to bring universities into closer contact with the market have often required large infusions of government funding. The development of university-industry research centers in the U.S., for example, was spurred by hundreds of millions of dollars in investment by individual states. Thus the effort to encourage interaction between university and industry science was never really about replacing government as the primary patron of scientific research, but about rethinking what the goal of that patronage should be. The success of these strategies has meant that in some fields, universities, industry, and government have become almost inextricably intertwined. One such field is pharmaceuticals. In this area, almost all academic researchers have financial ties with firms, and those researchers in turn set government's agenda for science at NIH. This has led to criticism of NIH for being unwilling to challenge industry interests.

The fact that industry funding is declining as a percentage of all academic research funding probably means something, but it does not necessarily mean that academic science is becoming any less bound up with the marketplace. Instead, it suggests that we should start trying to understand that relationship in sites like NIH - where the money is big, the lines between public and private are blurry, and the interests are complex.

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Codes of Commerce: Continuity and Change in the Culture of American Academia

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In the 1980s, as emerging biotechnology firms and bioscience-oriented multinationals sought expertise found in American universities to advance corporate objectives, scholars, policymakers, and activists became concerned that developing university-industry research relationships would lead to increases in conflict of interest, secrecy, proprietary research, loss of unbiased public interest analysts, and distortion of research agendas. Much scholarship on university-industry relationships as well as journalistic accounts written over the past twenty years suggests that these conditions were new and marked a sharp break with the pre-biotechnology revolution world in which Merton-like norms governed academic science. We suggest that much of this work is ahistorical and inaccurate. This writing asserts transformation in the practices and culture of academia, but since the work is synchronic, there is, in effect, no effort to capture change over time.

In this paper, we make a first pass at understanding change and continuity in the incursion of the world of industry into American academia. We explore the place of codes of commerce in the talk of academic administrators. Our data are drawn from the periodicals in which university leaders speak to one another. Based on a systematic review of two such periodicals from 1960 until 1990, we show codes of commerce are not entirely absent in any period. In their discussions with one another academic administrators illustrate that the world of commerce has influenced how they think about universities throughout the second half of the twentieth century. However, the manner in which the language of the world of business is used in discussions of academic administration and the future of the university varies across the thirty year span we study.

Thus, in the 1960s, where major research universities felt flush with federal and foundation support, commercial codes are seen relatively infrequently. Administrators from smaller colleges, however, were promoting the value of the education they offer in terms of the practical job market benefits students garner.

In the 1970s, by contrast, academic leaders at major research institutions faced increasing financial pressures and worried about the replacement of academic-style collegial models of governance by business-like contractual agreements.

Finally, by the 1980s, while it is true that much discussion focused on academic-industry partnerships in the biological sciences, this was only one area in which codes of commerce could be found in discussions among university administrators. In particular, we see widespread use of market language to describe the benefits university students gain from their education and entrepreneurial framing of non-market-oriented faculty practices.

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A Feminist Approach to University-Industry Relationships: Integrating Theories of Gender, Politics, and Capital

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Ever more frequently and ever more globally, universities have been partnering with for-profit industrial firms. Whether the university's role in these relationships is viewed as a savvy entrepreneur or as the exploited one "getting into bed" with private interests, clearly, the scholarship on these relationships is growing alongside the increasing interconnections of academic and industrial organizations. Yet in the vast and growing literature on the commercial activities of universities by economists of innovation, sociologists of science, historians of technology, higher education researchers, science/technology and society scholars, legal scholars, and popular writers there is still a notable lacuna. Namely, critical feminist analysis of university-industry ties is missing. Why should those who care about reproductive rights, or about the social construction of gender and gender ideologies, or about dire poverty and systematic violence against women around the globe pay attention to how universities are funded?

This paper explains why information about university-industry ties is relevant to global justice issues and should be garnering critical scrutiny from various feminist perspectives. For example, from a liberal feminist perspective, the concurrent history of greater inclusion of women in university life along with closer ties to industry is not usually told. What is the role of women in university-industry relationships? The scientists and engineers engaging in these cooperative R&D ties are still mostly men. From a more STS/technoscience perspective, the implications of women's absence from university-industry ties have also gone largely unexamined. As Wacjman (2004) points out, the methods of STS may be a primary cause for the lack of attention to gender. Consider Latour's (1996) Aramis: although the title bespeaks "love," no discussion of the construction of masculinity as part of the love of technologies is discussed. Gender would seem central to loving machines. Agency centered methods like actor network theory focus on who is present in technoscience networks rather than who is missing (i.e., women, people of color). The paper also applies this "technofeminist" perspective to university-industry relations. In this paper, five reasons why university-industry relationships are significant for justice are elaborated. Knowledge about university-industry ties aids in understanding of:

1. effective nonhierarchical structures;
2. how intellectual property laws are shaped by and shape technical communities;
3. how exclusion of women from technoscience networks shapes technology;
4. how technoscience commodifies women's bodies;
5. the role of higher education in creating justice in developing nations.

In short, university-industry relationships illuminate how structures, laws, technologies, bodies, and education are constructed to either hinder or promote justice and equity. Discussion of topical examples, such as the potential role of university-industry relationships in commodifying women's bodies, is employed to develop theory-based propositions. An empirical agenda is developed toward better understanding the implications of these gendered relationships.

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Choice of Research Priorities by Public and Private Sector

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Shifts in U.S. public policy regarding the patenting of research products funded by public monies have resulted in arguments that universities and their scientists are abandoning their traditional public goods role in favor of self-interested behavior. Part of this line of argument focuses on the increasing influence that private sector firms have on the research agendas of university scientists. If U.S. universities are minimizing their public goods approach to research and behaving more like private firms, then the remaining sector for public oriented research would be public sector agencies such as the U.S. Department of Agriculture's Agriculture Research Service (ARS). Using in-depth interviews with industry, university and ARS scientists, we compare the criteria for research problem choice among industry, university and ARS scientists involved in agricultural research- with a special emphasis on agricultural biotechnology research.

Industrial versus Academic Agenda in Research Schools

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The concept of research schools has attained some interest lately. The creation and organisation of graduate education in research schools has quickly, during some five-ten years, become a prioritised way of providing graduate education in many European countries, for instance in the Nordic countries where roughly every second graduate student is registered at a research school, and in Germany where the issue has been given much attention.

A research school gathers students from several departments and disciplines in what can be regarded as a formalized programme with common courses and seminars. It is normally multidisciplinary by definition.

At many research schools, collaboration with industry is furthermore a vital component. PhD-students are encouraged and expected to get into scientific as well as industrial networks and take part of the distribution of information there. Establishment of contacts for the future is equally important, be it with an industrial orientation or an academic one.

The main question of this study is: Can high academic standards be maintained together with an "industrial twist" of the research?

The paper will present empirical findings of the governance and organisation of five prominent research schools and discuss the results with respect to achievements, collaboration and potential tensions between an academic and industrial agenda. The question of which type of skills that should be required by someone with a PhD today and in the future, especially with respect to the need of the industry, and how research schools can

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meet this demand, is of highest interest as well.

In total, nearly 150 graduate students have been admitted to these research schools. Some 60 interviews have been made with graduate students, industrial representatives and research leaders in academia, and a questionnaire has been answered by the PhD-students.

The creation of research schools with high academic ambitions and an orientation towards industry can be interpreted as being in line with how Gibbons et al (1994) and Nowotny et al (2001) have described the development, using the Mode 1/2 terms. It also seems to be well in line with the framework known as Triple Helix (Etzkowitz & Leydesdorff 1998, 2000). The study will contribute to a development of these theoretical approaches and critically relate the empirical findings to the literature.

2.1.13: Energy Systems in Transition: Demand, Intermediary Actors and Users' Based Strategies

The Importance of Intermediary Organisations for the Transition to Sustainability: the Case of Passive Houses in Austria

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Sustainable buildings have an enormous potential to reduce energy consumption as well as material flow and consequently are at the centre of programmes to reduce greenhouse gas emissions. In Austria, a specific technical concept of ultra-low energy buildings - the passive house - was first introduced in 1996 and set off an interesting dynamic of socio-technical niche development. Currently there are more than 4000 residential units with about 10,000 passive house residents - more per capita than in any other country of the world. It is even considered to make the passive house standard obligatory for new buildings and use it as a guiding vision for the refurbishment of the existing building stock.

Sustainability requirements (sustainable buildings need higher quality standards and a closer coupling of technologies, planning procedures, building design and quality control), however, have led to profound shifts in the social organisation of the construction process, e.g. the need for collaboration between the actors involved in planning, constructing and using buildings. A core task for developing a new socio-technical niche or 'technology-specific innovation system' around passive houses thus is the coordination and alignment of actor groups, or rather socio-technical assemblages, and the shaping of institutional contexts. The successful growth of the passive house niche seems to have strongly depended on the establishment of a variety of intermediary organisations to organise integrative planning processes, to set standards and market the passive house concept, to certify components, to transfer knowledge to professionals, to assist consumers in choosing architects, installers and technologies or to organise participation processes. New interest organisations mediate between producers and the policy level, energy agencies act as system builders to transfer these new technologies and practices into the mainstream building sector, etc.

This paper draws on a qualitative case study to analyse the dynamic growth of the socio-technical system of passive houses in Austria with a special focus on the role of intermediary organisations. Empirically, the paper is based on qualitative interviews with representatives of relevant organisations as well as the analysis of various documentary sources. Our results shall contribute to a better understanding of the role of intermediation in the management of socio-technical niches and in the transformation of socio-technical systems in general.

With our paper we want to contribute to the current STS literature in two ways: Firstly, the role of intermediary organisations for the growth of socio-technical systems and - in a more aggregate perspective - for the transition of socio-technical regimes towards sustainability has not been widely researched yet. Secondly, our study focuses on the current 'mainstreaming' of a niche and its reshaping of the dominant structures in the construction sector, whereas many case studies either focus on still isolated niches or investigate regime transitions from a long-term historical perspective. We think that our paper can shed some additional light on such niche-regime dynamics, the role of intermediaries in this context and on political strategies to shape these niche-regime interactions.

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Unravelling the Threads:
Discourses of Sustainability and Consumption in Online Forums

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In this paper we address two issues and consider their mutual relevance. In the first place, we are interested in forms of contestation in relation to energy usage and its environmental costs: in particular, we focus on the in some ways problematic relations between terms such as lifestyle, consumption and sustainability. Increasingly, discussion of the changes that social actors need to make to become more responsible users of energy is framed by a discourse of lifestyle; yet, arguably lifestyle and related terms contain unavoidable connotations - notably an implicit reference to consumption and its significance for identity - which are in tension with the intended social changes towards which these discussions are oriented. The prevalence of this discursive framing is, we argue, potentially problematic for analysts and social actors alike. In the second place, we are interested in the significance of particular technologically mediated forms of debate and contestation. This is in part because, in line with the basic tenets of any STS approach, it is necessary to move beyond undifferentiated notions of public spaces or spheres to consider the empirical detail of specific forms of practice. But we also argue that certain forms of sequential online communication have strategic analytical value for this topic: for it is possible to trace, in the threads of discussion, the temporal movement of attempts to associate and dissociate these terms, and thereby both to display and refine understandings of the discursive space of contestation.

The primary source for this analysis is an extensive online discussion that followed a polemical newspaper article which had argued against the coherence or validity of notions such as 'green consumerism' or 'ethical shopping', although reference will be made to other data for the purposes of contextualisation. Drawing on broadly discourse analytic methods, we will consider the ways in which contributors position themselves in relation to others, the categories they use to achieve and assert the legitimacy of this positioning, and the ways in which the tension which is at the heart of the original article is dealt with over the course of the debate. Our argument is relevant for a number of STS areas including studies of energy use and environmental issues, and studies of online practice and communication. Furthermore, we argue and endeavour to demonstrate that the latter, whilst an important area of research in its own right, has considerable analytical value for understanding some of the dynamics of the discursive space in which the former are constructed.

A Demand-Orientated Perspective on Energy Systems
- Using, not Producing

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When changes of the energy system are discussed in public debates or in policy-making contexts, for example in order to combat climate change, usually a top-down, or supply-side, perspective is used. One recent example is the European Strategic Energy Technology Plan

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(SET-plan) - 'Towards a low carbon future' - which was presented on November 22nd, 2007 by the European Commission. The SET-plan mainly addresses improvements and substitutions of production technology but overlooks reduction and efficiency measures and technologies. This is problematic, since the 2020 targets forming the foundation of the SET-plan are interrelated and call for a comprehensive perspective (ensure 20% of renewable sources in the energy mix; reduce GHG emissions by 20%; reduce the primary energy use by 20%). Incorporating energy usage in policy documents of such importance is essential to facilitate the understanding of the driving forces of energy demand on national and local levels.

In this paper we nuance the trivial notion that the bottom-up, or user-side of the system is important when striving for more efficient use of energy and combating climate change, in other words we focus on the demand-side rather than the supply-side. Our overall aim is to fertilize the energy debate and to give input to future strategy- and policy-making processes, by way of highlighting the user-side. To do so, we explore concepts such as Energy Usage Systems, Energy Services, and Everyday Household Activity Systems.

Several studies show that a significant part of the energy efficiency potential is to be found on the user-side, namely by the interaction of new technologies and changing behaviours. We will compare different potentials of energy efficiency and elaborate the concept of Energy Usage System. A key feature is the services produced in the Energy Usage System, providing various utilities and conveniences. We will elaborate on the notion services and introduce our version of Energy Services. We will also show that there are various ways to approach and systematize the user-side of the energy system, for example via sectors, the built environment and infrastructures, or by way of approaching human activities. In this paper we choose to highlight energy use in households and to elaborate the notion of Everyday Household Activity System in the context of changing these in a sustainable direction.

Bringing users, services and demands into energy related strategies and plans will also facilitate the analysis of the energy system from an actor's perspective. Thus, we will not only be able to address the question of what could change but also by whom change is possible.

Action Research to Translate Socio-Technical Theory into Useful Tools for Practitioners

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In this paper we present a recently started action oriented project: CHANGING BEHAVIOUR. The project aims to develop practical tools that are based on a sophisticated understanding of sociotechnical change, in particular in the field of energy. The difference with other research projects is that we will do this interactively with those who are actively involved in practice and aim for transfer of knowledge and expertise.The paper will discuss the project's aims, methodology, contribution to Science and Technology Studies literature and available outcomes, and it will in particular focus on the results of close monitoring of interactive learning and reflection processes between researchers and practitioners. The project builds upon a growing tradition for researchers in the field of STS to engage in action research. In

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the project the researchers' role is to inventory, analyse and evaluate existing practices. They bring to this process their knowledge of recent theory, methods and tools in the analysis of socio-technical change, as well as a broad interdisciplinary knowledge base on the adoption of new energy technologies and behaviours. Their conceptual understanding helps to make explicit the tacit knowledge accumulated in previous programmes. The practitioners bring to the process their prior experiences of demand management programmes, their tacit knowledge of what works and what does not, their knowledge of their operating environment and the practicalities of programme management. The CHANGING BEHAVIOUR project aims to bring theoretical insights and practical experience into fruitful dialogue in a number of methodological stages: An inventory of European demand management programmes is assembled to identify existing programmes, collect various indicators of their successfulness; A conceptual framework of sociotechnical change is developed by combining theoretical insights of end-user behaviour and a meta-evaluation of previous demand side management programmes to identify factors influencing the successfulness of such programmes. The framework is further refined by organising dialogue workshops with intermediary organisations and by organising pilot projects, in which context-tailored best practice programmes are implemented in different European countries. The lessons learned throughout the process are evaluated and build into a 'toolkit of best practices'. CHANGING BEHAVIOUR is thus exemplary for action research because of its close monitoring of interactive learning and reflection processes between researchers and practitioners. We assume that better energy demand management practices can be developed by transmission of theoretical understanding into practice. We also assume that theories of technology adaptation and appropriation as developed in the field of Science and Technology Studies can be refined by scrutinizing them in contexts of action and practice and by transferring practical understanding and research-user needs into theory-development.

2.1.14: Mixed Influences in and of Science Policy

Revisiting 'Weinberg's Choice' :
Old and New Tensions in the Concept of Scientific Merit

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Since the beginning of science policy, the issue of priority setting among branches of science and scientific institutions has been on the policy agenda. One of the concerns of the science policy studies branch of STS has been to track and explicate the assumptions and values underlying 'scientific choice' on the policy level and among scientists. Operationalization of choice in boundary organizations reflects the dynamics of heterogeneous agenda setting activities involving an increasing variety of stakeholders, and has therefore been fruitful ground for the study of science's institutional conditions. In this paper we revisit a key contribution to the discussion of scientific choice, namely Alvin Weinberg's classic and much debated two articles in Minerva in the early 1960's, "Criteria for Scientific Choice" (1963), and "Criteria for Scientific Choice II - The Two Cultures" (1964). These contributions represent two of the first and most important attempts to create a meta discourse around the notion of priority setting in science policy, and many of the points advanced are still of relevance to current discourse.

The paper sets out to elaborate on some of the issues advanced in Weinberg's original papers, in connection to priority setting today. Specifically four issues will be dealt with: The tension between scientific and institutional choice, the assumptions behind the triad of scientific, technological and social merit, the elusive 'externality from size' argument for funding promoted by Weinberg, and finally the problems involved in the idea of basic science as 'an overhead' cost for applied science, and applied science as an 'overhead' on a sectoral mission. These four issues will be elaborated from a policy theory perspective and connected to present day challenges for science and technology policy.

Mediating Policy, Practice and Research,
a Historical Analysis of 40 Years Science Policy Practice

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In 1957 the Agricultural research council was established, a science policy body for the agricultural sector. For more than 40 years, the organization mediated the linkages between agricultural practices, policy changes and emerging science and technology. The history of the organization is both a history of science policy making as well as a case of how in actual science policies the different practices of policy making, farming and research get linked. Unlike many other research councils established at that time, the council had no substantial budget for research funding. Nevertheless it was considered as a successful science policy body. As such it serves as a case for understanding non-funding dimensions of science policy making: agenda setting, coordination, boundary work, networking, issue framing and the like. In our paper we analyze the organization as an intermediary organization between the ministry and the agricultural research sector.

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We focus on how the organization developed the capacities (networks, databases, negotiation practices, agenda setting) to "do science policy". Without funding the council developed again and again new science policy practices. Our analysis shows the how these practices emerged (sometimes as unintended consequence of other practices), were employed, and faded away. These practices of science policy are exemplified through the role of the council in managing the emergence of the environmental crisis since the 1970s as a new "social issue", and the construction of biotechnology as an object of economic and agricultural innovation policy in the 1980s. For the environmental case, the council initially mediated social pressures on the agricultural sector by reframing ongoing research as environmental research, but changed this buffering role later to develop research programs for ecological agriculture. The biotechnology case shows how the council uses its 'policy making instruments' to put this new area of science and technology on the agendas of both the ministry of Agriculture and the agricultural research sector.

The Role of Research Funding Organizations in Nanotechnology: Battling for Playground

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Recent literature positions research funding organizations as intermediaries between science and government. This intermediary position, however, is not a given state of affairs. We compared the role of research funding organizations (RFOs) in the development of nanotechnology as an object of science policy. The comparison comprised nine European countries (Denmark, Finland, France, Germany, the Netherlands, Norway, Sweden, Switzerland, and the United Kingdom), four of which were investigated in more detail (Finland, the Netherlands, Norway, and Switzerland). In some countries, such as Germany and Finland, the intermediary position of RFOs has remained rather stable during the period of investigation, which covers the last twenty years.

In this paper we will analyze cases in which researchers and Ministries 'bypassed' the research funding organizations while organizing research funding programs for nanotechnology. In Norway and the Netherlands the national RFO initially was left out of the process, but in Norway the Norges Forskningsråd (NFR) soon was assigned a central position. In both countries the RFOs were at a later stage also re-involved in activities to organize follow-up programs. In Norway this re-involvement seems to have originated from within the RFO, whereas in the Netherlands a mixture of parallel developments led to re-involvement. Although in each of the two countries research funding officially is institutionalized through a central RFO with divisions or sub-councils, differences in the respective internal organizational structures may in part explain why in Norway the RFO more easily regained its intermediary position. The 2002 reorganization of NFR enabled it to deal with an interdisciplinary field more easily, compared to the Nederlandse organisatie voor Wetenschappelijk Onderzoek (NWO).

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Changing Practices of University
Biotechnology Research Units in England and the Netherlands

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The theoretical and empirical evidence suggests that the governing of research in the Western European countries has been changing in the past two decades . New governance approaches are at the forefront of discussions on public sector reforms, including the research sector . Competition for resources and changing state steering of research through various policy mechanisms, such as performance-based funding, accountability, intermediary bodies, quality control and performance measurement has been brought to the fore. In part, many governance changes were accompanied by the New Public Management approaches of restructuring the public sector in order to make it efficient and effective and give more power to the managers in the public organizations, such as universities. In such context, external funding bodies and university managers have increasingly attempted to steer research. It is still questionable to what extent such governance changes influence the academic research in universities. The current paper addresses this knowledge gap by providing insights based on the international comparative study on how university research units in biotechnology maintain and change their research practices in response to the changes in their institutional environment (*). Our analysis has shown that respondents in all cases of our study perceive their institutional environments as changing. All research units prefer to maintain stability in their activities, but not all of them have been equally successful in this respect. The researchers note changes in the speed and amount of produced research outputs and in the balance between research and teaching activities. The paper concludes that the shifts in governance influence research practices of research units to a certain extent.

This paper is based on a study that is an exploratory inquiry which looks at similarities and differences between basic research units in public universities at a given moment of time across two countries. The study is based on the case study design where a basic research unit is the unit of analysis. The comparative approach is employed where different traditions of university governance are taken into consideration, such as Continental and Anglo-Saxon with the representative countries of both types: the Netherlands and England. Biotechnology is selected as a representative of multidisciplinary field of research. The underlying logic is to explore both Mode 1 and Mode 2 types of knowledge production . Research units are selected according to the perceived amount of credibility within the field. The data includes 77 semi-structured interviews collected in 2005 with research units, university managers, and policy makers in England and the Netherlands.

2.1.15: Regulation as Reconfiguring People, Policies and Things

'Acting with IT' : Experiments in Reconfiguring People, Politics and Things in the History of Developing an Electronic Patient Record

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IT seems a monstrous phenomenon that requires intervention and actions in multiple ways in order to be tamed. Part of the monstrosity are the high political expectations and stakes that have to be transformed into innovative and transforming technologies that simultaneously act as unnoticeable aspects of everyday life and work processes.

Various academic fields have observed and participated in exploring taming strategies when answering questions such as: How are programming, systems development, design, and implementation activities best understood and performed? Fields such as HCI (Human Computer Interaction) PD, (Participatory Design), CSCW (Computer Supported Cooperative Work) and STS have moved out of the laboratory and participated in design, implementation and observation of IT in natural 'real life' settings; they have in various ways argued for a socio-technical approach, 'worker' or 'user' involvement, and for the relevance of participation, action research, intervention, and the role of ethnographies of work in systems development.

In order to sort out various ways of engaging or acting with information technology during the last twenty years, we look at one of the first experiments in Denmark with developing an electronic patient record, as it took place at a ward at a university hospital in the in the late 1980s. Inspired by discussions within STS on intervention and politics, we address questions such as: To what extent, and in what ways were computers and information technology at that point considered a political issue? How did those expectations inform the development processes? What kind of engagements and interventions took place? How should these instances of 'acting with' IT be conceived in light of the present concern with 'intervention' and its potential implications for STS?

Thus we want to explore a historical perspective on the co-production of science, technology with policy, democracy, law and the organization of health care.

Heterogeneous Networks and the Regulation of Tecommunications in Greece

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This work examines the development of the private radiobroadcasting sector, an originally technical project that induced a major technical, political and economic conflict in Greece in 2001. By that time, the Greek socialist government had decided to regulate the sector, providing formal license for the use of frequency spectrum to a number of analogue radio stations and imposing technical specifications on the corresponding broadcasting infrastructure. After twelve years of unregulated proliferation of the privately owned radio

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stations, this would have been the first attempt to apply radiation safety and environmental criteria on their operation and to assure the security of communications in aviation systems that used neighboring frequency spectrum in the proximity of the Greek capital.

Our work follows the period of intense social reactions, controversies, negotiations, tactical and strategic moves of the large number of stakeholders that relate to the operation of Greek mass media. We also record important regulatory interventions, technical studies that sometimes supported conflicting views, official documents, decisive events. The human and non-human agency entangled in a heterogeneous network with continuous shift of roles of actors. During the process, important human actors, like the government and the private broadcasting firms, converged using two tactics - the cooperative construction of technical artifacts (studies, documents, procurements) and the strengthening of the position of professional consultants who intervened and tried to stabilize the network. Such tactics of the human agency were in accordance with macroscopic strategic preferences of the corresponding actors that typically traverse their engagement in the social environment in Greece.

Our methodological approach uses micro analysis, which underlines the contingency of socio-technical projects. The network entanglement is based on always partially-formed connections that provide opportunities for calculations by actors. Local culture and traditional social alliances do not determine completely the actor behavior or the outcome of a negotiation. Our analysis emphasized on the formation of a center of calculation that would stabilize an associated actor-network.

In this environment, we have followed the efforts of the government to construct such center of calculation that would be fully controlled by the introduction of appropriate legislation. The task was to supervise and manipulate the relations of various actors, embodying in the network smaller independent centers of calculation. In pursuing this strategy, the government failed. A number of different calculation centers remained active throughout the process, with contradicting activities in an ever-changing context, which induced instability and eventually left the network idle.

On a historical note, after a year of unfolding events, the whole effort to regulate the radio broadcasting sector failed completely. A principal member of the cabinet was removed from office and the project was gradually abandoned, leaving the broadcasting environment in a state of legislative vacuum that lasted a few years on.

The Partnership of R&D, the Government, and the Business Sector

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The problem of intensifying innovative activities is one of the government's priorities. Its resolution is based on an increase in the government's role in accelerating processes of industry modernisation and development of public sectors (health, education, etc.) on the basis of innovations. The solution of this problem is closely related with development of various forms of partnership of R&D, the government, and the business sector (public-private partnership - PPP). This is a new for Russia management technology in the innovation area

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that began developing since 2002 and is aimed at securing a mutually beneficial resource-related, institutional, and organisational and managerial interaction of R&D, the government, and the business sector.

The most common form of PPP in S&T and innovation is an innovation project of national importance. An analysis of the legislative base ensuring the implementation of these projects reflects its incompleteness. A compensation of shortcomings and lacks in the Russian legislation base concerning the functioning of PPP is associated with the necessity of a precise identification of an area of using PPP and the status of the business community in such a partnership, as well as mechanisms of incentives for R&D institutions, etc.

An obstacle to effective implementation of projects is the incomplete formation of an institutional environment, the lack of favourable entrepreneurial climate, etc.

Prospects for the development of PPP are related with the formation of technological clusters in the regions, having obtained the status of special economic zones. The attraction of private investments will provide conditions for the creation of technology clusters in such areas as medical accelerators and nanotechnologies, biotechnologies, pharmacy, etc.

The structure of the report includes:

1. An analysis of innovative activities in Russia.
2. Problems hampering the development of PPP.
3. Forms of PPP and their application in S&T.
4. Initiatives of the government and the business sector on the development of forms of PPP.
5. Recommendations on the development of PPP with the account of world-wide experience.

Programming Languages as Designed Objects

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What motivates the design of a new programming language (or the extension of an existing language)? One might reasonably assume that technical considerations form the primary motivations in such a design task; however, there are a host of non-technical factors that might be just as important to a designer.

This paper investigates the degree to which a variety of written resources address the relevance of non-technical factors in design decisions for programming language creation and extension, as a means to assess the health of STS-related research into the black box of programming languages. Of particular interest is the extent to which resources address power dynamics in some way, be that in terms of labor, community, personal, or other aspects. The conclusion is that social forces are critically under-analyzed with respect to the design of programming languages. Primary source and computer science literatures all point toward the importance of social forces in the shaping of programming language design, though often un-reflexively. Instead of delving into programming languages like the any other

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activity or artifact, social scientists have seemed to approach languages simply as technical tools, black boxing them without concern to unpack the power struggles and cultural assumptions that go into their creation. While many fields have seen increasingly detailed involvement by STS researchers at detailed levels, the technical nature of programming language design seems to have resulted in a severe dearth of empirical research in this area. This paper hopes to conclude by pointing to areas in which understanding the social forces at work in programming language design is relevant to society at large.

2.1.16: Feminist Technology Studies: New Directions

Should We Forget Gender?

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Feminist studies of science and technology emerged from critical observations about women's absence from major parts of this field, due to a diversity of processes and acts of exclusion. Technology and many scientific fields were described as 'masculine', and in part, this description was used as an explanation of the lack of women. An example of this way of reasoning is the hacker figure, the image of computer enthusiastic, nerdy men, which was seen to put women off computer science.

A problematic aspect of this line of research lies with its potential effects. Here, Giddens' (1979) notion of the double hermeneutic relationship between research and its subjects may prove useful. What happened when feminists put forward the idea that science and technology, or in more concrete instances computer science, was 'masculine' and in need of transformation? Was this helpful to get more women included, or did it in fact work to reinforce the labelling of being 'masculine' and so undermine or diistract such efforts?

In this paper, we will discuss this problem, drawing on a wide body of research into computers and computer science. We will analyse the basis of terming computers and computer science as 'masculine', detailing and assessing accounts leading to such labelling, and the effects on (relevant) women of doing this. This will be followed by a critical engagement with the difficult issue of how to balance observations about the importance of gender with the need to avoid reinforcing gendering effects. Do we have to forget gender in order to avoid its reproduction?

Gender In/Authenticity and the In/Visibility Paradox:
How Norms Work

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Over the years, I have increasingly mobilised a language of 'gender in/authenticity' - as in, technological occupations or pleasure in technology are 'gender authentic' options for men but not women. The term itself has worrying essentialist, even normative connotations. And yet I have found it an increasingly powerful concept - for thinking about the apparent congruence or non-congruence of gender and engineering identities for men and women engineers; and for explaining why, in some settings, gender does not appear to change very much or very fast. In this paper, I propose that the concept 'gender in/authenticity' can be used to capture the (hetero)normative pressures of 'the way things are'.

I outline the empirical evidence - largely from my ethnographic work on engineering workplaces - that spawned the concept. Together this evidence reveals dynamics in which, subtly, women engineers are perceived, and can feel as, not quite 'real' engineers or 'real' women. These dynamics are very consequential. They mean that women engineers tend to

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be highly visible as women but invisible as engineers - which in turn means they have to struggle, far harder than men engineers, in order to 'belong' in engineering communities of practice.

Theoretically, I make links with a number of key themes in wider feminist thinking. I highlight how readily these gender dynamics and performances seem to be constrained by dualistic and (at least implicitly) heteronormative readings of gender. And I resurrect the dual meaning of norm, to argue for a mutually reinforcing relationship between the statistical norm (the man engineer) and the sociologically normative pressures within engineering workplaces revealed empirically.

Queering the Artefact: Subjects, Objects, and Heteronormativity

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Recently, the question of heteronormativity has drawn the attention of scholars within feminist technology studies. The notion of 'queering' studies of gender and technology has led to increased interest in the relationship between technologies and sexuality.

This paper addresses this relationship by examining the manner in which technosocial interaction constitutes a dynamic process of both subjectivation - the production of the gendered subject - and objectivation - the constitution of the technological artifact as social entity. By drawing upon Judith Butler's notion of the heterosexual matrix and Barry Barnes' concept of bootstrapped induction, I address the manner in which subjects and objects are rendered intelligible in relation to each other and within a system that privileges heterosexuality.

I combine empirical work with motorcyclists in Costa Rica with this theoretical development to identify the gendered identities articulated through the use of technological artifacts, as well as the continuous process of this same artifact's ontological construction, whereby steel, plastic, and leather are transformed into social entity. This process is conceptualized as a case of both citationality - Butler's tool for understanding subjectivation within the heterosexual matrix - and finitism - here used to address the continuous constitution of technological artefacts. Using sociological fieldwork with motorcyclists allows me to render visible the ubiquitous presence of heteronormativity. Along with the theoretical analysis, it illustrates the fashion in which gendered subjects are constituted with respect to a heterosexual imperative, and the role that the material plays in this discursive mechanism. In this manner, I hope to begin to address some unanswered questions regarding the relationship between sexuality and technological artefacts.

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Doing Raceability, Doing Masculinity:
Gendered Articulations of Cars and Street Racing

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The paper also addresses the theme of men/masculinities and technologies, and also addresses men's relationships with and performances of gender through the technologies. It builds on a number of sources, including Redshaw's (2007) analysis of dominant articulations of the (race) car and the notion of gender scripts (Oudshoorn & Pinch 2003) from feminist technology studies to think about gendered meanings of the car, car driving and speed. It combines this with empirical material drawn from web forums and motor magazines to explore how 'doing masculinity' and 'doing raceability' are intertwined. In particular, the paper examines how masculinity is done in several interlinked aspects: first, in dominant articulations of the driver-car; second, in the ways users re-shape the performance, style and power of the car; and third, in articulations of spontaneous street racing and how this forms a community of raceable users.

The Intersection of Gender, Race, and Cultural Boundaries or
Why is Computer Science in Malaysia Dominated by Women

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This paper investigates how and why computer science in Malaysia is dominated by women. Drawing on recent critical interventions in gender and technology studies, the paper aims to opening up more culturally situated analyses of the gendering of technology or the technology of gendering, with the Malaysian case exemplifying the core of the argument.

The paper argues along four different strands of critical thought. First is Lagesen's (2008) and Landström's (2007) critique of the 'black-boxing' of gender in studies of the co-construction of gender and technology. Second, is Bray's (2007) critique of the anglo/euro-centric bias of gender and technology studies advocating more of context sensitivity and focus on the cultural embeddedness of gender and technology relations. Third and in line with this, is the need to pay more attention to spatial practices and body politics in regard to race, class, and gender in gender and technology relations - as illustrated by the case of Malaysia. Fourth and also evident in the empirical case, is a critique of 'western' positional notions of gender configurations and opening up for more fluid constructions of gender identity including the many crossovers between relational and positional definitions of femininity and masculinity.

2.1.17: Science Cities: Innovation and the Urban

City Tech: How Cities Do Science

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The relationship between cities and technoscience has typically been framed in terms of cities as sites - cities have been conceived as sites for the production of technology by corporations, as in the case of Anna-Lee Saxenian's work on Silicon Valley and Boston; or cities have been conceived as sites for the deployment of alarming technologies and big projects that damage communities, the so-called "panic urbanism" critiqued by Nigel Thrift. But how do cities do science, and what are the implications of cities' scientific practice for the portability of knowledge and science-based regulation? We may be used to thinking of federal governments funding big science, but in the case of New York City's ban on foods containing trans fatty acids, city employees engaged in an extensive literature review, feasibility research, technical product testing and applied sociology in order to implement regulation. The technical research was carried out along the classic lines of university-based scientific research: a professor of baking at one of the city's technical colleges test-baked every commercially available trans fat alternative in each of three types of food deemed standard and representative, and submitted the results for organoleptic testing. New York City will be compared to the case of Philadelphia, which copied New York City's trans fat ban without the engaging in any of the same research and ended up having to grant a far-reaching exemption to all small bakeries. Indeed, many of the states and cities that considered trans fat regulation in 2006-2007 ultimately failed to enact those bans. The implication is that just as laboratory technicians may not be able to reproduce experiments or machines without hands-on training from their peers, as was the case in Harry Collins' work on TEA lasers, so too science-based regulation may not be portable without extensive supporting research.

Negotiating Landside-Airside in NY LaGuardia Airport: 1933-1939

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What is the Landside-Airside Boundary? In the general civil engineering and architecture lexicon, airside represents buildings and facilities on the side of the planes and landside refers to the same but on the side of passengers. For the more specialized jargon of airport designers, engineers and specialists airports must be divided into two control sectors: the landside, referring to all areas allowing the free flow of passengers, visitors and vehicles; and the airside, which are restricted areas only for use of authorized personnel, aircrafts and service vehicles. However, in terms of airport planning, security and regulatory codes, it represents the boundary between the "sterile" and the" non-sterile" zones, a through area where passengers move along "filters" in order to be "cleared" and "segregated". As we may see in this first approach to a definition, even in practice, there is hardly a consensus.

Throughout this paper I try to describe the landside and airside boundary based more on the evidence found in revisiting the cultural history of aviation and airports, than any of the

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existing definitions or the current technical conventions. Metaphorically, this boundary can speak of a truncated love story that in essence is not different to our fascination with automobiles or trains, but finally ends up truncated, as the landside-airside history will show. My conception of landscape-airside captures, in its physical form, the romantic days when the "airminded" enjoyed visiting airfields just for pleasure, but also offers historical reasons to explain why they were gradually separated throughout the years.

My research hypothesis is first based on the empirical comparison between the landside - airside boundary and its strong disconnection with the early years of airport architecture. Just a glimpse of the first years of aviation will allow us to notice a radical departure from our tactile relationship to planes, toward our present physical "divorce". Our right to enjoy the world of aircrafts has been strangely denied. In the apparent "evolution" of this transformation there was a clear breakthrough, almost dividing history in two opposite halves. Spanning from the pioneering days of airfields, only after the Second World War, were airports laid out the way they are now. Curiously between1937 and 1944 a small number of projects seemed to redefine our historical relationship to planes and the fascinating world of aviation. But among these examples, one predominated: the 1939 New York Municipal Airport, also called North Beach and later LaGuardia Airport. It distinguished itself from the rest perhaps because it was the first of its kind and literally the first modern airport in America. Unanimously, its contemporaries considered it an exemplary technical innovation in airport planning, although its architecture was strongly criticized. As I suggest in this essay, some specific features of its layout captured for the first time, the growing conflict between humans and machines; in other words the irrevocable breaking-off of spectators from airplanes that became a silent witness until the terminals were finally demolished in 1960. So, how can we trace its history?

Disorderly Design:
the Role of Mess in Visual Representations of Wireless Networks

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The study of visual representations in science, law and engineering clearly illustrate the sociological value of images and the practices that surround them. In these contexts visual materials such as graphs, photos and sketches are seen as pivotal in understanding how practitioners construct knowledge, collaborate, reach consensus, recruit new members and do work. In essence, their persuasive power stems from the transformation of mess that occurs behind-the-scenes (raw materials, repetitive experiments and alternative interpretations) into finely honed, ordered, compatible and comparable visual accounts. The resulting inscription is therefore deliberately designed to omit the uncertainties and contingencies of everyday practice. Drawing on ethnographic observation and participation in a volunteer community wireless group in Australia I consider the visual methods members employ in the design of a wireless fidelity (WiFi) network to describe how they retain elements of multiplicity, unpredictability and disorder. Here, the textures of practice are not reduced, hidden or eliminated in the process of inscription. Mess is visually pronounced and public.

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Using examples I argue that the persistent presence of mess in the visual objects WiFi members produce is not simply a consequence of the volunteer nature of the group or the fragility of the technology itself. I will show how members deliberately build it into representations, how it is purposefully preserved and, furthermore considered central to how they innovate. Engaging with this volunteer community group also meant participating in and contributing to its visual culture and thus offers a site for posing new questions for studies of knowledge practices in new digital technology.

2.1.18: Governing by Numbers or Networks

Constitutive Versus Regulative Economic Centralization - Rationalities of Governance

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The case: The organizational centralization and the monopoly over national statistics in Canada were achieved through the work of a Royal Commission which was established in 1912 and acted for several years until the Dominion Bureau of Statistics was founded in 1918. The purpose of this paper is to explain why economic statistics, mainly import-export statistics, were the main target of statistical reorganization in Canada. My main argument is that Economic statistics were state tool for closing the boundaries of Canada and internalizing its economic activity in order to interact as one unit, as a "state", with other countries. The problem, for the statisticians, was that the numbers generated in the normal course of recording trade and collecting tariffs did not seem to record anything meaningful; they had a particular problem with transshipments, things that pass through the US on their way someplace else. The subject matter that the Commission was dealing with was not just a narrow aspect of national statistics; on the contrary, it was seen as a crucial part of demarcating and defining the nation's boundaries as well as resolving social tensions. The statistical development was part of the Canadian National Policy plan to unify the country, to fight regionalism, and to strengthen Canada's economic and political boundaries. The tension between regionalism and federalism, for example, resulted from conflict between the core and peripheral provinces and between the local elites in each province and the central elite in Ontario.

The analysis of this case draws on the conceptualization of the relationships between local and central power (Mukerji, 1997) as well as Foucault's concept of governmentality (1991), which explains the spread of central power through local sites. The discussion of rationalities of governance is relating to the idea of the constitutive state and captures the state both as a process of formation and as a condition that is always unfolding and never finished (Carroll, 2007). Within this conceptual framework economies are reviewed as being co-constituted by governments, no less than by economic ideas, through practices as official statistics. Measuring "the economy", especially at the beginning of the 20th century, helped to solidify it and to strength its reification. Historically, the method of economic calculation has created systems of regulation that tend to centralize power than to defuse it (Porter, forthcoming). Therefore, while Canadian statisticians were regulating statistical activities through standardization and toward centralization, they also constituted "the economy" with these practices.

From State Sociology to Centres of Calculation: the Swedish case

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Crucial to the development of modern society is the production of statistical and quantitative knowledge by different institutions such as universities, research institutes and the private

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sector. At least since the 1960s, there has been an ongoing philosophical debate on the limits and uses of this type of knowledge, both as a general issue, but especially within the social sciences themselves. However, these discussions have to a certain extent overshadowed the very practice of the social sciences. This project thus attempts at understanding the social sciences from the general perspective of Science and Technology Studies, and to continue to develop a "sociology of quantification" (Desrosières 1998), where the practices of constructing this knowledge is examined empirically in order to shed new light on social research.

By drawing attention to the development of post-war Swedish sociology, through a process of following central actors, mapping networks and alliances, and examining the practices of constructing surveys and applying statistics (Latour 1987), I am trying to describe a structural transformation in the social sciences, and to relate them to social change in general. Initial studies show that Swedish sociologists, between 1945 and the late sixties were heavily dependent on surveys and research programmes commissioned by the state. This early form of sociology (as a large-scale institutional practice) was produced simultaneously as Sweden was "quantified" on a much more general level, through governmentally initiated processes of centralization and standardization of all official statistics. Also, the impact of structural functionalism and the historically strong credibility for empiricist (quantitative) epistemology were key elements in making the social sciences become "proper" sciences, which were producing knowledge on the social conditions of the nation-state.

In the field of Science and Technology Studies and post-Kuhninan philosophy of science, attention has been drawn primarily to the natural sciences, economics and technological innovation. The sociological and historical consequences of the social sciences have however been quite under-researched. In Wagner et. al. (1991) Anthony Giddens calls for a renewed understanding of the social sciences in late modernity, serving both as a field of study in its own, and as self-awareness for social scientists in their everyday research.

In my empirical case study of a Gothenburg-based research institute called Society, Opinion & Media (http://www.som.gu.se) I am describing the way local researchers are co-producing epistemology, the surrounding society, institutional prerequisites, and statistics in order to produce facts about society. My empirical material ranges from the practice of constructing surveys (survey forms, measurement scales, methodological reports), descriptions of institutional changes, media impact, and state-issued commissions on the role of the social sciences in Sweden. This way I am aiming at a broad understanding of the social sciences embodied in an empirical case study, which may produce new knowledge on the transformation from a homogenous science of the State, into heterogeneous centres of calculation in the contemporary.

Governance and Participation as User-Driven Innovation

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Within the last couple of decades comprehensive reforms have changed the way the public sector delivers services to the citizens and private companies. We talk about New Public Management reforms or a movement from government to governance. This development is

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often described as a move from the classic hierarchical bureaucratic administration, as Weber described it, to a public administration based on policy networks where actors from the market and the civil society are included. Hence, a characteristic feature in the emergence of governance is an inclusion of citizens in policy networks. By participation in e.g. School Boards, Elderly Councils, or Citizens Panels users of public services are getting involved in the development of the policy in the field.

In 2007 the Danish government announced a new reform of the public sector called the Quality Reform. The objective is to increase the quality of the public administration and the idea is to reach this objective by user-driven innovation. In this way the Danish government wants to increase the role of the citizens and other actors in the network. The role should no longer be "just" to develop the policy in a specific field the users are supposed to come up with ideas of how to innovate the service by changing the delivery of the service in question.

Based on a literature study this paper will discuss two questions:

1. a theoretical question concerning how we can develop the concept of innovation to include user-driven innovation?
2. And a practical question of how is it possible to create the institutional frames for user-driven innovation?

Networked Governance and Self-Service Society

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This paper will focus on the political implications and future development options of electronic governance or 'e-governance', in view of the emergence of what can be called 'self-service democracy'. It investigates the interlocking dynamics of the use of network technology in public services, and the objective of making people more responsible for their decisions. It does this in the context of the organization of public services around 'citizen demand' and 'social production'. While the increasing use of information technology moves governance from the domain of institution-based politics to the consumer-driven one, it also makes it possible, and even necessary, for the polity to rearticulate its strategies in terms of the new network-world. However, there is a growing tension in this network-based political realm between the advancement of citizen participation, e-democracy and the self-organizing potentials of civil society, and the need to retain a conception of this realm as a systemic whole for the purposes of administration and efficient governance. This tension - its transformation and its concrete, theoretical and ontological implications - constitutes the subject matter of the paper. The approach used, including the ontological dimension related to the constitutive conditions of governance, brings up radically new kinds of questions and problematic areas that do not come in view in mainstream research. It is the aim of this paper to identify such forms, methods and values from the viewpoint of which the inherent logic of closure in various e-governance initiatives, principally in European countries, can be criticized. It will provide important new knowledge beyond the available literature and research.

2.1.18: Governing by Numbers or Networks

The paper asks what forms of collective self-understanding steer our practices and thoughts in the context of network governance? Even more significantly, it asks what the overarching ideas controlling our self-conduct in the era of electronic networks are. How have the electronic forms of governance influenced the ways in which we have come to understand political agency in a networked world and what are the political rationalities that direct this understanding? Methodologically, the paper utilizes a broad range of ideas from what has been called the governmentality school. By the term governmentality, I refer to those techniques and discourses through which political strategies, administrative institutions, the market economy and the welfare of the population are brought together. I am thus not examining institutions or political structures in themselves, but rather the interweaving of different theories, programs, practices, and technologies in a given historical period, elements that together form a functioning network.

2.1.19: Acting with Telecare Technologies, I

Caring with Technology: Older People, Observation and Code

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New and emerging care technologies are the visible, material signs of attempts to solve a range of health related problems in Western economies. Given the projected growth of those in the older age groups and policies aimed at 'aging in place', many of these technologies are targeted at supporting the care needs (or perceived needs) of frail older people within the domestic environment. Older people and their families are also the target of forceful advertising campaigns, exhorting them to prepare themselves by adopting systems which it is said, will retain their independence and avoid what is seen as the worst outcome: institutionalisation. Technical 'solutions' involve sensors, alarms and web-based or telephone links, reminding older people to take medication, to eat, or to close their doors and windows.

One home telecare system recently trialled in Britain began by 'learning' how people moved about their houses through a network of sensors linked to a computer. This learning was then expressed as codes, allowing visual displays of behaviour patterns and durations and places of activities. Sets of codes are then used to create 'norms', which inform the positioning of a range of alarm systems in the house, connected to a call centre. Alarms are triggered when there are deviations from the client's personal behavioural norms. In situations where the person is deemed to be vulnerable, e.g. if they suffer from dementia, these graphical 'reports' are also transmitted regularly to a care practitioner, who interprets them and takes appropriate action. This system, because it is individualised, is said to give peace of mind and a sense of security to users and family members/relatives. But under current plans for 'roll out' of telecare by agencies under financial constraints, the complex codes developed from the computer 'learning' are reduced; behaviours are aggregated or collectively codified, so systems can be standardised. Personal norms, then, are reduced to more generic norms. Drawing on close observation of telecare systems being introduced into people's homes and a series of citizens' panels of older people discussing their aspirations for home care, this paper discusses the implications of this 'roll out' for how care work is practiced, and for understandings of 'safety' and 'independence' for older people. This paper will contribute to key STS debates about co-production; interventionist research; technology and power; normativity and technology.

"Maybe when I'm Older" : User Representations as a Factor for Successful Domestication of a User-Interface Robot for Elderly People

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This paper sets out to find out how elderly users are represented in user tests with a user-interface robot through document analyses, interviews with researchers and passive observations of user-robot interactions.

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In advanced user tests by the research department of a multinational technology firm, single elderly people were selected to play games with a user-interface robot which functioned as a game-buddy. Based on extensive research, the researchers and engineers held a set of reasons for developing technology for the elderly: e.g. people are aging, pressure on healthcare systems are increasing and elderly people wish to live at home as long as they can. Researching this game application thus makes sense, for the knowledge gained may eventually lead to (improving) technologies that mitigate the effects of an aging population.

After the laboratory test, test users were asked whether they could see themselves as the user of the robot. All answered that they liked the concept, that they knew people who could have use for such a robot, and that they were happy to contribute to the research. But none actually saw themselves as the prospective user, or at least not yet. For the elderly test users the robot signified being old, alone and needy and they did not see themselves as such.

Making use of Akrich's concept of user representation, I will show that the researchers were able to build a comprehensive image of elderly people, making use of demographics, expert opinions, application scenarios etc. This gave them an overview, which I will call a macro representation. However this did not match the micro representations; the elderly users' self image. Subsequent field tests showed a remarkable reversal; despite their initial reservations, the elderly people domesticated the robot successfully up to the point that many expressed that they would miss the robot once it was gone. Though the user-interface robot is a research platform and not a consumer product, the initial difference in user representations between the designers and the elderly people indicates the importance of matching user representations to pass the appropriation phase of the domestication process.

This paper will conclude that the concept of user representation is important for understanding the relation between designers/engineers and users, and combining domestication theory and the concept of user representation can be theoretically fruitful. Based on this, I will outline a path for developing tools which allows insights to be applied in design practices.

Monitoring Care in Everyday Life:
the Case of Outdoors and Mobile Tele-Care Services

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The introduction of new health technologies and other electronic developments for the provision of health and social care at distance, such as tele-care and telemedicine, is challenging our traditional notions of care, home or autonomy. At the same time, questions concerning safety, knowledge or what should be considered as "good care" arise, but political and practical interventions are occurring in a sociological and ethical vacuum. Actually, there is a strong contrast between a wide and acritical adoption of this kind of devices and a lack of analysis about their consequences in everyday life. Furthermore, most of these empirical researches about tele-health and care are focused on home-tele-care services and other domestic spaces, such as care flats or residential homes.

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Taking into account this context, our research will try to investigate a kind of service that spreads out its care provision beyond the walls of home and places of confinement. Specifically, our fieldwork is focused in a recently set up Catalan Red Cross service called SIMAP (Intelligent System of Personal Alert Monitorization). Based in a mobile telephone network and a Global Positioning System (GPS), this new device permanently allows locating a person and detects the risky places and situations related to their geographical positions. By means of interviews and an ethnographic work in the Red Cross central alarm office and also accompanying some users in their daily activities, we will try to demonstrate some of the sociological and ethical consequences of this sociotechnical innovation: What is changing in user's everyday life and the rest of involved agents, such as relatives and formal and informal carers, care providers, managers and technical support bodies? How are notions such as care, space or health being reordered? Which new care relations and gendered work distributions are emerging?

Reorganizing and Researching Care as Acting with Patients and Health Care Professionals: Transforming Subjectivities through Mechanisms of Inclusion and Exclusion

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A collaborative project between the IT-university and the university hospital of Copenhagen seeks to reorganize and IT-support care for patients with pacemakers. Part of the reorganization implies that patients "read" their own pacemaker and send the data to the hospital through mobile technology. Initially, the experiment was set up by cardiologists and aimed at testing the effect of self-monitoring by patients with pacemakers. The project focused entirely on the relation between individual patients and the university hospital and sought to organize this relation differently.

Prior to actually making any changes in the care relation, we got involved and a discussion took off as to the relevance of also including other parties in this reorganization process such as GPs, other hospitals that treated the patient, and patient networks. The hospital and our research group decided that more actors should be included and a joint research proposal was written.

One of the assumptions in the proposal is that people with pacemakers form a diverse group and that some may benefit from this possibility of reading the data, whereas to others it will create insecurity. Following up on this assumption this paper reflects on the inclusion/exclusion criteria at work in the project - in relation to patients as well as to other actors related to the pacemaker patients. How were patients categorized initially and what role did the categories play in relation to recruitment? How did the categories transform during recruitment and what role did they play for access to care?

The paper thus reflects upon what "acting with" entails in this specific project. It also reflects upon what methodologies can possibly be employed to make sense of such a close entanglement of researchers and researched. In analyzing the material through the lens of how criteria for inclusion/exclusion transform subjectivities and vice versa, the paper draws on studies of the construction of research subjects for experimental research. The paper

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seeks to add to this literature and to the literature on STS and intervention by discussing the complexity involved when part of the "acting with" implies developing new IT-designs.

'Acting with' Non-users:
Telemonitoring Technologies, Surveillance and Autonomy

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User-technology relations are an important theme in STS research. In the past decade many scholars have shown how users not only matter once a technology is in use, but also play an important role in the design, the production, and the selling of technologies (Coombs et al 2001; Oudshoorn and Pinch 2003, 2007). Interestingly, non-users have drawn considerably less attention. A few notable exceptions are the studies of Kline, Summerton and Wyatt but they only focus on consumer technologies. This paper addresses non-use of health-care technology. More specifically, I will try to understand what non-use is doing for heart-failure patients who refused to participate in a clinical trial of a new telemonitoring system recently introduced in the Netherlands. The telemonitoring system consists of wireless automated devices for daily measurement of weight and blood pressure. These measurements, collected by patients at home, are automatically send to nurses at the telehealth-care centre. In case of deviant measures, nurses phone patients to ask them why they have failed to keep their weight and blood pressure within the set standards and inform nurses at the heart-failure clinic who have the authority to change medication. Based on in-depth interviews with heart-failure patients (5 users and 5 non-users) I will compare and contrast patients' narratives on the technology. Adopting a post-phenomenological approach I will show how telemonitoring artefacts mediate patients' perceptions of health care providers and their illness. Users embrace the technology because they consider it as an embodiment of the health-care provider: "The doctor is always with me". The daily surveillance provided by the technology enables them to regain control over and trust in their failing bodies. In contrast, non-users resist this mediating agency of the artefact. They view the technology as an unwelcome intruder in their daily life because it draws too much attention to their illness: "I will become a heart patient all the time". They resist this omnipresence of their disease and consider the daily surveillance as a threat to their autonomy. For them the technology transforms self care into an obligation. The paper concludes with a reflection of how focus on non-users may provide a useful strategy for 'acting with' telecare technologies.

New Thoughts about Old Issues or Old Thoughts about New Issues? Re-Conceptualising STS Approaches to Engagement.

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The large and growing literature on 'public engagement' has centred on now-familiar themes of science and democracy, critiques of the deficit theory, relations between the sciences and their publics, and the need to 'open up' scientific governance to wider social issues and concerns.

In this paper, we hope to suggest some new theoretical departures and perspectives on what has become an 'old' (but nevertheless significant) set of issues. How has the notion of 'engagement' migrated over time and what new meanings has 'engagement' acquired? What socio-technical arrangements are necessary for the performance of 'homo participatus' and how does this concept relate to more established notions of 'homo economicus'? When and how can it be said that the publics have 'engaged' - and what does this form of taking into account imply? Finally, what of the moral dimensions within STS accounts of engagement: what alternative moralities are being identified and performed within different relationships of engagement?

The paper will draw upon and develop a number of empirical sites in order to explore the changing configurations of engagement and new ways of thinking about engaging. These will include the operation of 'engagement initiatives' within scientific governance and attempts by private enterprises to engage their customers in the development of new innovative products. Our intention will be stimulate discussion and also to highlight some of the issues which will be developed in the larger session to which this paper is an introduction.

Acting with Engagement?
- Policy-Makers' Conceptualisations of Public Engagement.

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In its striving for more openness and transparency the UK government puts increasing emphasis on the involvement of stakeholders and members of the general public in the policy-making process. Thus, public engagement has not only received interest in the STS community but also in the policy arena. However, while the literature that discusses both the overall concept and individual engagement exercises from a social scientific perspective is abundant, analyses of policy-makers' point of view and the meaning they place into public engagement are more rare.

This paper explores the civil-servant perspective on public engagement, which has a critical impact on the success of the concept in a policy arena. The paper builds on a research relationship between the University of Liverpool and the UK's Department for Environment, Food and Rural Affairs (Defra). More specifically, it draws on a project during which I spent

2.1.20: Acting with Engagement New Modes of Conceptualizing Science, Citizenship and User Relations

six months as a participant observer within Defra's Nanotechnology Policy Team. The research focused mainly on policy-makers' interaction with and understanding of different kinds of knowledges, such as science and the engagement with stakeholders and the public. During my time at Defra, the UK government's programme on public engagement on nanotechnologies came to a conclusion and represented an important element of discussion on the Defra policy floor.

The paper explores how civil servants make sense of the general concept of public engagement and how it fits in with their more traditional understanding of policy-making practices. In examining the way in which the engagement programme on nanotechnologies was organised, the paper first discusses the practical dimensions of public engagement in the policy-making context. In a second step, it analyses how the qualitative nature of public deliberation fits into civil servants' understanding of their work, which mainly focuses on the use of quantitative 'evidence' from the natural sciences. As a consequence, the paper suggests that there are not only practical problems that make it difficult for policy-makers to make sense of public engagement. More importantly, there are deeper epistemological questions that crucially influence both the transfer of meaning from engagement exercises to the policy floor and the success of the general concept in the policy arena.

In examining policy-makers' difficulties in making sense of public engagement in their everyday practices, the paper contributes to the discussion of public engagement and the objectives of democratising debates, facilitating mutual learning, and creating a more robust policy, that are attached to it. It comes to the conclusion that these dimensions might be met in individual exercises, but that their impact is cut short through a lack of uptake on the policy floor.

How to Learn from Objections

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Political perceptions of the need to develop a culture of innovation based in science and technology combined with an experience of major controversies around emergent technologies have fostered an increasing interest in research communication and dialogue as a means to further the innovation agenda and handling controversies. Among STS scholars it has been commonplace to understand this interest as a more or less explicit reformulation of the deficit-theory. This paper will take a different view. Inspired by Bruno Latour and Isabelle Stengers it argues that research communication has a strong potential for influencing the research process by imposing upon researchers a new set of questions which requires attention. The paper draws upon examples from Danish research projects within bio- and nanotechnology and discusses how experiences from social contestation as well as commercial appropriation have influenced researchers sense-making as well as their practices.

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         User Relations

Publics Performing Publics: of PiGs, PiPs and Politics

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It is now commonplace to acknowledge the vast array of techniques for studying 'public understanding of science' and for implementing 'public engagement with science'. Increasingly, there has been a concern with how such techniques do not simply describe publics, or enable the voice of putative scientific citizens. Rather, such techniques come to be regarded as 'making' the public in the sense of furnishing practices, discourses, relations through which publics with particular sorts of characteristics come to be enacted. As such, the present paper treats these 'engagements with' and 'enactments of' the public as instantiations of contemporary modes of governmentality. However, such modes of governmentality need to be considered in relation to broader social and cultural dynamics in which the 'public' is enacted. Specifically, members of publics, in performing themselves as 'members of publics' in exercises of public engagement, mobilise and deploy various and contrasting versions of 'the public'. The paper thus aims to explore such questions as:

a. What are the resources available to members of the public when performing themselves as members of the public? What are the dynamics of identification and differentiation through which members of public come to identify themselves?
b. In what ways do such performances throw into relief the assumptions about being a 'member of the public' or a 'scientific citizen' embodied in the discourses and practices of the various techniques of 'public engagement with science'?
c. How do publics' performative resources and the assumptions built into techniques of 'public engagement with science' interact? Do these interactions produce complex governmental forms in which 'scientific citizenship' is enacted in hitherto uncharted ways?

Accordingly, this paper's contribution to the STS literature entails a re-orientation to the complexity and dynamism of both the public and the contemporary forms of governmentality. Drawing on a broad range of literature, a key aim is to sketch an initial 'parametization' of performative techniques and resources available to lay people. For example, the paper distinguishes between publics-in-general (PiGs) and publics-in-particular (PiPs), and shows how lay persons demarcate these in various ways in the course of doing 'being a member of a public' (and, indeed, from the perspective of STS, doing 'being a scientific citizen'). The paper ends with a consideration of the wider implications of the present analysis, especially for a rethinking of the politics of 'public engagement with science' (in which, say, publics are 'resourced' rather than 'in-voiced').

2.1.21: Bourdieu, Politics and STS: Tensions and Future Paths

Studying Reproductive Medicine with Bourdieu's Tools: Strengths and Limits

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Fields, in Bourdieu's terms, are described by the capital at work in them; in every particular field there is a corresponding particular form of capital, which confers power and influence. The boundaries of the field are to be found where this capital no longer is the main currency of power. But this notion of fields is highly dependent on a further central concept within Bourdieu's reasoning, that of the illusio - as it is only by subscribing to the belief in the value of a particular form of capital, at stake in the field, that this capital attains value. Thus, illusio renders a seemingly deeply structuralist notion of capital/power held by individuals into a more dynamic view of the world which is related to poststructuralist understandings of power/knowledge. In this paper I will explore the usefulness of Bourdieu's notions by applying them to an analysis of the field of reproductive medicine, in a case study of German speaking Switzerland. I will demonstrate that the illusio in this field is complex. The capital at stake is mainly scientific and clinical for practitioners, but while patients do partially subscribe to this, the wish for a child remains the key aim of their pursuit. The power structures of the field are ambivalent, as the practitioners have the clinical power, but the patients pay for their treatment and thus hold considerable economic capital. Thus, ambivalences of multiple, sometimes conflicting values and power positions need to be negotiated both on the part of practitioners/researchers and by patients. Although Bourdieu's 'toolkit' helps to make this visible, I will also discuss some limits of this approach.

The Illusio of Objectivity: Bourdieu and the Complicity of Dissent

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In this paper, I explore parallels between the rhetorical authority of randomized controlled trials (RCTs) in science and medicine, and work by Bourdieu on the cultural reproduction of state authority. In the article "Rethinking the State: Genesis and Structure of the Bureaucratic field," Bourdieu argues that state injunctions owe their obviousness, and thus their strength, to the fact that the pervasiveness of the language of statehood helps to reproduce the cognitive structures through which the state is perceived. He suggests people respond pre-reflexively to a social world riddled with "calls to order," and argues this pre-reflexive submission helps to explain the ease with which the state maintains its monopoly over physical and symbolic violence. Building on this point, I suggest that it is within the nature of any authoritative power to influence and prescribe even the forms of resistance which that authority has engendered in the first place. Even when challenging a dominant viewpoint, individuals are often compelled to follow the dictates of tacit "resistance scripts:" their dissent must adhere to methodological rules stipulated by the very authorities they contest. Through a case study analysis of recent debates over the safety of antidepressant drugs such as Prozac, I apply this insight to RCTs and their use in evidence-based medicine (EBM). I argue that a limitation of EBM is that dissent is limited to those who have the capital to frame their

objections through the very methods they seek to oppose, inadvertently strengthening the systems they seek to challenge. Dissent is complicit in reproducing the structures that have invoked the dissent in the first place.

Awakening STS? Bourdieu, Culture and Politics in the Field of Translational Research.

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This paper argues for the increased use of the ideas of Pierre Bourdieu in the field of STS. The pre-eminent position of Bourdieu in areas such as the sociology of education and cultural sociology is contrasted with a relative 'absence of Bourdieu' in science studies. Our aim is to awaken STS from its 'doxic slumbers'. We outline key elements of Bourdieu's conceptual toolkit: habitus, illusio, capital and field. In brief, fields are hierarchies of power within social worlds which produce a set of dispositions (a habitus, where agents reflect the structures they are embedded in), and where individuals and institutions strive to accumulate capital to maintain (and enhance) their position within a field. Capital takes various interrelated forms: economic (money), social (networks), cultural (education), symbolic (status), and so Bourdieu's schema is useful in understanding the complex (and sometimes hidden) production and reproduction of social worlds (eg inequalities in education). We also briefly discuss some of the pitfalls commonly associated with Bourdieu, for instance the claims that his concepts are too vague, and that his approach is deterministic and ahistorical. We then illustrate the salience of a Bourdieusian approach to science and medicine through a short discussion of our ethnographic research on the field of 'bench to bedside' embryonic stem cell research. In particular, we highlight the tensions in habitus, illusio and different forms of capital within and between both laboratory science and clinical medicine. We adopt Bourdieu's imperative to use and adapt his 'conceptual toolkit' and we introduce five 'new notions': expectational, scientific and clinical capital; and individual and institutional habitus. We conclude with a discussion of the value of a Bourdieusian approach in understanding, and therefore potentially changing, the production and reproduction of inequalities in medicine, science and society.

Forms of Capital in the Field of Medical Education

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Medical education is an arena in which definitions of legitimate medical knowledge are asserted and contested. In the United Kingdom, each medical school employs a somewhat different curriculum, placing more or less emphasis on basic science, clinical skills and social and humanistic perspectives. This paper draws on Bourdieu to analyse the politics of knowledge in medical education, conceptualising medical education as a field and medical knowledge as a form of capital over which medical schools compete. With reference to a

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study of two English medical schools, I argue that the central struggle in the field is between clinical capital and scientific capital. One school studied employed a science-oriented curriculum and sought recognition from the higher education field; the other school was clinically oriented and more closely linked to the healthcare field. Though both curricular strategies are legitimate, scientific capital is more readily translated into economic, social and symbolic capital in medical education. The struggle over knowledge in medical education is ultimately a struggle for power, with important consequences. The unequal epistemological positions and levels of capital among medical schools have implications for student recruitment and the reproduction of the field. The tension between scientific and clinical capital also affects curriculum reform, as attempts to increase the social and humanistic content of medical curricula are refracted within this central field struggle. Using Bourdieu's framework to 'think relationally' throws into relief the hitherto under-theorised relationships between medical schools and medical students, and between medical schools and broader political structures in healthcare and education, and the impact of these relationships on medical knowledge.

2.1.22: Assisted Reproductive Technologies and New Perceptions of the Body

From a Love Story to a Story about Cells

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The paper is based on the research project 'Perceptions of gender, genes and reproduction' studying popular understandings of reproduction in the light of assisted reproductive technologies (ART) and the new genetics. How are ART and biogenetics included in contemporary cultural theories of how reproduction takes place and how is this related to changing perceptions of nature and the natural? The background of this approach is the conviction that to identify, understand and deal with ethical dilemmas in the new life sciences, we need to know how people perceive the process of reproduction, genetic parenthood and gendered bodies. In current informational material about conception and pregnancy, depictions of reproduction have become focused on body parts and details, exemplified by how portraits of male and female bodies are increasingly replaced by illustrations of egg cells, sperm cells and genetic material. The popular scientific information, in the media and at the fertility clinics, is thus increasingly depersonalised and focused on details of the biological body. Egg cells and sperm cells are no longer understood as abstract, microscopic parts of a body but appear as separate and definite units with particular characteristics, in other words as a figuration of a potential human being. The double helix appears in a similar fashion as simultaneously a concrete matter in the human cells and a figuration of a unique individual. Previous research has pointed out how new visualization techniques, such as ultrasound, have contributed to an understanding of the fetus as a separate individual and not an integral part of the pregnant woman's body and this trend seems to have gone one step further, to the level of cells, in the sense that cells are separated out and 'individualized'. The paper will present and discuss some of these illustrations of cells and conception.

Substances of the Body: Cultural Perceptions of Blood and Genes

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Bodily substances, such as blood, sperm, flesh and bones are, as shown in anthropological writings, inscribed with diverse meanings throughout the world. In local theories of procreation, diverse bodily substances are believed to contribute to the creation of the fetus as a physical and viable entity. Simultaneously, the substances are also believed to transmit for instance relations and statuses, and are thus essential in making the fetus a culturally recognized 'social person'.

Based on interview material from lay people in Norway, I intend to pay special attention to how culturally recognized personhood is connected to bodily substances such as sperm and egg cells, blood and genes - the substances that 'matter' in our Euro-American understanding of human reproduction. Which local chains of meaning do these bodily substances occur in? How are they linked with highly valued concepts such as individuality and relatedness, concepts that are constitutive in Euro-American ideas of personhood? How

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are blood and genes seen as part of self and personality?

The paper will pay particular attention to differences between blood and genes as main symbolic substances of the body, particularly with reference to the concepts of individuality, uniqueness and relatedness. Is for instance the idea of 'genes' more individualising than that of 'blood'? Are genes as a connective substance more particular than blood as a connective substance? Is the symbolism of 'blood' more mermeating than that of 'genes' because of blood's concrete and visible presense in everyday life? Are 'genes' and 'blood' similarily related to the concepts of nature/culture, given/changeable, predictable/ unpredictable. Or are there significant differences between them?

Representations of the Egg Cell: Science and Culture on Display

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The Norwegian legislation clearly states that egg donation is prohibited in Norway. This paper analyses interpretations of the egg cell, and emphasises how it is understood differently by men and women, heterosexuals and homosexuals, lay people and experts. The empirical material consists of qualitative interviews, and interviewees were selected to allow the analysis of how a diversity of actors and contexts might result in a diversity of renderings of the egg cell.

The experts interviewed came from philosophy and sociology of the family and were involved in bioethics. While the philosophers explained the egg cell as part of a metaphysical order, the sociologist related the egg cell to the sperm cell and to a discussion of men's and women's rights and obligations towards children. Some women outside the expert group gave added value to the egg cell, compared to the sperm cell, while some men outside as well as inside the expert group thought the egg cell as strongly linked to motherhood. Beside this, heterosexual women as well as homosexual men seemed to agree that ideal motherhood is too strongly associated with women's biological reproductive functions.

Thus, the paper will analyse how both lay people and experts use science and especially new knowledge from genetics to establish their arguments against egg donation, but also how science and genetics are activated to argue for the opposite - to support egg donation. Norway is said to have the world's most restrictive legislation with regard to biotechnology and is one of few countries in Northern Europe that does not include egg donation as part of public health care.

This paper suggests that interpretation of the egg cell is consequential to family politics as well as the regulation of this technology. The theoretical perspectives employed draws on the STS critique of the Public Understanding of Science tradition, with particular emphasis on contributions that has explored how people in everyday life situations perform rational cultural translations of scientific knowledge.

2.1.22: Assisted Reproductive Technologies and New Perceptions of the Body

Bio-Dads: Kinship Practices among Gay Men Who Have Become Parents through Surrogacy

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This paper explores the 'natural relationship' created by genetic inheritance in the families of gay men who have become parents through surrogacy. Kinship, as Dona Haraway noted, is a 'technology for producing the material and semiotic effect of natural relationship, or shared kind'. In particular, the paper investigates the medicalisation of kinship resulting from the new genetics (and how this shapes the experience of family) with a particular focus on the notion of bilateral descent.

This analysis is based on data from in-depth interviews with gay men in Australia and the United States. The interviews explore these men's decisions about having children, and their understandings of parenting and family and their negotiation of the legal and bio-medical aspects of reproductive technologies.

This material shows two distinct ways of conceiving relations - the made and the given. That is, the social and the genetic. As Marilyn Strathern suggests, these different ways of thinking about relatedness parallel the ways in which knowledge itself is validated - as either invention or discovery. Although the kinship practices of these men illustrate a strong emphasis on kinship created through 'choice' (intent, affect), importance is also given to genetic destiny (prescription) that is coded in DNA. The latter illustrates the medicalisation of kinship, paradoxically at a time when new reproductive technologies have provided the opportunity for gay men to have children that did not previously exist, and potentially undermines attempts to create families of choice based on autonomous individuals. This emphasis on genetic links also illustrates the notion 'genetic families' where members are linked primarily through the information their bodies hold about one another. In particular it is often anticipated that egg donors will makes themselves available in the future to provide further information about family medical histories.

These data show varying degrees of importance placed on biogenetic relationships (parenthood), and on the social aspects of parenting. They also show that kinship in this group is built on a hybrid of so-called natural and cultural facts - particularly genetics, gestation and parenting practices. Notably, surrogacy does not necessarily create a 'natural' link between the child and the woman who gives birth. Rather, this link is created or enacted through 'choice' - one that may or may not be pursued in the future. However with the medicalisation of kinship a connection between egg donor and child must exist, irrespective of choice.

2.2.1: Interventions: Oral Life History Interviews with Women Scientists

Strategically Enacting Career Narratives: Interviewing Women Scientists in Japan

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Since 2005 I have been collecting oral life histories from women scientists in Japan, supplementing my fieldwork conducted since 1976. In my talk I will address gendered, generational, local, trans-national, and disciplinary differences in both these scientists embodied narratives about how they have strategically negotiated the challenges of building careers in changing ecologies and mine. I also will explore how we all have made use of my ethnographic fieldwork and oral history interviewing project, all acting within and beyond the boundaries of our research.

These oral life histories have been collected as part of an intersecting set of projects, using audiovisual recording equipment, with the goal of developing digital archives. They also are informed by more than thirty years of anthropological fieldwork among physicists in Europe, Japan, and the United States. Life histories have been collected by anthropologists for about a century; beginning in the 1970s many feminist researchers have interrogated the gendered assumptions embedded in that research and revised the methods to address the formation of privilege and marginality within and across communities of cultural practices.

My work is situated at the intersection of cultural, feminist, and narrative studies, studying the performance and enactment of privileged knowledge making cultures. I study embodied narrative strategies in the daily performance of diverse visual, oral, textual, and material cultural artifacts. These gendered life histories reveal diverse strategies for constructing career narratives.

I study variations in the transnational high energy physics community's craft knowledge, research styles, learning and pedagogic practices, disputing processes, social structures, and political economy. I do the same for my fields: anthropology, history, and womens studies. My research has focused on how clusters of researchers strategically appropriate and negotiate shifting local and trans-national knowledge making ecologies: research equipment, intellectual traditions, debates, laboratories, universities, conferences, policies, funding, and public cultures.

In the course of these activities we researchers produce distinctions, privilege, and marginality within our communities. We try to control our borders and we think we have a shared history and expect to have a shared future, although we frequently disagree about how to engaged in these tasks. I also explore our strategic uses of national, regional, class, and gender differences as we build our ecologies and conduct the work of making knowledge,

Twenty years ago I explored how Japanese women negotiated their position as doubly marginalized: women scientists building careers in Japan, at the margins of the then dominant research arenas in Europe and North America. I also compared their strategies with those of US women scientists. Now I can explore how the enacted narratives of women researchers in Japan and the US have changed as our ecologies of knowledge making have changed during the last two decades.

2.2.1: Interventions: Oral Life History Interviews with Women Scientists

Gendered Contingencies and Negotiations in Ethnographic Fieldwork when Studying Plasma Physicists

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The aim of this paper is to discuss acting as a gendered self in ethnographic field work and how it becomes an act of contingency and negotiation in relation to collecting data among plasma physicists. Laboratory work is a central activity amongst my informants and is continuously defined and negotiated. The meaning of research and identity as a physicist are articulated through practices like hands-on knowledge and skills in building equipment and machines, beside the actual experimentation and data analysis. The hands-on skills are in talk and stories defined as an essential for an experimentalist. These skills are also gendered, reflecting my informants narratives on machines and the essence of experimental physics and the actions through which the younger physicists learn the hands-on work. I discerned a jargon among my informants that was gendered research ideals and what being a real physicist means. Even so, people in the lab claims that it was a neutral space without gender biases or hierarchy. By defining themselves, the physicists also defined me as an anthropologist. Coming from a Swedish gender context, I realize that the American gender context challenged my intended interactions with my informants. In order to collect data, I as an ethnographer had to act and challenge the informants environment, and sometimes stories. Through that action and as a woman and ethnographer, I become what Donna Haraway calls inappropriate/d other. Every researcher bears different experiences and belongs to different social worlds, depending on class, ethnicity, gender and locality. These different experiences give each person a set of dispositions. When a researcher tries to act through or scan a situation it is done through the lens of these dispositions.

My work is situated at the trisection of science and technology studies, gender studies and cultural anthropology, where I focus on narratives on the construction of gendered research identities, knowledge representations and embodied practices in laboratories. In my earlier research I have been studying the gendered construction of technology and research identity on an innovation research institute, developing prototypes and research within information and communication technology. In my present study, I have conducted field work at a plasma physicist laboratory in the United States, using following observations and deep interviews. My study will contribute to the debate about contingencies and negotiations while collecting ethnographic data and how these methodological contexts are gendered. Moreover, my paper will contribute to the debate on how an ethnographer studying science negotiate between acting with and through the scientists and being an inappropriate/d other.

Ethnography in Practice: Learning to Make Knowledge Differently

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My scholarly work is informed by, and seeks to grapple with, my immersion in the practices and discourses of science and engineering education: teaching at a high-end undergraduate

2.2.1: Interventions: Oral Life History Interviews with Women Scientists

college for science and engineering, I seek to interrupt conventional fantasies about the power of scientific knowledge while hoping to nurture my students understanding of knowledge making practices; I seek to make a difference in the way in which they engage these practices, while leaving their enthusiasm intact. In this paper, I explore this balancing act: I seek to articulate the value of teaching anthropology, its methods, approaches, and philosophical dilemmas in the context of undergraduate science and engineering education.

As an anthropologist of science and technology, I have become interested in pedagogy as applied STS. My classroom is a field site where I study the making of scientists and engineers and where, at the same time, teaching anthropology is made to be an intervention in this process. The paper hopes to relate two findings that come out of my teaching an research: the study of the self, especially when it is made to be understood in its cultural contexts, appears to be an effective machine for contextualizing and querying the practices of knowledge-making - while any mention of gender, among my constituency, blocks this path of inquiry and learning altogether. The paper mobilizes fieldwork in the classroom and outside, interviews with students, instructors and diversity workers at the college, focus groups, and exit and assessment exercises. My current research is an ethnographic study of a big science project-in-development, the TMT (The Shaping of an Extremely Large Telescope).

Life Histories of MIT Women Graduates:
Institutional, Historical and Personal Impact

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As director of the The AMITA/Margaret MacVicar Women's Life History Project at MIT, I have trained students in oral history so that they conduct interviews with women graduates from the Institute. The goal of the project is to produce an archive of life histories of MIT women graduates. These archives, available to the public, are used for research on the history of women at MIT and the evolution of the Institute with regard to women, the study of women in higher education in the U.S., and the changing role women especially in the fields of science, engineering, technology and architecture. MIT was one of the first technological universities in the USA to admit women. When the project began, the three women graduates from the class of 1922 were still alive, and constituted the first group of interviewees. These three foundational interviews show clearly the social, political and historical constraints that surrounded women - regardless of educational achievement - as well as the successes each of these women attained through use of deep scientific understanding combined with sheer grit. The Project also gives undergraduate students at MIT an incredibly rich opportunity to learn about women of another generation and affords them a hands-on historical perspective that transcends labels they sometimes reject.

The project is generously funded by MIT women graduates. This support has made it possible to begin to realize the long-term goal of establishing a national resource on women's education in non-traditional fields. With my direction each student researches the background of the alumna, contacts her, learns how to complete an oral history interview, meets and interviews the alumna and then transcribes, edits and negotiates its final deposit in the archives. Without exception, the undergraduates have found this experience one of the

2.2.1: Interventions: Oral Life History Interviews with Women Scientists

most energizing and exceptional in their undergraduate years: "I consider myself lucky to have met these determined women and gotten the chance to talk about their life histories... Though they may not know it, they have inspired me to always strive for my dreams and to never give in if others try to discourage me. They have taught me that after leaving MIT, one can go forth and reach whatever goals one aspires to accomplish." (Eleni Digenis, '94) I will address the positive aspects of this project as well as some of the multiple challenges it continues to confront - including resistance from alumna families. This project creates links across multiple generations of women students in science and engineering, negotiating narratives and identities, empowering both interviewer and interviewee, and constituting communities. Each year undergraduates and those alumna who have participated in the project come together in a group to re-discover the power of the exchange.

2.2.2: Human Technologies: Techniques and Practices from the Social Science

The Social Technology of Mental Disorder

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Listing 301 psychiatric disorders the current edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM) provides criteria for psychiatric diagnoses such as MDD, BDD and IED (major depressive disorder, body dysmorphic disorder, intermittent explosive disorder), just to name a few. From its first version listing 106 disorders in 1952, this classifications system made by the American Psychiatric Association (APA) has been an object of increasing ridicule and downright anger. Critics have always argued that it has been merely fabricated by an accidental group of American psychiatrists and that it is oppressive. In addition, a committee preparing the next version of the DSM planned for 2010 (and now delayed) concluded that, so far, biological markers have been found for not one of the 301 DSM disorders. To many of its enemies, this proves once more that the DSM is not scientific at all. In the meantime, their attacks have been strengthened by laboratory researchers partly blaming the DSM for their inability to find biological markers. Rather than grouping people together with similar underlying diseases the DSM is blamed of saddling biomedical research with actually quite heterogeneous groups. Seen from an STS perspective, however, the DSM might well be called one of the most successful technologies ever. It has numerous human and non-human allies all over the world. This paper develops a stance in 'the DSM wars'. I will argue that there is nothing unscientific about the DSM which, however, does not yet immunize it from critical appraisal.

Machines and Machinations: the Sequel

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Terms like 'social technology' and 'human technology' sound suspect: Science and Technology Studies, after all, has shown that 'society' and 'technology' are inextricable, all engineering is heterogeneous, and people are cyborgs. In this context, 'social technology' smacks of dualism. In practice however, the new approach to technology has continued to focus on devices, artifacts, objects: on machines rather than machinations, to borrow Latour's phrase. Yet, each year, faculties of social science and management pour out legions of graduates skilled in a dazzling array of social technologies: psychotherapy, behaviour modification, time management, assessment, interviewing, and breaking bad news, to name but a few. Since the days of Machiavelli, the development of social technologies has continued unabated. I will argue that these technologies merit more attention from an STS perspective, not only to complete the picture of the current technoscientific landscape, but also to refine its view of heterogeneity and its critique of dualism. I will illustrate my argument with the example of a ubiquitous social technology, the psychological test, and focus on its play with resistance.

to establish a certain order based on differentiation, standardization, classification, objectification and homogenization.

This paper is based on the anthropological fieldwork conducted in India among two marginalized communities. It tries to understand the various dimensions of risk perceptions and the mechanisms of negotiations of the risks among the marginalized communities who are the potential users of these genetic health care intervention programmes. I argue that the idea of 'risk' and perception of 'being at risk' are not only the byproduct of application of new genetic knowledge and technology but it also emerges out of a complex web of interactions between the various stakeholders in these programmes. The understanding of these new risk perceptions becomes all the more important in the context of developing countries like India, where large number of people are poor, illiterate and marginalized.

The paper tries to explore the following questions: How do the marginalized communities perceive the risk of a genetic disease? What are the various determinants of these risk perceptions? How do people negotiate these risks in their day-to-day life? What is the role of the various stakeholders in the construction of these risk perceptions?

A Multi-sited Ethnography of Emerging Forms of Life: The Case of β-Thalassaemia in the Indian State of West Bengal

Kalpana Ram

2.2.3: Technology and Perception of Risks and Diseases, II

to control and particularly with the idea of controlling the future . These intervention efforts are testimony to a 'shift' from the old understanding of a problem like illness or a health condition caused by external factors like God or environment to a new and scientific understanding of the problem explained on the basis of inheritance pattern or genetics.

Propositions:
With varying methods and purposes, differential intervention efforts that include population genetic carrier screening, counseling and treatment efforts, for sickle cell anemia bring different types of risk perceptions into picture. In this paper I try to explore how intervention efforts bring different types of risk perceptions for individuals and communities living in different socio-cultural and political situations. I also attempt to understand that to what extent the ideas of risk perceptions affects individuals, their families and groups. Based on my fieldwork research, I put forward four propositions vis-à-vis risk perception and genetic health intervention efforts in India: (1) Modernization induces risk perception irrespective of societal contexts (2) Risk ideas are contextual; there are 'good' risks that are maneuvered as advantageous and there are 'bad' risks that are disadvantageous (3) Though modernization rouses or renews the idea of risk, but, socio-cultural factors largely influences and shape the way risk is perceived in a society and (4) The strategies or means of modernization (e.g. health intervention) determine the kind of risk perception that emerges in a given society than the modernization itself.

Methodology:
Data for this paper was primarily generated through social anthropological fieldwork techniques like case studies, interviews and participant observations in India among four different tribal and caste communities living in four different states. Individuals, community leaders and health care professionals and activists were the unit of study. The data was collected between April 2006 and May 2007.

Contribution to STS literature:
The general findings and broader arguments put forward in this paper will expectedly generate debates on the way new genetic knowledge and technologies are used in marginalized societies and the way people understand and deal with them. This debate will be a contribution to the STS literature.

We've Got Enough Problems: Subjective Understandings of Infectious Risk in Xenotransplantation

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In sociological theory, risk is often conceptualised as a pervasive and feared feature of our everyday lives. In such understandings, society is cast as risk adverse, whereby risk is a hazard or danger that is caused by and the responsibility of humans who, in their own rational interest, should seek to minimise that risk. Such approaches however, fail to sufficiently account for subjective definitions, performances, and lived experiences of risk. For example, Douglas (1992: 23) outlines that risk can be a neutral concept, whereby it can either be a positive or negative experience as influenced by "the probability of losses or gains". Consequently, risk-taking can lead to fortuitous outcomes, and should not simply be

2.2.3: Technology and Perception of Risks and Diseases, II

avoided. How risk is understood and analysed is particularly salient for engaging with new and controversial medico-scientific innovations and dilemmas, such as xenotransplantation.

Xenotransplantation (XTP), or animal-to-human transplantation, involves infusing, implanting or transplanting living animal cells, tissues or organs into a human recipient. In the Australian context, human clinical trials of XTP are currently under a five-year moratorium, which is due to expire at December 2009. This moratorium was put in place by the National Health and Medical Research Council, who were concerned by the scientific uncertainties surrounding potential cross-species viral transfer (zoonosis), and the belief that more scientific research needs to be done. What this evaluation ignores however, is how the Australian public understand and perceive levels of risk desirability in XTP, as well as the relationship between risk and XTP in general. This is most important in regards to people with medical conditions targeted by xenotechnologies, such as people with Type-1 diabetes, Parkinson's disease, Huntington's disease, people on dialysis, and people waiting organ transplantation.

Drawing on primary interview data collected in Australia from August 2005 to April 2006, I will examine how people specifically targeted by xenotechnologies construct risk. While it was found that the research participants construct risk in a multiplicity of positive and negative ways, I will primarily focus on how the research participants discuss the relationship between zoonosis and XTP. This reveals that they draw upon their existing knowledges of zoonosis to make connections between potential zoonosis and XTP. Specifically, the research participants use recent and current zoonotic concerns, such as severe acute respiratory syndrome (SARS) and avian influenza, to illustrate their indifference and/or concern to zoonosis in XTP. Consequently, despite the potential benefit of XTP to all the research participants, connections between zoonosis and XTP risk cannot be simplistically made. Rather, they are influenced by the research participant's own social risk assessments of zoonosis in general, rather than relying upon the assessments made by 'experts'. As a result, risk is a perception that is reflexive; guided by lived experiences and knowledges that are situated and embodied. These types of knowledges should not be marginalised, and need to be considered, respected and valued in decision-making and regulatory processes.

Risk Knowledge and the Prevention of Chronic Disease in the Age of Molecular Medicine: the Case of Cardiovascular Diseases in Finland

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The topic of the paper is the shifting logics in the understanding and control of a major contemporary public health problem, cardiovascular diseases. More specifically, it focuses on the current "geneticisation" of this group of diseases and its (prospective) effects on their prevention. How is the understanding of chronic disease changing through the molecularisation of medicine? How does this transform the older, lifestyle-based concept of their prevention?

The key to these developments is the concept of risk, which guides both medical research and preventive practices. Molecular medicine introduces new risk factors and reformulates old ones in a way that has the potential to challenge established understandings. This risk

2.2.3: Technology and Perception of Risks and Diseases, II

knowledge initiates a series of subtle changes that take effect on many levels (clinical pictures and disease classifications, the geographical and social patterning of disease, the primary targets of public health work, questions of attribution and responsibility etc.).

The uses and potentials of the new genetic risk knowledge are explored in the context of Finland, where cardiovascular diseases have been a main public health issue since the 1950s. Consequently, there is a strong national tradition both of preventive policies and medical research targeting this group of diseases. However, the role of this tradition vis-à-vis molecular medicine is ambivalent. On the one hand, it has created conditions for genetic research and public health genomics by assembling vast longitudinal health records of the Finnish population. On the other hand, it is committed to lifestyle-based risk reduction strategies and likely to resist departures from this paradigm.

The study comments on the burgeoning contemporary discussion on the consequences of novel biotechnologies in medicine and public health. It presents a perspective that is somewhat missing from the debate: rather than looking at the "revolutionary" effects of the new knowledge, it focuses on the subtle changes introduced into an established field of practice. This makes possible a more balanced estimation of the potentials of molecular medicine in demarcating and preventing chronic diseases.

Theoretically, the study contributes to the understanding of exchange between laboratory work and other domains in fixing new objects (genetic risk factors). In case of molecular medicine there seems to be striking differences in the framing of research questions within "the laboratory" and outside it: in more applied contexts the focus on postgenomics, epigenetics and complexity is often discarded in favour of a more straightforward gene concept. The paper describes the dynamic and circular relationship between genetic knowledge and its "application", and the way the prospects in terms of public health benefits are used to consolidate the research programme of molecular medicine.

The paper is based on textual analysis of medical and public health texts. Both specialist material on the genetic background of chronic diseases and more popular texts on the use and significance of this novel knowledge for public health are examined.

2.2.4: Symbolic Internationalism: Computing, Users and (Trans)National Agendas

Policy Machines: Shaping European Computer Users

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With technical aid provided through the Marshall Plan, US politicians, administrators and executives sought to shape European firms and markets after the American model. This paper argues that in the years following WWII, computer technology was used to instill in European managers and technical experts the values of productivity, free enterprise and economic integration.

Scholars in Science and Technology Studies have in recent years turned to studies of political interventions with science and technology. Yet, many of these studies implicitly assume the given context of nation states, expressed in regulatory and other local conditions. A few works, leading among them Jasanoff's Designs on Nature (2005) and Beck's Cosmopolitan Vision (2006), go beyond such national studies; this paper seeks to contribute to this growing literature. Based on research in the records of the Marshall Plan administration as well as in corporate archives of computer manufacturers, it provides a historical case study of the co-production of policy and business with computer technology across national boundaries.

Supporting European postwar recovery, the Marshall Plan comprised a technical exchange program that was aimed at increasing the productivity of European firms and at advancing the economic integration of European markets. Through this program, called the Productivity and Technical Assistance Program, US experts were sent to Europe to consult with corporations and governments, and European study groups were brought to the US to familiarize themselves with American corporate and technical culture. Leading US computer manufacturers, among them IBM and Remington Rand, participated in these efforts: their top executives were part of the progressive business community that supported the Marshall Plan in congressional testimonies, and the companies hosted European study groups, and integrated their own operations in Europe. Even if Marshall Plan administrators and computer manufacturers did not directly collaborate, they were doing the same work: instilling the values of productivity and economic integration in Europeans. Yet, closer analysis reveals differences between their approaches towards shaping Europeans communities. While Marshall Plan administrators sought to win over Europeans and change their attitudes, corporations single-handedly enforced American ways in their own operations in Europe.

The Marshall Plan stood at the roots of the global development regime, both are characterized through the continuity of ideas, actors and institutions; this paper provides insights into the beginnings of today's global co-production of technology, policy and business in a regime of American hegemony.

Transnational Technology:
the Unified System of Computing and its Discursive Practices

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Internationalism formed an integral part of socialist discourse and was supposed to be deeply rooted in the perceptions of policy makers and people. In actual fact national identities continued to exist within or less surprisingly against the framework of socialist societies. While crypto-nationalism has been studied extensively in the past, the fragile balance of internationalist discourse and national interests has received far less attention.

The paper addresses this friction featuring the example of a truly inter- if not transnational undertaking, the creation of a transnational large technical system that was hailed as a paradigm of socialist cooperation - the Unified System of Computing (EC).

With the Unified System of Computing, created from 1967 to '69, the Comecon countries created a computer system that was closely modeled after IBM's system /360 and that was developed and produced in at least five Comecon countries, with others joining later. This enterprise required large-scale technical cooperation among the participants, creating the need to coordinate political bureaucracies, research and development as well as sales departments. Documentation and software had to be created for a multilingual environment and a fair amount of travels and coordination was needed not only among the top bureaucrats but also among developers and what came to be software engineers.

The paper will focus on three major aspects of this process. Firstly it will delve into the process of creating the Unified System and trace the frictions of internationalist discourse and national interests and provisos from the side of East Germany. Secondly it will focus on the creation of a transnational technical community and highlight the discursive shifts that made this community possible. Thirdly the paper will reflect on the official image drawn for both western and eastern audiences of the Unified System as an achievement of socialist cooperation.

Socialist Internationalism and its Limits in Czech Computing

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My paper explores the changing cultural meanings attached to the Comecon's Unified System of Electronic Computers (also discussed by Simon Donig) in Czechoslovakia. According to official sources the Unified System was a shining example of socialist technological prowess and of the accomplishments of peaceful international collaboration. Compatibility between the computers was to mirror the economic and political integration of Eastern Europe with the Soviet Union. I argue that a closer examination of the actual reception of these machines by Czech users tells a very different story. This paper integrates work on the technical and political history of the Unified System project in Czechoslovakia,

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based on hitherto untapped archival sources, with a user-oriented perspective influenced by recent work in STS.

Observed closely, even the idea of international compatibility starts to seem problematic. At the very beginning of the project in late 1960s Czech computer scientists did not want to discard the work design work they had done for the new Czechoslovak computer, so they included a couple of novel features in the Czechoslovak Unified computer, which rendered it incompatible with the computers produced in the other Comecon countries. Czech users also seem to have been aware that the Unified System design was in fact an exact but unlicensed copy of the American IBM system/360 designs. The users of the unified system computers were frustrated by their inaccurate and faulty operation and, when possible, they opted for buying the IBM system/360.

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The Goodbye Petrovka Plan:
Internet Use and National Identity in Ukraine

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MIT was one of the first technological universities in the USA to admit women. When the project began, the three women graduates from the class of 1922 were still alive, and constituted the first group of interviewees. These three foundational interviews show clearly the social, political and historical constraints that surrounded women - regardless of educational achievement - as well as the successes each of these women attained through use of deep scientific understanding combined with sheer grit.

2.2.5: Public Understanding of Science in Asia and Brazil

Between "Public Understanding Promotion" and "Science Communication" : Japanese Development of Science Communication in the Introductory Period

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This paper investigates the achievements and problems of science communication in Japan, which has experienced the introductory period for the last several years. For this purpose, I conduct a sociological case study into a science communication project at Hokkaido University, CoSTEP, which I am affiliated.

In Japan, science communication has been drawing increasing attention for these several years, against the background of the unpopularity of science subjects among young people, and the growing distrust in science and technology. The government's Basic Program for Science and Technology (2006) stresses the accountability to the public, responsible actions against ethical, legal and societal problems, and the enhancement of public engagement in science and technology. The government recently geared up science communication by putting higher budget priority in the field.

As a part of such effort, the education ministry funded three universities for starting up special education programs for science communicators and science journalists. CoSTEP (Communicators in Science and Technology Education Program) at Hokkaido University, starting in 2005, is among these three programs and offering one-year education program of science communication for graduate and adult students.

The major question here is whether such initiatives encourage science communication in a sense of interactive communication between the public and science and technology, instead of conventional one-way "public understanding promotion" policy. One of the features of CoSTEP is learning through practice, and the students not only listen to lectures in the classroom but also perform science communication activities as a part of the training program. This practical training covers a wide array of science communication activities such as the production of radio broadcasts and science cafes, web creation, the publication of newsletters, science class delivery to elementary and secondary schools, and the management of a consensus conference; CoSTEP can be deemed as a miniature of science communication movement in the country. The overview of these activities reveals the possibility of interactive science communication, which may enhance public engagement in science and technology, but the problems remain unsolved how to sustain such activities in the society, securing financial resources and facilitating the use of human resources.

Through sociological survey into CoSTEP, including participant observation and interviewing, this paper clarifies the achievements and challenges of the country's science communication movements in the introductory period and assesses if the movement would provide a successful alternative to conventional one-way "public understanding promotion" and facilitate public engagement in science and technology.

2.2.5: Public Understanding of Science in Asia and Brazil

Laboratory-Based Training of Science Communication: the Hundred Mysteries of the Universe Project

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This paper presents the background, concepts and content of a newly-developed laboratory-based training program of science communication for young scholars.

BACKGROUND: Science communication between researchers and the public is a major topic today in a Japanese science and technology policy context. In 2005, three universities started science communication programs for graduate students with governmental financial support. But the courses focus mainly on general skills and are not directly related to the field students specialize in. Furthermore, the students are required to take science communication courses in addition to pursuing their research. This places a heavy workload on them. As a result, the number of enrollments is still limited. An alternative program is needed which is more closely related to a students' specialist discipline and their daily research activities.

OUTLINE OF THE PROGRAM: A new-type training program was developed at the Astrophysics Laboratory of Nagoya University. The characteristic of this program is that the whole project is embedded into the daily activities of researchers in the laboratory, especially its outreach activities. The program, named "Hundred Mysteries of the Universe", was started in 2006. It is now in the final stage. The project was taken mainly by graduate students and postdoctoral fellows and four faculty members acted as advisers, two of whom specialize in astrophysics and two in STS.

In the project, the trainees collect questions concerning the universe from people outside of the University, compose tentative answers to these questions, release them to the public, collect comments on their answers, and revise the answers. These exchanges were mainly through a website, which is operated by the trainees themselves. In due course, they also organize and carry out an open event, in which they directly speak with a variety of participants including school children and elderly people. Through this project, the trainees are intended to learn how to develop and organize channels for communication as well as how to communicate with citizens.

FINDINGS: We conducted participatory observation, listening to trainees and faculty members, and a survey to understand the perceptions of trainees and participants outside of the University toward the project.

One significant change indicated by the trainees is that they realized that, contrary to their understanding, people regard experts as those who can answer any questions in their field, which resulted in much hesitation to answer questions outside of their narrow specialty. They also realized that the variety and scope of peoples' questions was beyond their expectation. Another major change is that trainees become aware of the pleasure of exchange with the public. The trainees said that the project should be continued as an intellectual space for exchanging ideas about the universe with various people.

Through the laboratory-based training program of science communication, trainees can learn its importance directly and naturally with faculty acting as good role models. Some points are

2.2.5: Public Understanding of Science in Asia and Brazil

still open for discussion; what are the demerits of this program and what kind of an institutional or external support are required for this kind of program?

Scientific Cafes in Japan: A Critical Review

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Science and technology communication among citizens has become popular in Japan in the last four years. The first science cafe in Japan was held by NPO in Kyoto in the autumn of 2004. Many science cafes have since been held by universities, administrations, NPOs, academic societies and associations. According to the report of Japan Science and Technology Agency, science cafes have been held in 324 places in Japan from March 2007 to February 2008. Although science cafes become popular in Japan, it seems to me insufficient that science and technology communication has progressed by science cafes. Has "Interactive communication" that is one of the purposes of the science cafe been achieved? Was a new relationship between science, technology and society able to be constructed? Does it give a chance for science and technology researchers to reflect on the results of their studies with the public?

In order to obtain suggestions for an ideal science cafe, this paper reviews and examines the present conditions of science cafes in Japan. I will discuss the history of these cafes, their management method as well as the difficulties and shortcomings of such cafes in the Japanese context, especially using the case of science cafes in Hiroshima City as an example.

The paper concludes that some of the difficulties in the science cafes are caused by children's tendency to lose interest in science. Also the change in the national policy of science and technology has created a negative effect. It also suggests that sponsors and facilitators need to have common consensus about "What is the participant's request? (Does they only want to obtain up-to-date information, to give any opinions, or to communicate with scientists?)""Does a lecturer understand the purpose of science cafes?""Can a topic in trans-science be treated in the cafe?" etc.

Living Science & Public Scientific Literacy

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This paper puts forward the concept of "living science" based on the review of current situation of public scientific literacy in China (Mainland) and international comparative studies. Generally speaking, the degree of Chinese public's understanding to most of the concepts was lower than that of USA, EU and Japan. Meanwhile all these countries showed the same trend of relatively high or low, but there are appeared some abnormal besides the

2.2.5: Public Understanding of Science in Asia and Brazil

universalism and similarity. Related analysis reveals that public understanding of science and public scientific literacy are matter of content, context and traditional dependence. And, there are five characteristics of living science: connecting tightly with basic living demands; giving importance to accessibility and perception; integrating with social knowledge; putting instrumental and practical result in the priority; connecting inherently with cultural tradition deposition. (shortly as BASIC) If we could say that science is refinement of everyday experience and thinking, then approaching to scholarly "academic science" from "living science" which particularly emphasized on common sense becomes an essential way for public understanding of science. Also, it has an important implication: "academic science"(R. K. Merton, UCDOS: universalism, communism, disinteresting, original, skepticism.) should be linked with "post-academic science" (J. Ziman, PLACE: proprietary, local, authoritarian, commissioned, expert.) and "living science" to conduct the activities of science popularization in order to guide the public understanding and using science in daily life. It is that the public scientific literacy not only consistence of elements of pursuit of truth, but also seeking for wealthy and hankering for well-being.

Science, Technology and Social Inequality in Brazil: Contributions from Sociology of Knowledge to science Education

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The limited access to the university is one of the principle characteristics of higher education in Brazil. Millions of the youth do not have the possibility or the opportunity to advance in their studies, a reality that aggravates the social inequality of our continent even more. We can point out that university teaching is passing through a time of change. Many speak of neo-liberalism, globalization, and post-modernity. For the purpose of this article we can affirm that we live in a epoch of transition. How can social sciences contribute to the discussion on scientific knowledge and technological application in this context? It is presented an introduction of the main Sociology of Knowledge authors, until its unfolding so called Sociology of Scientific Knowledge. The studies in this recent field can contribute to a better perception of the role of science on the modern society, especially in the context of the teaching of sciences in Science-Technology-Society approach. Note that the Sociology of Scientific Knowledge suggests a multiple scientific practice, one that involves several actors in its execution and takes into consideration the social aspects in the production and application of science, aspects that need to be included in the science education. To conclude, and related to the Brazilian situation, this recommendation should lead to the comprehension of the role of the interaction between scientific production and the Public Sector. A second important aspect is about the need of a continual formation and atuation against social inequality present in the country. If not, science in Brazil will be less than it could be while a need of the society; it will only represent a luxury for few.

2.2.6: Health Promotion and Prevention Programmes in Practice

Balancing Surveillance and Individualised Lifestyle Advice; Mediating between Two Worlds in Primary Care

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Prevention programmes are based on the idea that (good) health is a matter of self-control. People are expected to actively manage health by lifestyle modifications, self-surveillance and bodily restraint. In fact, these prevention programmes aim to alter individuals' lifestyles such that this reduces the probability of future illnesses. This paper provides an in-depth analysis of a pragmatic trial on the effectiveness of a secondary prevention intervention for cardiovascular diseases by means of multidisciplinary care teams in primary care in deprived neighbourhoods. The analysis draws on empirical material collected through participant observations of patient consultations by practice nurses, and (in)formal conversations with practice nurses and patients.

This paper analyses how in these kinds of prevention programmes health care professionals balance systematic screening services and the systematic attribution of risk with individualised lifestyle advice. The prevention intervention was based on the idea that populations can be monitored based on systematic pre-detection of cardiovascular diseases (CVD). Through structured treatment plans, new health care professionals - practice nurses and peer health educators - providing culture-specific health education, as well as recurrent physical examinations and blood tests during follow-up, patients 'at risk' for CVD were monitored. However, in order to establish and sustain more and long-term effects of behavioural change in patients, this intervention had an individual-orientated approach. Patients participate differently and make choices to what facets of lifestyle change they incorporate into their lives. The trial results have shown a minimal health improvement. So, although health was seen as a matter of self-control, this programme also facilitated a partnership model to prevention. Hence, the patients are both configured as individuals who are responsible for their own health and individuals that need to be assisted in taking up this responsibility.

Therefore different issues can be explored concerning prevention interventions using an individual-orientated approach. Firstly, the notion of control. Screening services and recurrent risk assessments can be seen as mechanisms of control, as they provide a regulatory impulse towards 'at risk' patients. As patients remained enrolled in follow-up, but behavioural change was difficult to bring about, the notion of control is redefined. Secondly, the notion of modifiability of risk. Prevention implies that health risks can be modified or minimised through lifestyle changes. However, the inability of patients 'at risk' to alter their lifestyles indicates that risks may not be modifiable per se. And thirdly, the creation of an artificial reality. An individual-orientated intervention facilitates 'at risk' patients to integrate their new health status into their lives and translate it into terms of subjective, lived experiences. However, the emphasis on systematic attribution of risk made 'at risk' patients decline participation in the intervention after the trial phase. This indicates that an artificial reality was created, that countered the sustainability of the intervention in practice.

2.2.6: Health Promotion and Prevention Programmes in Practice

The Tyranny of Protocol:
Chronic Disease Self-Management and Social Order

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Chronic disease is receiving increasing attention in Canada because of its burden, not just on individuals and their families, but on the health care system and the Canadian economy. According to the Health Council of Canada, "good chronic disease management programs have demonstrated that they can improve patient care and the quality of services while reducing health care costs". As a result, responsible citizens are expected (by the state, fellow citizens, and themselves) to participate in chronic disease self-management strategies.

This paper proposes to examine the literature on chronic disease management and the empirical site of the current chronic disease management strategies of the Canadian province of British Columbia (BC). I will look the strategies and practice guidelines that appear on the BC Ministry of Health's website as well as the information on the Chronic Disease Self-Management Program in BC that appears on the website of the University of Victoria, the facilitators of these programs for the government. These strategies and programs reflect the current demands within the "evidence-based" discourse that permeate many practice and policy-making settings.

I will examine the arguments promoting chronic disease management and the epistemological debates that appear in the literature on "evidence-based" practice, as well as the concepts of responsibilisation, governmentality, and Foucault's "technologies of the self". Together, these will provide the theoretical framework to explore how the policy strategies of chronic disease self-management position people with chronic disease as key actors not only in their own health care but in the management and organisation of the health care system and health care and social services. Questions I hope to answer include: How do these strategies, which demand regulation, compliance, accountability, and personal responsibility, allow for the complexities of people's lives? How do evidence-based protocols and guidelines as well as technologies such as flow charts and test results contribute to an ordering of people's lives? This paper will contribute to STS research and current debates about evidence-based practice by problematising the purpose and effects of the policy strategies of chronic disease self-management.

Going for Gold: More People, More Active, More Often

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Going for Gold is a Public Health Intervention to increase physical activity levels in sedentary adults whose lifestyle means that they are at risk of developing chronic health problems such as Obesity and Coronary Heart Disease. It focuses on adults who are unemployed, disadvantaged or socially excluded. It has the distinction of being unique in the world, and is

2.2.6: Health Promotion and Prevention Programmes in Practice

the only scheme to reward people for being active and improving their health knowledge and understanding, on a City wide scale (population 137,000). This intervention is a partnership between Newport Local Health Board, Newport City Council, Welsh Assembly Government, the Welsh National Public Health Service, many Voluntary Organisations and local Businesses. Set in Newport, South Wales, UK and covering many areas of deprivation, the project has already attracted 31,000 local residents to join. Going for Gold is committed to delivering the National Outcomes of More People, More Active, More Often by acting as a catalyst for significant change in activity patterns, providing doorstep opportunities, and promoting cycling and walking as environmentally sustainable forms of transport. Going for Gold co-ordinates the efforts of Newport's physical activity providers, providing a single, accessible, package of physical activity opportunities directly to local residents. A substantial social marketing campaign to develop brand awareness and to affect behavioural change has been undertaken since the scheme launched in April 2007.

Going for Gold intends to enhance the physical and mental health of participants, reduce unnecessary demand on health and social care services, and to compress morbidity in Newport. It is a highly successful project which is tied into the London Olympic Games in 2012, and intends to utilise the build up to the Games in the UK to leave a lasting and positive health benefit for the City. The measures of success for the project which are being measured include: increased physical activity levels measured by Sports Council for Wales Adult Participation Survey; enhanced mental health levels of participants, measured using SPF 36; percentage of those who sign up from areas of deprivation, measured using Annual Ward Analysis; and partnership working success measured using in depth interview techniques with all partners.

2.2.7: Health and Healthcare - Feminist Approaches

Re-Reading the Death of Nature:
'Feminist' Science Historiography in a Populist Mode?

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The enduring influence of Carolyn Merchant's The Death of Nature: Women, Ecology, and the Scientific Revolution has recently been celebrated in a twenty-five-year retrospective symposium on the work in Isis: Journal of History of Science in Society. The contributors to this symposium praise Merchant's work for, among other things, "challenging standard accounts of the Scientific Revolution by introducing feminist and environmental perspectives" and for "its contribution to feminist theory." A critical interrogation of the politics of knowing underlying Merchant's historiography, however, calls these accounts into question.

Although Merchant aligns herself with feminism, environmentalism, and "utopian socialism," she adopts as the thesis of her book the claim that "by critically reexamining history, we may begin to discover values associated with the pre-modern world that may be worthy of transformation and reintegration into today's and tomorrow's society" (p. xix). Given that the pre-modern world she evokes is built on the "communal organic societies" of agrarian communism, modeled on the peasant village community, and of "dialectical" millenarianism, this stance is actually much more in keeping with Romanticism and its heir, classical populism. Hence, the purpose of this paper will be to argue that Merchant's (undialectical) historiography of science is not feminist - or, rather, socialist feminist - and "ecological" but populist. The paper will also conclude with a brief examination how populist approaches to "knowing" about science, derived from Merchant's work, are currently lending support to problematic political projects like the post-developmentism of Indian physicist and subsistence ecofeminist, Vandana Shiva, and poststructuralist/poststructuralist-anarchist "anti-globalization" activism.

Reassembling Gender-Related Legislation.
The Case of Gender Quotas in Norwegian
Corporate Boards and the Role of Gender Research.

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In 2008 Norway implemented a new reform on gender equality that requires all Public Limited Companies (PLCs) to have a minimum of 40 percent women on their boards of directors. This reform was passed by a clear all-party majority of the Norwegian Government a few years earlier, in December 2003. The political consensus was not at all obvious but resulted from well-made argumentative strategies. What happened along the way?

Norway has a relatively long tradition of legislative action to promote gender equality. In the 1970s and 1980s, several reforms were implemented as a result of initiatives shaped by the women's movement, contribution from women's studies research, trade unions and political parties. As the institutionalisation of gender equality has progressed during the past couple of

2.2.7: Health and Healthcare - Feminist Approaches

decades, it seems reasonable to assume that the ties between women's studies/gender studies research and gender-oriented policy-making are still strong. Should we consider women's and gender studies units as laboratories for inclusion strategies and policy-makers towards equal opportunities for women?

This paper analyses the making of policy with respect to gender quotas on boards of directors in Norway, with an emphasis on the construction of the arguments and enrolment strategies. It analyses, in particular, the role of scientific knowledge and experts in the development of gender policy. Who are given the role of experts concerning gender equality in the boardrooms? What sort of knowledge is made relevant, and how? The analysis is based on political documents (proposals, hearings, etc.) and interviews with policy-makers and advisors who were prominent in the political process.

Scientific knowledge in the policy-making regarding gender quotas in corporate boardrooms seems to have been of a different kind than expected. Relatively few traces of gender studies or feminist research were found. Still, scientific knowledge plays an important role in policymaking, but it is brought in from other sources like business administration and economics. Exploring the political rhetoric on gender quotas in corporate boardrooms I find that this knowledge was first of all employed as a tool to produce facts and validate arguments that support the governmental initiative. Thus, it seems like the laboratory of equal opportunities for women is populated by policy-makers rather than scientists or gender experts. These policy-makers act to reassemble a heterogeneous complex of facts and arguments, policy instruments and policy effects, in order to make a legislative proposal. However, this is not an instance of coproduction of knowledge and policy but rather of knowledge input into a process of political innovation.

The Researcher Identities of Physicists

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The notion 'sustainable science' was introduced by Londa Schiebinger, meaning an inclusive science not only socially and environmentally responsible, but also inclusive of gender, cultural and ethnic diversities. This approach links questions of gender within science with the scientist her/himself. Originally, the project was triggered by the charge of Judy Franz, Executive Officer of the American Physical Society (APS), concerning the scarcity of female physicists in Sweden1, a country that in other areas seems to have achieved considerable gender equality. In trying to answer this persistent question I want to investigate how gender is created within a physics research enterprise that neglects the social realities of its pursuit and claim that objectivity and rationality are its only influences. The tools for investigation include semi-structured research interviews conducted by a physicist, thus approaching a specific type of participant's observational method2. The study will be done within the GenNa program3, through the transgressive encounters between physics, gender science, sociology and philosophy of science that are enabled in this environment.

2.2.8: The Search for Sustainability

Anchorage of Innovations:
Using the Greenhouse Effect to Save Energy

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Understanding the dynamics of socio-technical change is a central topic in STS. Over the past decade, various STS scholars have started to make these insights of use to policy and strategy, trying to contribute to what is often called sustainable development. In this work, STS people often collaborate with scholars from other disciplines, e.g. policy studies and innovation studies. To embark on a road towards sustainable development, these scholars generally argue, we need a combination of societal and institutional change along with technical change. Such encompassing change processes are called transitions or system innovations. (e.g. Elzen et al. (eds.) 2004)

One widely used perspective to analyse such transitions is the so-called multi-level perspective (MLP) that distinguishes the following three levels: (1) "socio-technical regime": the meso level of an existing system that the analysts is interested in (e.g. the energy system); (2) "technological niches": a micro-level 'breeding space' for alternative technologies; and (3) 'socio-technical landscape': macro-level cultural and societal factors. Using MLP, socio-technical change processes are analysed as the interplay between these three levels. (e.g. Geels 2004)

The concepts used in this model, however, are too general to be directly useful for policies seeking to induce or guide sustainable development. We need more focussed analystical tools that zoom in to what happens when (radical) innovations in a niche link up to an existing regime. We use the concept of 'anchorage' to analyse these processes.

We will elaborate this concept on the basis of a case study of glasshouse horticulture in the Netherlands. To be able to grow a variety of crops year-round this sector consumes about 10% of natural gas in the Netherlands. To reach the Kyoto CO_2 reduction levels this should be reduced drastically in the years ahead which has led to a variety of initiatives and alternative concepts. Some of these are minor adaptations, others imply a drastic reform of glasshouse technology as well as the way it is related to other sectors. In the most advanced of these concepts, heat generated in a glasshouse in summer is stored underground and used in winter leading to a net production of energy rather than energy consumption. Thus, the greenhouse effect is used to actually produce energy. Because the various alternatives are picked up by the regime in various ways this is a rich case study to analyse various forms of anchorage.

To study anchorage we pose three general questions, notably: (1) what anchors, (2) where does it anchor, and (3) how and why does it anchor? As has been stressed in various other studies, radical innovations are usually developed outside an existing system by so-called 'outsiders' (Van de Poel, 2000). In our study, focussing on processes of anchorage, we find that it is useful to distinguish an intermediary category between 'insiders' and 'outsiders' which we call 'hybrid actors'. It is especially these hybrid actors that play an important role in anchorage and, hence, should receive special attention when seeking to induce transitions towards sustainability.

2.2.8: The Search for Sustainability

Ventilating the Black Box of Sustainable Infrastructure Planning

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Sanitation infrastructure has been built up over the past 50 years in most industrialized countries by actualizing a very narrow socio-technical regime and strong path dependencies, as a consequence. Technological and institutional structures are strongly aligned and planning is carried out by a limited number of professionals sharing a narrow technological paradigm. Recently however, a large range of context conditions has changed fundamentally, which challenge the taken for granted decision and planning procedures. Over the past two decades deregulation and privatization policies have questioned the former institutional alignment, but also radically new technologies and increasingly uncertain prospects of regional development have questioned the established regime. The long term sustainability of this regime is even more questioned when it is projected into newly industrializing countries such as China or India. As a consequence the current development mode of these regimes has been criticized by a large array of commentators such as neo-liberal political movements (emphasizing the alleged inefficiency of highly localized organizational structures), by development studies (questioning the optimality of the prevalent regime in different national contexts) or by environmental movements (emphasizing more sustainable decentralized options for sanitation and water provision).

Given this criticism, the proposed paper presents a fundamentally different approach to strategic decision making and planning in infrastructure ((Regional Infrastructure Foresight (RIF)) by explicitly addressing uncertainties, ambiguities and interdependencies. Prototypes of the RIF procedure have been run in three regions in Switzerland in the course of the year 2007. Each RIF procedure run over a 9 month period. It involved local decision makers, who explored the range of potential developments, stakeholder positions, evaluation criteria and socio-technical options over a time horizon of 25 to 35 years for their regions. These investigations were complemented by two one-and-a-half day workshops with a broader stakeholder representation, in which the options are evaluated before the background of qualitative scenarios of regional development. The regions were chosen in order to cover a wide range of typical situations in infrastructure management in Switzerland.

At a conceptual level, the RIF methodology may be interpreted as a localized procedure for a transition towards sustainable sanitation futures. Given the strong entrenchment of current day decision structures and the considerable challenges ahead, transformations of the system have to start at the local level. By systematically opening up the black boxing of current decision and management procedures radically new and different decisions may be addressed. In this sense, RIF represents a localized procedure on which a more encompassing transition management processes could be based and thus pave the way for more sustainable infrastructure futures.

Renewing Innovation Policies for Sustainable Sociotechnical Transition

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This paper explores the implications for mainstream innovation policy of the growing attention to sustainable consumption and production, and the new political centrality of climate change. Drawing upon the author's experience and role in the UK ESRC Sustainable Technologies programme and the UK NESTA innovation agenda, a number of core issues are identified which represent critical new challenges for innovation policy. These include: the interface between the policy domains of innovation and sustainability, the reintroduction of societal mission into diffusion oriented innovation policy, the relationship between long term visions and short term action, bridging the arenas of new technology and behavioural change, and reconfiguring national policy for global concerns. These issues are discussed in relation to UK and European policy developments. It is argued that central to the successful pursuit of the sustainable production and consumption agenda is the spanning of a number of conventional policy boundaries. New concepts of innovation as a sociotechnical network are explored as a means of facilitating this policy change.

Although interactional concepts of innovation have been developed in the academic world over the past 30 years they have been slow to be effectively taken up in the policy arena expecially with regard to environmental sustainability. Supply side R&D projects and market based instruments prevail. It is suggested that notions of open innovation, user led innovation, sociotechnical networks need to be developed more creatively than before around the global challenge of climate change.

The new prominence give to sustainability following the Stern Review and IPCC 4th assessment have given rise to high political demand for new creative innovation policies around a defined societal purpose requiring the urgent and radical change. A new policy mode is needed with a new combination of mission focus and demand orientation.

Evaluating a Systemic Instrument: Focus on Learning

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The concept of 'learning' has received considerable attention in different theoretical strands of thinking about how socio-technological change may come about and/or be stimulated in the face of complex problems that our society is confronted with. In the literature on Strategic Niche Management (Geels, 2002), for example, it is argued that radically new technologies require the adaptation and/or combating of socio-technological regimes. Whether or not such change takes place depends amongst others on the occurrence of learning processes within protected spaces (or niches). Scholars of Actor Network Theory too advance the idea that learning is an important process in arriving at new socio-technical configurations, even if they

2.2.8: The Search for Sustainability

regard niche protection as an obstacle rather than a stimulant of learning (e.g. Hommels et al, 2007). And in the literature on innovation systems, it is argued that systemic instruments are needed to fulfil systemic functions beneficial to supporting system innovation as a collective endeavour (Smits & Kuhlmann, 2004). Several of the proposed systemic instruments have a strong affinity with learning.

Despite this general interest in the phenomenon of learning, in the context of innovation and technology studies that investigate system change the concept is still rather poorly defined and operationalised.

The aim of our study was to develop a more elaborate conceptual framework for looking at learning processes in the context of system innovation processes. We also explored whether it helps to understand and monitor processes of system change in a context of deliberate systemic interventions. We used it in two case studies of specific intervention programmes carried out by a self-proclaimed 'system instrument'; NIDO (the Dutch Initiative for Sustainable Development). The overall goal of the first experimental programme for system innovation to be discussed (Values of Water) was to give an impulse to the development of sustainable water management in cities. The other programme (Market Chances for Sustainable Products) endeavoured to transform existing niche markets of sustainable products into mainstream markets.

The overall question that guided our research was whether the interventions in the two programmes indeed resulted in learning towards system change. Potentially, a benefit of such endeavour may be that it helps innovation scholars to link higher level notions like transitions, regime and/or system change to the sphere of everyday human interaction.

The developed analytical framework that integrates concepts from the Innovation Systems approach with a social learning perspective, proposes essentially that systemic instruments can serve to enhance conditions for social learning and that such processes may result in learning effects that contribute to system innovation by diminishing system imperfections. In actual practice, 'systemic instruments' take the form of specific interventions that in one way or another need to address relevant system imperfections and failures. The empirical findings confirm the assumption that differences in learning can be explained by the existence or absence of conditions for learning. Similarly, the existence or creation of conducive conditions are linked to the nature and quality of systemic interventions.

2.2.9: Markets for Public Goods, II

Markets and the Shaping of Government ICT Innovations: the Case of e-Government Project in Dubai

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New public management ideas and practices have been adopted in several Western countries such as the United Kingdom, Sweden and New Zealand. Under such arrangements governments have been utilizing market mechanisms to improve public service delivery, which usually involves privatization or activities such as contracting out. Similar NPM policies have been transferred to the context of developing countries and there have been a variety of results. Several countries are now exhibiting similar policies related to Government IT (Dunleavy et. al, 2001), which involve actors from the private sector even more, for a number of reasons, one of which is the need for technological expertise. These patterns are now also emerging in the context of developing countries that are investing in national ICT projects to reform the public sector and improve public service delivery.

The aim of this paper addresses the implications of the configuration of the process of providing public goods, which involves the market in the process of planning, and developing of Government ICT innovations. The argument set forth is that this configuration is contributing to the shaping of these innovations and the experiences of members of public sector organizations that take part in the same process. The case study is of an e-government project within a public sector organization in the City of Dubai and is presented to illustrate the extent in which this configured arrangement that involves the market is resulting in an emergent relationship between actors from the private sector, members of public sector organization. This emergent relationship, and sets of experiences are in turn is shaping the Government ICT innovation as well.

The paper is based on ongoing research that explores the experiences of ICT professionals working with e-government projects in Dubai. Data collected was mainly through in depth interviews with ICT professionals from public sector organizations, coordinating government institutions and private sector firms.

Markets for Public Bads: the Societal Construction of 'Emissions Trading'

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The paper reconstructs the innovation journey of emissions trading, a market for allowances to produce (limited) amounts of environmental pollution - 'public bads', as it were. It shows the historical path along which this particular configuration in governance develops: from precursors in economic theory and regulatory practices at the US Environmental Protection Agency over the US Acid Rain Program and the Kyoto Protocol as part of a nascent regime of international climate policy through to the European Emissions Trading Scheme and

2.2.9: Markets for Public Goods, II

current attempts at constructing a global carbon market.

The process is analysed as an innovation process in governance that sees several phases with increasing alignment and stabilising linkages across the poles of (economic) science, professional policy development and particular governance domains to which the instrument is applied (Voß 2007; see also Rip, Schot, 2001; Callon, 1992; Callon, 2007).

Over the course of the innovation journey a design community emerges, becomes institutionalised and expands transnationally to form a global 'technological regime' in which policy processes within particular governance domains are embedded. A special feature of the innovation journey of emissions trading is that this process goes hand in hand with the organisation of commercial activities around this emerging market. This so called 'carbon industry' adds a momentum to policy development which is independent of the original goal of environmental protection. Emmissions trading as an innovative 'design on governance' thus takes on a life of its own, clearly questioning its instrumentality (Voß, 2007).

The overall dynamics of the innovation process demonstrate how public policy and commercial markets co-evolve and are intertwined in de-facto existing governance arrangements. Insights are gained with respect to specific process dynamics through which markets become societally constructed. The paper concludes with a discussion of consequences for the public issue of effective environmental protection.

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When Wind Power meets the Electrical Grid
- Organizing the Equilibrium

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Following the liberalization of the European electricity markets, the grid as well as the activities of maintaining and managing the grid, has been 'unbundled' from all other undertakings in the electricity markets - in stead, the grid has been crystallized into one of the 'purest' text-book examples of a 'natural monopoly'. Within this 'natural monopoly', safety, reliability and the continuous flow of energy are perceived as collective goods, and

2.2.9: Markets for Public Goods, II

they remain key arguments for keeping ownership over the electrical grid within the state. Some common and general trends of the emerging, liberalized electricity markets in Europe are thus state-owned grids, with the primary task of securing supply, forming the basis and the infrastructure for production and consumption of electricity in increasingly privatized markets.

But what is so natural about the 'natural monopoly'? Not very much it seems, made up, as it is, of an intricate web of cables and lines, transformers and generation plants that enable the light to turn on once your hand touches the switch.

The proposed paper examines what goes into making this 'natural monopoly', stressing the safety and reliability of the grid as it is translated into a question of balance between supply and demand; without the constant balance at 50 Hz, the system faces the danger of disturbances, and at worst, blackouts. Secondly, the paper investigates how wind turbines are connected to the grid, because in this process of getting connected, the question of balancing supply and demand gains a new significance: wind power, framed as a fluctuating energy source, cannot be planned for or even predicted, and therefore it is said to potentially disturb the balance and overall functioning of the grid.

The paper thus proposes an examination of the encounter between the public good, i.e. security of supply, and on the other hand an increasingly private good, the electricity. Taking as point of entry the 'planning' device ZDE ('zones de développement de l'éolien terrestre'), a device organizing the first relation between turbines and grid, we get a peep of how a hybrid market (mixing the public concerns for securing energy, and the actual privatized production) frames identities and goods as something in between public and private markets.

Markets as Simulations: Economic Theory and Market Design in the Restructured Electricity Industry

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Both economics and economic sociology have seen a recent increase in interest in the involvement of economic theory in the formation of economic institutions. I argue that this interest is the result of the emergence of a new type of market, which I term the reflexive market, which incorporates an explicit surveillance and regulation in terms of economic theory into the rules of the market itself. With reference to restructured wholesale electricity markets in the U.S., I suggest some distinctive features of these institutions. Of particular interest is the use of rules that constrain the outcome in advance to conform to the predictions of economic theory.

An example is the incorporation of independent Market Monitoring Units (MMUs) in the large wholesale electricity markets in the US. The MMUs continually compare pricing behavior to the predictions of economic theory, which expect bids to correspond to marginal costs in a competitive market. The MMUs may invoke "market-power mitigation" measures to bring bids into agreement with the theory. A second example is found in the markets for generating capacity. These markets do not have an active demand side, since the amount of capacity that must be purchased depends on the amount required for system reliability. Several

2.2.9: Markets for Public Goods, II

system operators in the U.S. have adopted a demand curve that simulates the downward-sloping demand in a competitive market, as described by economic theory. The behavior of prices in these markets, and the pricing behavior of participants, is thereby legitimated, not because it is the outcome of an impersonal equilibration of supply and demand, but because it resembles the result of an idealized competitive market.

2.2.10: Technology and Mobility

Social Morphology and the Role of Actors in the Development and Use of Mobile Telephony Networks

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Today's information and telecommunication (IT) systems sweep across national borders and penetrate diverse cultures at an unprecedented speed. Over the last decade, for instance, the mobile telephony subscription grew to reach 3.3 billion, half the world population. It is true that these systems develop only as extended networks and so they demand certain uniformity across geographical regions, technical network infrastructure, technology management and user habits. It is a topic of current research to describe where such uniformity originates or how is eventually attained.

This work examines emerging actor behavior in the development and the use of mobile telephony networks, in a world of fading social boundaries. Our methodology examines empirical findings of the social physics analysis, a proposed new paradigm for the integrative study of management, physical and technological systems./1/ This research investigates the cross-talk across physical and social sciences. It is based on huge amounts of data being collected on the interrelationships among social actors along with new methods for studying large-scale networks. Physical concepts such as small-world networks, self-similarity, the Noah effect, etc, are gradually incorporated in the social science analysis and terminology./2/

On the issue of actor participation in the development of IT socio-technical networks, we claim that micro and macro analyses bridge when national or professional boundaries fade. Motivated by Castells /3/, we study social structures defined around a concentration of power when an IT project develops in an environment of state monopoly and we follow their transformation to network morphologies around a basic social interaction as the project expands to large scale. Then, certain types of actor interactions expand across the whole network. Variety is accommodated into the social morphology, where all actors entangle seamlessly and proceed as indistinguishable components in an intense and complex social engagement.

On the issue of actor participation in a socio-technical network through an IT artifact, we study the usage of mobile telephony in the operations management of large-scale events (including the 2004 Olympic Games). Again, following social physics methodology, we search for common morphological aspects - this time in the group dialogue sessions aiming to resolve technical and administrative problems. We find that the length of such conversations during serious incidents grows disproportionably longer than expected. This finding corroborates studies which probe tricks that lengthen important discussions (loose talk, personal references, etc) in order to establish trust among participants and create grounds for agreement./4/ In our data, moreover, this joint conversational performance also reflects the elongated time needed for the actors to resolve the problem associated with the discussion. Acting on an issue similes talking about the issue, at least when talking through a mobile phone.

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2.2.10: Technology and Mobility

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Performing Museums with Mobile Technology: a Story of Museums' Audio Guides

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Audio Guides applied in museums and heritage sites, including different forms of new media technologies (from cell phones, PDAs, handsets to walkman), receiving little attention by the academia, indeed have performed the new global mobilities of the museum. Current research pays attention mainly on the technological dimension of the audio guide and its educational role supplied for the museum, neglect that the audio guides not only bring new challenge to the museum as a scopic regime mentioned by Matin Jay, but also have become a new emerging media industry. Four novel theoretical approaches on mobilities, media and museums will be drawn upon in this research: firstly, the Actor-Network Theory on human-non human hybrids and the discussion on heterogeneity will be drawn on; second, the combination and contradiction of audio and visual when audio guide had been brought into the museum as a scopic regime will be discussed; thirdly, audio guide transforms the temporal and rhythm of the museum visiting, requiring to think museums with space and time together; finally, it will explore the new cultural and social capital required and performed in museum visiting when audio guide as the new media technology involved.

Using the 'Splendor of the Baroque and Beyond' exhibition - travelling from the Kunsthistorisches Museum in Vienna and shown in the National Palace Museum in Taipei - as an example, this research will engage the theoretical approaches by critically analysing the creation and consumption of its two versions of audio guide (one by a global company-Acoustiguide and the other by a local cell phone company-Taiwan Mobile). Multiple research methods - from interviewing, observation in the museum to visitors' note on website - will be applied.

Mobile Phones and Global Health: Converging Technologies for Development?

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Technological convergence, the combination of several generic technologies in new and innovative ways, is an exciting topic in science and technology studies and studies of innovation. Combining ICT (Information and Communication Technologies) and medical technologies is one of the fields of interest. If we look at mobile (cell) phones, a UK report (Wireless Healthcare, 2005) suggested that in 2005 there were at least 101 uses for mobile phones in healthcare. Mobile phones are not only important in Western settings; they are

2.2.10: Technology and Mobility

also seen as very important in promoting global health. In Africa, for example, mobile phone devices and programmes are being developed for use in the developing world in new and interesting ways.

Mobile phones provide an opportunity to send and receive health information through text message, organise appointments and more. Developers see them as a means to support the individual in adhering to their to their HIV retroviral drug regime. Skinner, Rivette & Bloomberg (2007) have shown that mobile phones can be used for entering health care research data on site in South Africa, which can then be sent to a centralised database through SMS.

In my paper I will present a case study concerning the combination of mobile phone technology with health care in Southern Africa. I will seek to address questions like: How is mobile health care conceived of by those involved in its development? What benefits are seen and who is supposed to benefit from this form of technology convergence? What are the stated reasons for using mobile phones in health care and what expectations are thus created? How do patients feel about the convergence of mobiles and healthcare in general, and do they feel they are gaining from it? What are the drivers and organizations behind these new technological combinations and why and in what form are they involved? What are the consequences for research, for the management of healthcare and for the well-being of patients, citizens, local administrations and health care personnel? Finally, what lessons can be learned from the case study for the analysis of converging technologies in global health care.

2.2.11: The Science Fiction of Science Studies. Acting with Science in the Future.

"If the Kids are United". Reproductive Unit Research in Four Actor Human/Human and Human/Non-Human Groups.

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North-Western European Federation 2038: This presentation aims at reviving the relational focus in kinship studies; that is research focusing on familial units formed through reproductive technologies. Kin-relationships, once a focal point in what we now call neo-classical kinship studies, have by-and-by lost momentum in the Socio-Life-Sciences predominantly due to the methylational turn and the accompanying expansion of System-Biologys all encompassing mathematical models.

Re-focusing on kin-alliances, I will present reproductive unit research, mainly concentrating on four actor groups (human/human) and on human/non-human units and their offspring. Classical narratives developed within the units on what makes their family especially in the face of the various reproductive technologies employed in individual units - will be matched with Galileo/RFID Safe-Citizen-Monitoring Data and methylation patterns. This mixed-methods presentation will provide the "backbone for an informed methodological discussion on the integrability of mode 4 embodied data and more classical empirical materials.

Further, local reproductive unit practices of kinship information-management towards their wider social circle and their offspring will be examined. Four actor human/human reproductive groups have gained wide social acceptance within the last 20 years. Their usage of the specific childrens literature and support data which has been developed in the Reproductive Unit Movement will be analysed. In contrast, research on the relatively new and politically contested phenomena of human/non-human units will be discussed with regards to the unit members status as to use a classical term moral pioneers.
The presented paper will close with some remarks on what can be gained, or lost, within mid-century kinship studies from engaging more closely with the work on kin relationships and kinship knowledge as en vogue during the millennium years. Technical"and temporal terms will be explained for a non-expert, non-contemporary audience.

Pattern Recognition and the 'Everything' Archive

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Let us imagine that it is 100 years from now and parts of the world are beginning to resemble projections found in Neal Stephenson, William Gibson and Richard K. Morgan's work. Borders have changed to more closely reflect political ideologies and they are now both physical and virtual. Death will soon no longer be permanent. Communication technology has continued to develop rapidly and rampantly. It is now possible to incorporate communication technology into a person's body giving the illusion that interpersonal communication and the transfer of information, even over long distances, is no longer

2.2.11: The Science Fiction of Science Studies. Acting with Science in the Future.

mediated through machines. In these circumstances, communication is increasingly invisible and may soon no longer require audible verbalization. In such a world, certain methods currently used to study communication technology will no longer be useful and others will see a renaissance. The STS researcher will also need to develop new skills to effectively pursue research and help make sense of this world. Yet, the scholar's relationship with communication technology will give rise to new ethical questions.

In this future society, tools for archiving visual, audio and text based information have become powerful and easy to use. And, archiving "everything" has become popular amongst both individuals and organizations. The phenomenon is similar to blogging in the late 20th and early to mid 21st centuries. These "everything" archives, which are used as repositories for a vast array of information related to a person's or organization's life experience, are a rich source of information for the STS scholar. And, archival research will become a more popular method for studying the relationship between society and technology. Scholars will look at the impact these archives have on memory and identity, as well as use them as tools to understand technology development, adoption, use and representation (to list but a few possibilities). However, the STS researcher is now confronted with a new dilemma: how to make sense of vast amounts of often poorly organized data. STS researchers will come to rely heavily on data mining and pattern recognition tools and they themselves will become objects of studies on technology use. But, in keeping with Stephenson and Gibson's projections, STS researchers will tend to have heightened pattern recognition capabilities, which will raise a number of new questions regarding research ethics and biases.

2.2.12: Technology and the Transformation of Everyday Sociality

The Mobile Phone, Perpetual Contact and Time Pressure

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There has been much speculation about how mobile telephony is facilitating the intrusion of work into every pore of daily life. The possibilities for constant connectivity and communication afforded by the mobile phone are seen as accelerating the pace of life and fuelling the contemporary experience of feeling hurried. In this talk, I explore these issues using a variety of novel methodologies, including mobile phone logs and time-use diaries. Overall, mobile phone use does not directly lead to a heightened sense of time pressure. Fears of work extension via the mobile phone also appear to be exaggerated, as the mobile is primarily used for social connectedness. However, there is some evidence that frequent use of mobiles during working hours does increase the pace of work, at least among men. Here I revisit our love/hate relationship with mobile phones, whose capacity to intensify connectedness we both embrace and experience as demanding.

Mobile Phones and the Transformation of Everyday Sociality

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A cell phone is a nice practical device. But it is also a socio-political artifact, which transforms deeply social relationships and the fabric of human life. Just its property - in contrast to the traditional phone - to be carried mobile at the body and to transcend the previous time-space-coordinates of calling, changes fundamentally the social situatedness of everyday experience and action, e.g. the relationship between absence / presence, public / private, closeness / distance, concentration / distraction. But persons are not just determined by the technological artifacts, they are acting in the relationship, using, playing, reflecting, resisting, searching for limits etc. New forms of human world- and self-relations are emerging, new forms of talking, of creating connections, new forms of sociality and community. Mobile phones are ambivalent fabrications in which socially imagined but also unimagined forms of action are materialized, and which can extend and catalyze, but also undermine, regiment, or even negate human subjectivity, agency, and sociality.

The paper presents a study on mobile phones and the transformation of human sociality in everyday life. Based on practice research (e.g. Klaus Holzkamp, Ole Dreier, Marx Wartofsky), ethnography (e.g. Jean Lave, Michael Fisher), and critical STS (e.g. David Hess, Langdon Winner, Sal Restivo, Donna Haraway), it analyzes the intimate relationship between the actions of persons and the materialized actions of the mobile machines, and asks how new forms of sociality might emerge as well as how the material mediation of everyday life might individualize persons and instrumentalize social relationships and connectedness.

2.2.12: Technology and the Transformation of Everyday Sociality

Structuration and the Value System Method
- Explaining Complex Contemporary
Technological Phenomena from a Socio-Historic Approach

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When writing my thesis last year I wanted to study a revival of vinyl replay within the dynamics of music replay in 2007, including declining CD sales, the disappearance of compact cassettes, RIAA actions against file-sharers and the increasing popularity of legal downloading, to understand how such events could co-occur.

I argued that one cannot study these developments independently, that they are interconnected and the results of patterns in history. A study of vinyl replay in 2007 would therefor have to take into account this wider context and the meaning it has for the parties involved. To capture this context in scientific research I built on the the framework as laid out by Giddens called Structuration, applied to technology by Orlikowski (1992).

She views technology as an occasion for structural change involving actors and institutions in processes of "Power" (in the allocation of resources), "Structure" (institutionalized patterns of interaction) and "Meaning" (semiotic valences). It follows from Giddens' framework that such processes are historically and socially situated. For my research I have combined Power, Structure and Meaning into what I have called "value systems" for each of the three parties involved: Electronics manufacturers, entertainment industry and consumers.

Using documentary research the notion of value systems allowed me to describe and analyze a historical overview of major developments that have shaped audio replay and compare the values these developments hold for the parties involved between mainstream audio replay and vinyl replay. The result is an organized insight into a complex situation of agency and structure, over time, across formats.

With the framework of Giddens and Orlikowski, using the value system method, I was able to analyze today's complex situation in music and movie replay from a socio-historical perspective and to provide a context that goes beyond the usual discourses.

The advantage of Structuration and the value system method is precisely that it provides a socio-historical perspective rather than for instance ANT's snapshot approach. Furthermore, the method also provides room for taking into account societal changes in using technology that intersect with the traditional evolution of technology from inventors and manufacturers to the market.

I used a similar approach to study the current conflicts between OLPC's $100 laptop and Intel's Classmate PC. My goal was to move beyond the common discourses of dumping cheap laptops in developing countries. I was able to show how the conflict actually harks back to developments in computer science and constructionist learning in the 1960s. It was then possible to provide an totally new discourse for a contemporary phenomenon that proved to be well anchored in history.

The method can be also used to look for instance at the wows of 3G mobile telephony in the face of society moving to wi-fi and to look at problems surrounding HD-DVD and Blue-Ray

2.2.12: Technology and the Transformation of Everyday Sociality

Disc. Structuration and the value system method can thus provide a new tool for STS to contribute to a better understanding of contemporary technological developments.

Situated Surveillance: an Ethnographic Study

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In recent years the sociology of surveillance has gained momentum and incorporated more and more interesting topics under its empirical gaze: CCTV in cities, face recognition in airports, screening of immigrants, police surveillance, etc. Interestingly the field seems much more conservative when it comes to developing theoretical understandings of surveillance.

Historically two metaphors have been dominating. One is Orwell's notion of Big Brother, the other Bentham's model of a prison, the panopticon, analysed and made famous by Foucault. Both metaphors run through many analyses of surveillance. In this paper we critically discuss the limits of these two theoretical concepts of surveillance and suggest new theoretical resources. In doing this we draw on experiences from an ethnographic study of the Danish Fishery Inspection. Using IT and other technologies fishery inspectors trace the movements of Danish fishing vessels at sea. These surveillance activities require painstaking work, and the result is not "the big picture", but only a limited vision.

The ethnographic experiences suggest that surveillance is a situated activity, and we point to Donna Haraway's work on situated knowledges and Bruno Latours work on the oligopticon as valuable theoretical resources (Haraway 1988, Latour 2005). Following Haraway, vision is always situated and partial, and Latour argues that in an oligopticon things can be seen in great detail, but the perspective is narrow. Seeing is always 'focused' on something and constructed within a bureaucratic space. It is the 'mappings' of persons and things through registration, protocols and measurements that make them visible in specific ways. This suggests that perspectives are embedded in specific bodily apparatuses and socio-technical infrastructures.

Thus an understanding very different from the situations of total visibility, contained in the notions of Big Brother and Panopticon, emerges. Situating surveillance involves blurring the distinctions between the surveillor and the surveilled and between control and care. Also it becomes obvious that surveillance is rarely a smooth process. Situations of surveillance involve friction and resistance and requires both work and coordination.

2.2.13: Life Sciences in Asia

Bioethical Dislocations of Stem Cell Research (SSR): Meanings of World Risk Society in Chinese Contexts

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The concepts of 'risk society' and 'world risk society' have been much debated in Europe since the 1990s. These concepts throw light on various aspects of science and society in China, if only for the questions they raise: Has risk society evolved from European modernity? Is it based on a culture that grew out of the Enlightenment? Has China has its indigenous forms of risk society and risk cultures? If so, how do these co-exist in a 'world risk society'? With regard to the bioethics of stem cell research (SSR), I briefly discuss various theories of 'risk' (symbolism, risk society and governance) that provide different understandings of SSR in a Chinese context. I look at the meanings of risk in the light of these theories at various levels of societal organisation: the national, provincial and local levels. In the light of SSR, I argue that the three theories all have relevance but in different ways in Europe and in China.

This paper draws on research based on interviews with over forty scientists from various stem cell laboratories, hospitals and research institutes in China and archival study. The relevant materials pertain to the motivations for conducting particular forms of stem cell research and the level of satisfaction of scientists with current stem cell research regulatory provisions in the PRC.

I conclude that China's discussions on bioethics are dislocated; and take place in a different organisational context and at a different level of debate compared to in Europe. This may have far-reaching implications for the ways in which we formulate bioethical guidelines for SSR in 'world risk society'.

Singapore Biopolis: Bare Life in the City-State

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In late 2003, the Singaporean government launched Biopolis, a life sciences technopole that brings key Singaporean biomedical research institutes together with global and local biotechnology and pharmaceutical companies and governance bodies. The government has allocated generous funding to a range of biomedical research at Biopolis and adjacent academic and clinical institutes. Its stated aim is to make Singapore the 'Biopolis of Asia', the premier life sciences hub in a region where several much more populous states, notably China, India and South Korea, are rapidly scaling up public investment in regenerative medicine and genomics.

This paper will tease out what is at stake in the creation of Biopolis for the Singaporean state and population and what it can tell us about SE Asian governmentality and its bioeconomic and biopolitical aspirations and anxieties. It is based on fieldwork and interviews with

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Singaporean life scientists, bioethicists and industry leaders, and forms part of a larger project currently being carried out by the Global biopolitics Research Group investigating the implications of the globalisation of life sciences, particularly embryonic stem cell research and regenerative medicine. In particular the paper engages with the perceived risks presented by bird flu, SARS and other global pandemics associated with East Asia, and the implicit utopian vision of a regenerative bioeconomy evident in the Biopolis project. Biopolis is a site which brings together local and imported scientific expertise with the biological productivity of the multi-ethnic Singaporean populations, who are understood as surrogates for the SE Asian population more generally. The ultimate aim of Biopolis, I argue, is to secure both the biological future of the Singaporean population and the economic fate of the city-state, through the advanced research and development of Asia-specific medical biotechnology.

Cracking the Code: the Rice Sequence(s) and the Taming of Food

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The world's ability to feed itself has plagued scientists and policy makers since Malthus wrote his influential essay on population. Indeed, with stark statistics on world hunger, population growth, agricultural production, and environmental change refusing to subside, one of the most critically important questions facing the world is how do we feed more people with less resources in an increasingly unstable environment? For many, the answer lies in advanced genetic research. As such, from 2001, four separate research initiatives released draft sequences of the rice genome. The first three were delivered by the Beijing Genomics Institute and agricultural giants Monsanto and Syngenta, with the most complete sequence prepared by a Japanese led international consortium, the International Rice Genome Sequencing Project (IRGSP). By 2005, with all data deposited in public databases, rice had become the first food, and only second plant, to have its entire genome fully sequenced, representing a major milestone in agricultural and genomic research.

Rice was selected for its acute dietary, economic, cultural, and scientific significance, yet unlike the sequencing of the human genome, news of the rice sequence received subdued attention outside scientific circles. This paper is an attempt to redress that balance by exploring the significance of rice sequencing beyond its intended practical applications in plant breeding technologies. In part a sociological study of green biotechnologies in the tradition of STS literature, and in part an ethnobotanical study of modern seeds, this paper will briefly document the scientific logistics and geopolitical bearings of the sequencing projects before moving to consider what it means to have this information in our possession. The analysis hopes to shed some light on the complicated and asymmetrical flows that operate within science and between seeds, agriculture, humans and our environment. In particular, and in keeping with the theme of the conference, this paper will draw attention to the notion of 'acting with' in plant breeding practices. No matter how far bioinformatics and genetic research removes us from the 'wet' in biology, modern biotechnology must continually solicit, or 'act with', the very biological and environmental processes it ultimately diverts and subverts to more amenable paths.

2.2.14: Stories on Information

Tin Can Telecommunication: Performances and Interventions

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AstroDime Transit Authority is a Research and Media collective organized around ideas of transportation and communication. Throughout the course of this year, we have developed and implemented the AstroCan Tin Can Telecommunications system. Its first appearance was on Bumpkin Island, in Boston Massachusetts, and our charge was to connect several groups of people through utilizing tin can telephones.

From that preliminary research, we have been writing and creating media around metaphors of communications technologies and artifacts. What makes a communications system "work"? How do participants respond to theimplementation of a small scale, low tech, short term, point-to-point telecommunications network? In making the workings of a telecommunication system visible, how is knowledge produced about it?

As artist-researchers, we publish in non-traditional and non verbal venues such as media festivals. However, we also publish a twice yearly video journal called INtransit which examines technocultures and practices. We have presented this journal at conferences such as the Society for Literature, Science, and the Arts. In this respect, our media and research interests cross over into STS.

With respect to our proposal for this conference we are interested in the re-embodiment of telecommunications systems in order to examine marketing systems and procedures. We use interventionist practices to make these systems transparent. Our methodologies include video interviews and documentation, surveys, performances, and research into the history of low-tech telecommunication systems. In our practice, we use the metaphors created through the marketing of "hi tech" communication systems such as cell phones, and overlay those metaphors on to a "low tech" communication system such as tin can telephones. In doing that, we hope to raise questions about the uses and misuses of communication systems in contemporary society. Hopefully we can have dialogue with other researchers in STS who share these concerns.

For our presentation, we would like to show video and still image documentation of our research to date. More information about our work can be found at
http://virtualberet.net/ata/research.html

Narratives Small and Grand

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In this paper we present a number of vignettes drawn from three years of fieldwork investigating the use and appropriation of information and communication technologies in the home. Our field work uses 'domestic probes' - a method adopted from the cultural probes

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approach of Gaver et al. (1999). We found domestic probes to be an excellent means for eliciting stories about technology practices in the home, and for exploring the sociotechnical and spatial arrangements that gave each home its particular character. The stories about the arrangements and deployments of technologies in the homes we studied expressed a logic, aesthetical preferences, a narrative thread, and ethical concerns, that together documented the moral order of the home.

For us, as STS scholars, each of these stories of specific arrangements around technologies elicited through our domestic probes, were read as an instantiation of the grand theories that compete to explain life, the universe and all that. Through the lens of our hermeneutics, the stories were read as reflections of Jamison's modernism, Beck's risk society, Foucault's subjectification, Freud's fetishism and Heidegger's technologically enframed life, writ small.

Now, one might well be suspicious of this. Surely it is pretentious to scatter these sorts of references about, and promiscuous to name-drop more than once, given that these grand theorists compete and conflict? Surely the stories stand on their own feet, have their own meaning, without needing to be "dressed up" through these sorts of associations? On the other hand, Freud and Heidegger, Foucault and Beck and all the others, are the master story tellers - grand in scale, grand in ambition, grand in reach. They are the tribal elders of social theory, and have provided the powerful metaphors, the classical models, the colourful word-pictures, and the familiar arguments that cannot other than inveigle themselves in the little stories we tell, about the personal stories told to us.

Technological Imperative in Technobiographies

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In technologically mediated society societal and cultural structures, practices and discourses guide people strongly toward consuming and using different technologies. Thus, it can be said that in such a society technological imperative prevails. We use the term in societal sense: technological imperative means societal and cultural force or pressure to utilize culturally central technologies that have become elementary part of society and its ideology (Talsi & Tuuva-Hongisto 2007).

Our presentation develops the cultural and social study of technology by utilizing the theoretical bases and methods of cultural studies, social science and women's studies. The study is connected to social and cultural studies of technology (MacKenzie & Wajcman 1985) and we emphasize the interpretations, meanings, practices and understandings given to technology (Mackay 1997). We use ethnographic research practices to reveal the cultural and social divides and encounters with technological imperative.

We examine technological imperative through technobiographies. Technobiographies are autobiographical writings and accounts where people describe their relationship to technologies and their idea of them (Henwood et al 2001). The collection consists of 52 writings of everyday relationship to technology. The technobiographies have been collected with co-operation with Finnish Literature Society's Folklore Archives at spring 2007 in ETIM-

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research project (Encounters with Technological Imperative 2007-2010).

In our presentation we focus on Finnish technologically mediated society and various encounters with technological imperative. We examine how technological imperative is constructed in technobiographies. How and in what way the technological imperative is emerging? And on the other hand, what factors and means can marginalize from technologically mediated society?

Requested Stories of Information Society

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The presentation explores information society development that took place in Eastern Finland, in North Karelia, at the turn of the millennium as a part of Finnish national technology project. The paper is based on ethnographic study of the North Karelian information society experiments conducted during the years 1998-2004 (Tuuva-Hongisto 2007).

The study scans the cultural interpretations of information society in terms of requested stories. The notion of requested stories emphasizes the ethnographic and reflexive approach of the study. In addition, it refers to contextuality: information technology and information society formed essential part in the national project in which the development of information technology was connected to building and shaping the Finnish society and Finnish identity. The study explores the different meanings, commitments and contexts related to the information society stories. The overarching feature of these stories is that they concretize the information society development and make it something identifiable, ordinary and common. The articulation of lived experiences, publicity and institutionality were essential in constructing the cultural national unity. The information society strategies and discussions requested, even demanded, the information society success stories. The information society turned out to be a public representation of the Finnish identity, which was actively constructed in public discussions and the various information society development projects.

The ethnographic study of the information society in North Karelia provides critical viewpoint into the requests behind the stories and exploring the connection of technology and nationality (see Hecht 2001). The presentation explores how these development stories of information society became an example of the success of the Finnish information society development (cf. Castells & Himanen 2002).

2.2.15: Science and Defence

Autonomy Classified under the Regime of Secrecy: How Scientists' Beliefs Maintain the Institution of Science in Post-Soviet Russia

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I try to explain in my paper how the certain scientists' beliefs maintain the institution of science in post-soviet Russia. The analysis of the institutional structure of scientific knowledge production in modern Russia shows that norms of scientific ethos (Merton, Cole) cannot describe the phenomenon of the Soviet and Russian Science, which nevertheless is highly productive and impressing. The Regime of Secrecy is not quite elaborated concept within Sociology of Science, because there were no reasons to consider success of non-western models of scientific knowledge production from the normative approach. As Peter Galison was interested in Secrecy as factor for scientific communications and public understanding of science as we have an intention to look at how Secrecy can be substitute for Authorship, for Universalism and for Organized Skepticism in Soviet and post-Soviet science. The Regime of Secrecy does not allow the Authorship in Science to exist. At least it will be hidden for a while. And the main institutional requisites of motivation in Russian Science is not a kind of mertonian public or expert recognition, it becomes the recognition for local scientific organizations only and in face of the State & Bureaucracy. The Regime of Secrecy provides the huge psychological resources for increasing level of patriotism, encapsulating and self-reference. In spite of theoretical point of view in the Sociology of Science the institutional structure does not lead to fading or charlatanism of Russian Science, but it serves to mobilization and non-market scientific production, where the competition is colored by politics and ideology. Neither international collaboration, nor the increasing mobility of Russian scientists change nothing in value structure and basic attitudes toward the Mission in some fields of post-soviet Science, where the Regime of Secrecy associates with struggle again, not the struggle for.

Keeping Nothing Secret: UK Chemical Warfare Policy in the 1960s

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This paper uses a historical case study to explore how governments act with military science and technology in order to keep it secret. Or rather, how they act to conceal their lack of military science and technology. It also explores what happens when secrets about (not having) science and technology are breached. The paper draws on recently declassified archival documents to chart the history of UK chemical warfare policy in the Cold War. It briefly follows shifts in policy from WWII to the early 1960s, then focuses in more detail on how later changes were engendered by a combination of novel research findings, changes in strategic thinking, new intelligence and pressures from NATO. The paper then moves to the fate of a significant decision, taken by UK authorities in 1963, to acquire a limited chemical warfare retaliatory capability, in particular I explore the role of secrecy in shaping whether or not this new capability was to be viewed as a deterrent.

2.2.15: Science and Defence

Despite the 1963 decision, no new chemical weapons capability was acquired in the UK, and the narrative takes a different route to show how this gap between policy and implementation was subsequently handled, again in relation to secrecy and transparency. I focus here on what happened when information about the absence of a chemical weapons stockpile was leaked into the public domain, and on the ensuing debate between Ministries over the significance of this leak. This returns us to the analytical theme that non-existent science and technology is equally problematic for government secrecy, and equally consequential for government action, as what exists. Furthermore, actors' different interpretations of what constituted a secret point towards a more subtle understanding of secrecy than simply construing it as the hiding or uncovering of items of information. The paper aims to use historical research to contribute to recent debate in STS about secrecy, transparency and science. It also raises questions about how STS employs historical approaches in order to act with past science and technology, particularly the reflexive dilemma of using historically oriented STS to construct a 'transparent' - and therefore presumably policy-relevant - account of secret events.

Health Policy Since the End of the Cold War

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Various studies show how in the US the end of the Cold War transformed the role of Defense and Security in the financing of Research and Innovation policies. Government, universities and industries were looking for a substitute to secure public funding with a level of legitimacy similar or possibly stronger than former National Security imperatives. The public and civil society had to be directly involved and concerned in order to justify a similar level of public funding. In this context, in the early 1990ies, public health slowly became a political substitute for National security. This was a major change in the institutional environment of Research and Innovation : it transformed the hierarchy of disciplines on campus, of industries in their relations to Government, the research and industrial geography of the US. Il was also of change of power, of imperatives. The Federal government continued to play a major role in order to control research as well as supporting it. But in exchange for its financial support, Government also had potentially a legitimacy at interfering with the orientations of Biotech Research and Innovation financed by public funds. It could argue that it had a moral, political, financial and economic responsibility at interferring with public health policies. The objective of this presentation is to analyze and debate some consequences of this situation. They are many. Based on various moral and religious issues, politics would interfere with Research. Also the strong growth of Biotech industry was based on availability of public funds. This lead to the creation in the US of various research facilities by private companies from Europe and Japan. In these conditions, many new drugs and therapies in their early stage were researched and developed. When, for many reasons, the context changed around 2002, public funding was restricted and private firms restructured their research. Public health is strongly in the present and future is greatly affected by this situation.

2.2.15: Science and Defence

Contextualizing Biosecurity:
the Influence of Codes of Conduct on Configurations of Responsibility and Accountability in Dutch Academic Hospitals

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Biomedical research can contribute to the improvement of human health and welfare, although it can also facilitate the development of biological weapons. This dual-use characteristic of the products and processes of the life sciences, in association with the reduction of technical and social barriers to the weaponization of bacteriological agents, has become a major security issue in the 21st century. At the Biological Weapons Convention Inter-Review Process (2003-2005), codes of conduct for biosecurity were promoted to manage the boundary between the dichotomized socio-technical applications of biomedical research. While the purpose of codes of conduct for biosecurity have been widely discussed and debated, implementation at the national level is only beginning to emerge. In August 2007, the Royal Netherlands Academy of Arts and Sciences (KNAW) introduced its version. The Code of Conduct for Biosecurity was generated with information gathered from science-policy experts, various members of the expansive target group, and an in depth study of the regulatory context. The provisions for preventing the misuse and abuse of the life sciences allow for adaptation at different levels and by different types of organizations, institutions and companies where biomedical research is developed and applied. According to its authors, the research and development of the text has facilitated awareness building and has encouraged discussion and debate between the relevant actors.

This research project is interested in how this learning process, including the surrounding dynamic of interaction, is influencing (individual and institutional) research interests and scientific practices. It will take academic hospitals in the Netherlands as the focal point of analysis. It will conduct interviews to uncover how the faculty members and researchers develop decision-making criteria, apply them in their day-to-day activities and understand the implications of their choices. Employing perspectives from STS, it will also evaluate the university publications, programmes, and policy documents to determine how the configurations of responsibility and accountability manifest, how they define academic and professional boundaries and how these changes influence the dynamics and organization of knowledge production. For instance, do they facilitate the advancement and/or alignment of research interests and stimulate new concentrations and/or collaborations? Or do they introduce barriers to participation and/or projects? In other words, the project aims to understand how the code of conduct for biosecurity in the Netherlands influences the creation of meanings, identities and divisions of labour in the context of academic hospitals and how these changes are shaping biomedical research and practices.

2.2.17: Understanding Architecture, Accounting Society, I

Design Thinking, STS, and the Built World

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The practice of design has popularly been understood as an art rather than a science. As a result, STS scholarship has focused on architecture and/or industrial design only sporadically. But because the designed world will double its volume by the year 2030 it is of immediate relevance to consider not only what STS has to offer these design practices, but what design thinking has to offer STS. The common ground between these seemingly disparate disciplines yields some unexpected and welcome possibilities.

From an STS perspective Bijker, Winner, Woodhouse and others have argued that design-stage decisions are far from neutral or merely aesthetic choices. Using analytic methods to reconstruct the implicit power relationships embedded in the built world would be a valuable tool for affected social groups that are generally excluded from the decision making process as well as for the sponsors of design projects themselves. Analytic analysis of conditions before design and after construction might also temper the latent determinism of designers and produce new knowledge about the social and environmental consequences of our design choices.

From a design studies perspective Buchanan, Cross, Simon and others have argued that design thinking may not be analytical, but it is a way of knowing that is no less valuable than traditional science. Rather than scientize design as was proposed in the late 20th century, these scholars argue that designers are capable of producing situated rather than abstract knowledge in the process of problem-solving for a particular social and/or environmental context. The confrontation between abstract and situated knowledge is, of course, a grand epistemological question that has been thoroughly considered by Haraway, Flyvbjerg and others. It has not, however, been adequately related to design in the broad sense of imagining how it is we would like to live in the future.

The purpose of this paper, then, is to employ the categories of thinking articulated by C.S. Peirce as a way to bring STS scholars, designers and communities together as common problem solvers. Peirce proposed that, in addition to deduction and induction, we employ abduction as a rational form of thought. If, as Pierce argues, "deduction proves that something must be, and induction proves that something actually is operative, then abduction merely suggests that something may be."

My argument is that abduction can be understood as a theory of design in which visual hypothesizing is a mode of analysis that may be less articulate than verbal hypothesizing, but one that is more complete and thus potentially more successful. In common terms, the charrette has become an increasingly popular planning tool that engages citizens and designers in collective decision making - in what is called "participatory design." The paper concludes by problematizing the contemporary charrette process and speculating how STS activists might critically contribute to public design thinking.

2.2.17: Understanding Architecture, Accounting Society, I

Importing, Cutting & Pasting Social Spheres: Computer Designers' Participation in an Architectural Project

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The project, in architecture, can be defined as a graphic production a space of representation one can access through visual effects. Among the universes of ideation (plans, sections, details that are used to give shape to a building, the so-called perspective drawings play a decisive role in convincing a multiple audience (in particular the clients) of the possibility for the not-yet existing building to finally exist. More than that, composed by the mean of computer-aided design (CAD) systems, perspective drawings are truly aimed to render new worlds by projecting potential spatial usages, lights, ungraspable things such as the atmosphere, people and objects living in and the like. While interrogating the material operations this representation technique is made of, I would like to take these virtual montages as cosmologies in the making. In composing drawings, architects address issues that can be formulated as follows: what do we need for the world we project to be or to hold? What do we put in it? Which are the relationships we decide to rely on? To observe the making of these drawings is basically to witness new universes being fabricated, corrected, coloured, articulated or dislocated, by simple clicks on keyboard. Based on an ethnographic fieldwork in a Japanese architectural office as well as in a studio of computer designers, this paper would aim to explicit some features of the production and use of these drawings. Especially, focusing on the architectural setting of the Japanese International Exposition Aichi 2005, I will discuss about the very nature of the social world as designed by the organizers. In the case of Expo 2005, how do architects in charge of the plans create a new assembly? And which assembly do they choose to create? What do they put into the images? What is the quality of space they design? What are the cosmologies they are versioning?

Knowledge Laboratories and the Urban Renewal of Brussels

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This presentation will build further on the PhD research, currently in a final stage, which explores the tensions between layers of knowledge production within architecture and urban renewal in Brussels. It addresses, inspired by the laboratory research methodologies of Bruno Latour, the various laboratories at work in urban knowledge construction as well as the translation processes taking place between those laboratories. By focusing on precisely the translation processes within and amongst those laboratories, the research questions how an alternative point of view can be adopted, meaning beyond traditional dichotomies such as bottom-up vs. top-down; software vs. hardware; authoritarian vs. participatory; orchestrated vs. everydayness. The more general research questions regarding the way in which actors - in architecture and urbanism in Brussels - produce and transport knowledge throughout the different knowledge building levels, will in this conference be delimited to the role of non-human actors in this process. What is the role of amongst others representation techniques,

2.2.17: Understanding Architecture, Accounting Society, I

historical actors (often in the form of urban traumas) and design as such in the architectural knowledge building process? If not intentional, are those actors nevertheless mandated? And if so: by whom? How does the (expected as much as unexpected) affect of those actors on their environments, influence or not the architectural practice and the architect's role as 'expert'? The presentation will specifically address how such actors affect architecture and urbanism's long-standing attempts towards more participatory and experimental practices and towards more attention for the everydayness of space. The question then becomes whether the success of such attempts, with a strong emphasis on the software of space, not precisely depends on the proper translation of such soft, quotidian knowledge into the architectural or urbanism project ('les briques'!)? And is it not precisely in this translation process that non-human actors (such as representation techniques) play a crucial role in transporting knowledge from one process stage into another? This presentation argues that it is precisely through those translations that knowledge is transported but also transformed, and that the theories and concepts of participation and citizenship are made operative (for both the better and the worse).

Rebuilding Cityscapes: Public Concerns on the Architectural City

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This paper explores how a cityscape may change, what kinds of controversies emerge in such a transformation process and how those controversies are closed by the production of a new cityscape. It is based on a research conducted in Brussels between 2004 and 2007 on the emergence of a redefinition of the cityscape by a non-human : " the capital of Europe ". The data was collected by the means of observation of public debates, interviews, analysis of newspaper articles, official documents and private archives. This lead to reconstruct the emergence of heterogeneous concerns on such a new way of re-assembling the city in a new architectural form with new landmarks. The paper emphasises the public character of such concerns, i.e. the embedding of the debates on the rebuilding of the cityscape in the sphere of media. It shows also how the public arenas of debate have connected one another with different kinds of objects such as books, reports, guidebooks, buildings or exhibitions. Those results lead to open a discussion on the traditional distinction made in the sociology of architecture between the production and the appropriation of a building. Indeed, the paper argues that an STS analysis of architecture must not be limited to the opening of the black box of the production process of the building. An analytical perspective must also be opened on the architectural city that shows another life of architecture, independent from its concrete materiality. This is a networked life of buildings that makes them circulate among the different spaces of existence of cityscapes, both in the world of production and in the world of appropriation. Hence, such an STS analysis of the architectural city interrogates how technical objects such as buildings starts to define and, therefore, rule the city as an architectural whole.

2.2.18: From Bench to Bedside: the Role of Evidence-Based Medicine, III

Valuing Knowledge and Action:
a Comparative Rhetorical Analysis of
Clinical Practice Guidelines for the Management of Hypertension

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Clinical practice guidelines have a translational mandate: they serve as a bridge between the knowledge produced through scientific research and the situated actions of health care practitioners. They are an evolving, proliferating, and overtly persuasive genre. However, little analytical attention has been paid to the persuasive strategies employed in these influential texts or to the values that they instantiate.

In this paper, I present a comparative rhetorical analysis of clinical practice guidelines for the management of hypertension. Hypertension has been a hub of activity both in the creation of guidelines and in the study of the "knowledge translation" process. This attention is attributed to the prevalence of hypertension, its high costs to individual and population health, its demonstrated under-diagnosis and under-treatment, its vast and diverse evidence base, and (more controversially) its profitability.

The analysis that I present was undertaken in two stages. The first stage involved a broad comparison of seven guidelines published internationally between 2003 and 2006. Rhetorical genre theory was used to conceptualize the formal strategies used by these guidelines to effect three "recurrent social actions" that are definitive of the genre: providing recommendations, presenting evidence, and inciting change. The second stage of analysis involved a close comparison of two guidelines, JNC7 Express (the condensed guidelines of the US National Heart, Lung, and Blood Institute) and UpToDate© (a proprietary online resource). Although UpToDate© is not a "guideline" in the same sense as its counterparts, it shares a common set of social purposes and provides unique insight into the potential role of information technology in the evolution of this genre. This close analysis employed the Aristotelian concepts of ethos (appeals based on the character of the speaker or writer) and pathos (appeals based on the emotions of the audience). While science - and evidence-based medicine - privileges logos (appeals based on the structure and content of an argument), ethos and pathos are particularly crucial to the translational work of clinical practice guidelines.

Through my detailed presentation of this analysis, I will develop two central arguments. First, clinical practice guidelines exhibit a range of rhetorical strategies which provide insight into how knowledge and action are understood and valued relative to one another in medical practice. Second, the resources of rhetorical theory can make unique contributions to conceptualizing the social functions of this medical-scientific genre in variously pragmatic, historical, hermeneutic, epistemological, and critical terms.

2.2.18: From Bench to Bedside: the Role of Evidence-Based Medicine, III

TB Vaccination and the Reinforcement of Difference: a Case Study of Korean Tuberculosis Vaccination and US Medical Standards

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One of major themes found in the field of international S&T development research is the conflicts between Western and non-Western perspectives on S&T practice. To begin addressing this theme, I examine the interactions between S&T development and medicine, using a case study of TB vaccination. In Encountering Development (1994), Escobar tries to identify the elements of development discourse and proposes a hybrid culture model that balances modern and traditional as well as Western and non-Western socio-economic practices. In Carnival for Science (1997), Visvanathan argues that, instead of adopting binaries given to us in Western though, diversity of skills and multiple identities could be proper tools for further socio-economic development. Headrick, in The Tools of Empire (1981), proposes that understanding the flow of information is critical for analyzing the diffusion of technologies between Western and non-Western societies. With this in mind, I would like to address is whether or not Western S&T practices continue to play a role in reinforcing the existing Western biased dominant technological and political system as they did during the colonial period before WWII. My case study of TB vaccination works to show that discrimination can be introduced and reinforced through medical technology and that the way in which "disease" is constructed, identified, and treated can vary by national context.

Trunz et al. (2006) report that, as of 2002, more than 157 countries and territories have done B.C.G. vaccination to prevent children from becoming infected with tuberculosis. One of these countries, R.O. Korea, has been administering the B.C.G. vaccine as a major medical policy. However, the vaccine, administered in many Asian countries, causes problems, such as positive Tuberculosis Skin Test results in immigrants and international students who received this vaccination in their home countries before coming to the United States. Attempts to explain the B.C.G. vaccination as a major cause for positive TB test results have not been considered as an excuse to waive compulsory TB testing for these people. Due to ignorance and poor policies in the U.S., immigrants and international students are forced to take medication to treat TB as a result of positive test results brought about by vaccination; these medications can bring about side-effects to those new U.S. students and residents. In this paper, several concerns are brought forward: (1) whether the U.S. is establishing and maintaining invisible barriers against immigrants from certain regions, (2) whether this type of policy forces new standards upon other countries, (3) how this situation compares to the standards of other countries, (4) whether there is room for international collaboration in developing universal vaccination standards & technologies, and (5) if ethnic/racial/cultural considerations still play a major role in medical standards. These questions, of utmost importance to scholars in the study of international development and medicine, can be explored through this study of TB vaccination and international science, technology, and medical practices.

"Morphology is a Witness that Doesn't Lie" :
Clinical Forensic Medical Claims-Making in Cases of Acute Sexual Assault

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In the UK it is consent, or the lack of it, which criminalises a sexual act. That is to say that engaging in sexual intercourse, or any other sexual act, with a person who does not wish to have sex is an assault and, depending on its nature and where in the UK it is committed (England and Scotland have different definitions of what constitutes rape), can lead to a rape charge. Although consent is certainly a step in the right direction from the previous determining factors (e.g. 'with force and against her will' which, although applied in Scotland until as recently as 2001, fundamentally misunderstood rape), it is very difficult to prove. Consent, which is a mental decision, has to be 'read off' the body, in the actions and potential marks left on the skin indicating non-compliance. It is the job of the Forensic Medical Examiner (FME) to observe the body of the complainant and record all visible injuries. With these observations they can then ascertain the mechanisms by which the injuries were produced, and, crucially, the concomitant level of force necessary to make them.

In this paper I will address how FMEs negotiate the boundaries between the legal and medical elements of their work by demarcating the physiological from the mental. Using data derived from interviews with FMEs, I will describe how they construct a medical report which both reconstructs the events of the assault and evaluates their severity without actually discerning consent. On the other hand, when no injuries are apparent, FMEs are to be found largely proclaiming that lack of injury does not mean consent. It would appear therefore that the Cartesian dualism of the mind/body is inherent to the work of FMEs and the claims that they make, and the boundaries they draw between themselves and the law.

This will be of interest to the STS community as it broaches a number of debates, both those in their infancy and those that are more established. The use of dualisms and their potential deconstruction will be discussed, alongside the rhetorical construction of boundaries. Moreover, this study sits firmly in the field of science and law studies, and my comments, particularly regarding grand claims-making in light of little physiological evidence, question established positions on the nature of expertise.

Securing Convictions and Three Terrains of Forensic Expertise:
Laboratories, Courtrooms, Worlds

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How do forensic experts secure convictions? Although this paper gives little credence to the so-called "C.S.I. effect," widespread claims about such a phenomenon are perhaps best read as expressing increasing cultural and legal anxiety about the ability of "real" forensic

2.2.20: From Crime Prevention to Securing Convictions: Terrains in Legal Expertise

expertise to secure convictions. Such anxieties notwithstanding, forensic experts do secure convictions. This paper suggests that forensic experts secure convictions in the terrain of the courtroom by blurring the boundaries between two additional terrains: the laboratory and "the world" (in the Latourian sense of the word). Without engaging in a - from a science studies viewpoint, absurd - debate about whether various forensic disciplines are or are not "science," the paper defines "science" as that which takes place in the metaphorical "laboratory," i.e., whatever self-proclaimed "scientists" conceptualize as scientific practice. Forensic experts, it would appear, routinely go beyond the confines of what they have ascertained through "science" to draw seemingly commonsensical inferences about events that occur in the world. It will be argued that forensic experts must do this in order to secure convictions; mere "science" is not enough.

Forensic DNA and Burglary:
a Cigarette Tip, a Suspect, and the Dutch DNA Database

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Forensic DNA is often considered to be an objective and unproblematic technology. In many cases this will be true, but simultaneously that same objective and unproblematic technology will manifest itself in practice with normative consequences for many, to the network included, individuals, whether these are professionals or juveniles.

This paper will articulate some of these normative consequences by describing a pilot study (DNA and burglary) organized in the Netherlands in 1998. More specifically, by using the criminal file compiled in the criminal investigation against suspect 'Albin', this paper seeks to describe how a cigarette tip was made into legal and convincing evidence through describing its complex present as to shed light on some of the normative consequences for professionals working in forensic DNA practices.

Then the suspected 'Albin' will be centre staged as it will be described how he became enacted by the evidence, first as a suspect that had to be made in a particular way so he and the Dutch forensic law converged, and, second, how he was made into yet another legal suspect by describing the Dutch DNA database and its analog accounting system.

Given the success of the pilot study, it was decided to change the Dutch forensic DNA legislation to such an extent that compulsory DNA swapping was lowered from a suspicion against a person for having committed a crime with a maximum penalty of eight to four years. Hence the case studied can be considered a Dutch landmark case if one aspires to add to the knowledge and insights on law/science interaction. On another theoretical level, this paper seeks to break a lance for 'the law' as an agent with agency.

2.2.21: Science Making on Shifting Academic Ground

Boundary Work in the Emergent Interdisciplinary Health Research Field: Biomedical and Clinician Scientists' Perceptions of the Social Sciences

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Canadian funding agencies have launched bold initiatives to support interdisciplinarity in health research and have recognized that the social sciences are integral to the knowledge in health.

The aim of our research was to explore the potential for the social sciences to integrate and develop in the health research field, a field in which the experimental paradigm holds a hegemonic position. Specifically, our study explored whether and to what extent biomedical and clinicians scientists' perceptions of social science research might constitute a symbolic boundary to the integration of the social sciences in the health domain. Understanding the perceptions of biomedical and clinician scientists as they relate to the social sciences is critical because of the high status that these disciplinary groups typically hold in the health research field, and consequently the symbolic power they wield over it. Sixty-one semi-structured interviews were conducted with biomedical (n=31) and clinician (n=30) scientists. The interview script covered three topics: experience with the social sciences; opinions about different research methods and their potential "biases"; and conceptions of legitimate science. Interviews were also conducted with social scientists (n=33), who were asked to comment on their own research practices. Knowing how social scientists perceive their own work - and how they define science more generally - allowed us to map out areas of divergence and convergence between their views and those of the biomedical and clinician scientists.

Results showed that clinician scientists tended to have a more favorable posture toward the social sciences than did the biomedical scientists: approximately half of the clinician scientists included in our sample were favorable to the social sciences, whereas only a quarter of the biomedical scientists showed a similar stance. Results also suggested that social scientists' perceptions of their own research practices and their definitions of legitimate science contrast those of clinician and biomedical scientists; this contrast suggests a rift between the epistemic culture of social science, on one hand, and that of biomedical and clinical science, on the other.

Drawing on Thomas Gieryn's concept of boundary work and Pierre Bourdieu's concept of field, we argue that the removal of organisational boundaries by funding agencies and other science-related organisations may not be sufficient to integrate the social sciences into the health domain and to foster interdisciplinary research. Symbolic boundaries also have to be taken into account because they seem to play a predominant role in maintaining disciplinary closure and perpetuating power relationships.

2.2.21: Science Making on Shifting Academic Ground

The Call for Interdisciplinary Research in the Health Sciences: the Views of Biomedical, Clinician and Social Scientists

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Interdisciplinarity seems to be the new creed of research institutions and funding agencies in Canada. Accordingly, many have engaged in restructuring processes in order to intensify interdisciplinary research: the replacement in 2000 of the Medical Research Council of Canada by the Canadian Institutes of Health Research (CIHR) is an eloquent illustration. However, there is no empirical evidence that this trend was intended to meet the needs expressed by health scientists. The aim of this study is to investigate the perceptions of biomedical and clinician scientists regarding the challenges, benefits and drawbacks of interdisciplinary research (IR) and the current call by funding agencies to integrate IR in the health sciences. Semi-structured interviews were conducted with 31 biomedical scientists and 30 clinician scientists. The sample was derived from the membership lists of the CIHR peer review committees between 2000 and 2006. The interview guide broached various themes related to IR in the health sciences. One theme focused specifically on promotion of IR by funding agencies, and another on respondents' perceptions of the benefits and drawbacks of IR in the health domain. The content analysis identified the general trends that emerged and explored the potential differences between the biomedical and clinician scientists. A majority of respondents, particularly the biomedical scientists, showed to have some reservations with regard to the purported greater heuristic potential of IR as compared to disciplinary research. The main drawbacks of IR reported by the participants were lack of understanding among scientists of different backgrounds and problems of team cohesion, time-consumption, and reduction in the quality of disciplinary knowledge production, with different emphasis between biomedical and clinician scientists. Nearly all respondents believed that funding agencies are promoting IR too vigorously, at the expense of disciplinary research, and that IR should be driven by the scientific agendas of researchers rather than that of granting agencies. Among the mentioned undesirable impacts of the new vogue for IR is the increased number of "artificial" interdisciplinary teams. Certain scientists did offer some recommendations in order to improve the functioning of IR in the health sciences. The disciplinary training of biomedical scientists seems to curtail their interest for IR. The differences observed between the biomedical and clinician scientists suggest that the latter are confronted with complex realities and contexts in which IR would offer greater pertinence and benefit.

How do Basic Scientists Define and Pursue Academic Legitimacy in the Entrepreneurial University?

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Enhancing Canada's economic competitiveness in the global knowledge economy has been a policy priority of the federal government in Canada for over two decades (cf. Government of Canada, National summit on innovation and learning. Canada's innovation strategy, 2002)

2.2.21: Science Making on Shifting Academic Ground

Science policy has become one of the tools to achieve this goal, resulting in a market-driven approach to science funding. Public funding agencies increasingly require scientists to demonstrate the economic value of their research and to engage in industry collaboration and the commercialization of research findings. Universities have largely accepted this mandate and tried to incorporate commercialization of research into the university's primary mission of teaching and research. This paper presents preliminary findings from interviews with 20 basic health scientists at the University of Toronto. The study seeks to understand how basic scientists define and pursue academic success in this new entrepreneurial world. Do these definitions and strategies vary across research settings and across career stage? Bourdieu's concepts of field, capital and habitus are used to explore the dynamics between scientists and between the university and the state. Conditions attached to science funding shape the structure of the scientific field, restricting or expanding the autonomy of scientists from political and economic interests. Within this field, scientists compete for scientific legitimacy. Struggles between political and scientific fields and within the scientific field ultimately affect scientific practice and the role of science in society. This paper will explore the implications of these struggles for the production and translation of scientific knowledge, the distribution of rewards across the scientific field, and academic career satisfaction.

2.2.22: Engaging Publics: Configuring Community as Mediated Places

Community in Digital Discourse: a Practice Framework

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This presentation will introduce a framework for investigating the practice and use of a social network information system for immigrant and diasporic communities. This project focuses specifically on South Asian immigrants who have arrived to the greater Los Angeles area within the last two years and explores the effectiveness of a cultural information system through a community-centered approach. This project is based around the understanding that while immigrant communities can indeed benefit from information systems, the development of these systems must still acknowledge community-specific realities. It thus focuses on the design and assessment of an information system created for a specific immigrant community. In particular, the project presented here will draw from the author's ongoing work with the South Asian Network (SAN), the region's leading non-governmental organization dedicated to serving the needs of marginalized South Asian immigrants. As such, this project sits at the confluence of several bodies of research, including informatics, communities in digital environments, and social networks. The presentation will discuss varying definitions of community in the design and informatics discourse, as well as explore their implications for understanding systems use and informational practice. In this context, this presentation will demonstrate the ways in which immigrant and diasporic communities represent new challenges for systems design in terms of cultural heterogeneity and mediation. Building on notions of mediated and imagined communities, this presentation will explore various configurations of social context for immigrant and diasporic communities in informational environments. Additionally, this presentation will discuss the ways in which inquiry into immigrant communities represents unexamined territory within the larger body of work of social networks.

Modeling Cultural Ontologies using a Blend of Participatory and Algorithmic Techniques

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This presentation discusses the feasibility to employ "light" participatory procedures together with algorithmic techniques to allow communities to semi-automatedly model their own digital environments. This will build on ethnographic studies in 'fluid ontologies' - methods that engage diverse community groups to reflect on their own situated practices and from that standpoint create ontologies that delineate for their digital systems. However, research has found that while such fluid methods are powerful, locally sustainable and flexible, they do little to engage critical questions around scale and interoperability. The ontology generation approach presented here explores the convergence between distributed techniques of ontology category annotation and automated algorithmic techniques of object clustering. By distributed annotation, I refer to the procedure of decentralizing the generation of an ontology among isolated community members; in particular, this consists of asking respondents to assess the similarity and/or the semantic relationship among specific ontology topics

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according to their subjective judgment. By automated algorithmic techniques, I refer to the collection of computational mechanisms for clustering and classification that can be utilized to aggregate similarity or semantic assessment into ontological models. The hybrid model is thus semi-automated for it blends both human participatory and algorithmic components to engage new human-technical ensembles. In this presentation, I will evaluate this hybrid approach and the possibility to engage different cultures, communities and technologies in diversifying information systems. In particular, I will use data gathered in the context of fieldwork with an indigenous Native American community in the San Diego County (CA) as a case study.

2.3.1: Cultural Constructions and Genetic Discourse

Culture, Ways of Knowing and Genetics in Russia,
the UK and the US

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Recently the question of the impact of socio-cultural factors on the epistemology of science has become one of the central issues in the social studies of science. Most scientists involved in this debate have been defending the special status of scientific knowledge as being the best 'way of knowing' the objectivity of the material world and admitting the possibility of culture affecting science only to a limited degree. How wide spread are such views among 'regular' scientists?

This paper is based on interviews with genetic scientists and medical geneticists from the UK, Russia and the USA. The interviewees were invited to reflect on the effect of cultural and societal factors on genetics in general and on their work in particular, drawing on their experience of working in different countries. Their responses will be considered in the light of the suggestion made by science studies scholars that scientists tend to relegate the social aspects of their work to what Kerr et al. have termed the 'macro realm', or the realm of political and economic issues which determine what projects receive funding, how the outcomes of basic research are applied and what ethical issues they raise, and to argue that culture and society have practically no impact on the 'micro-empirical realm' of day-to-day laboratory work. It will be demonstrated that the geneticists' responses far from being monolithic in terms of the perspectives on the epistemological effect of culture on science that they reflect, contain a wide range of attitudes on the issue and can best be understood in the context of the history of genetics in the countries where the respondents are based and in the context of their personal life histories and experiences working in different cultural environments.

Constructions of Complexity and
Accountability in Psychiatric Genetics

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Since the collapse of the 'gene for' paradigm in behavioural and psychiatric genetics, there has been a turn towards complex modeling of psychiatric illnesses. With the idea of 'genetic susceptibility' comes the promise of a more accurate diagnostic and preventive medicine. However, the disappointing progress of linkage and gene association studies has meant that promissory discourses have taken a cautious turn. The history of psychiatric genetics is problematic in itself. It has been associated with eugenics and its twin and adoption studies were heavily criticised. In this paper we explore the way in which scientists' portray psychiatric genetics as a robust and responsible science. We conducted a rhetorical analysis of review articles (n=10) whereby scientists were engaged in the retrospective/prospective accounting of scientific developments to specialist and non-specialist readers. We found a range of devices through which constructions of facticity and complexity appear to exonerate

2.3.1: Cultural Constructions and Genetic Discourse

the science from criticism, while accountability was performed via displays of moderation, flexibility and ethical responsibility. In addition to balancing optimism and caution, a distinctive characteristic of these articles is the way potential criticisms are incorporated and neutralised. The implication of this research is that accounts of psychiatric genetics are shaped by a history of controversies, since they appear to be increasingly resilient to critics of the science.

The paper is informed by rhetorical and discursive approaches to the construction of knowledge. Rhetorical discourse analysis combines aspects of the philosophy of ordinary language (Austin, 1962; Wittgenstein, 1958; Rorty, 1991), social constructionism (Gergen, 1994; Shotter and Gergen, 1989; Shotter, 1993), ethnomethodology (Garfinkel, 1967; Lynch, 1985, 1993), conversation analysis (Sacks, 1972; Schegloff and Sacks, 1973; Schegloff, 1989), and discursive psychology (Billig, 1987; Antaki, 1994; Potter, 1996; Edwards, 1997). By asserting that scientific accounts can be analysed in terms of their rhetorical dimension emphasises the argumentative, situated, and action-oriented nature of language. In the context of STS, the construction of scientific facts and entities (i.e. polygenic complexity) are contingent to the discursive nature of scientific controversies.

The discursive turn is something of a minority sport within STS. Nonetheless, there is an area of literature to which this paper makes a contribution. We are thinking of the work of Law and William (1982), Gilbert and Mulkay (1984), Greg Myers (1985, 1990), Prelli (1989), Kerr, Cunningham-Burley and Amos (1997), and Hedgecoe (2001). Drawing on this tradition of STS, our paper will foreground the kinds of discursive resources available to scientists to construct versions of science that convince, persuade, counter, and defend. More broadly, it also seeks to locate psychiatric genetics within a broader historical account of molecularization.

Following the Shifting Sands of Genetics and Medicine in the 21st Century

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If we are to believe those conversant with the current developments in postgenomic studies, recent decades have witnessed a significant shift in focus away from the reductionist genetics of the twentieth century tending toward a widespread and pervasive understanding of the gene as the ultimate determinant of forms of life, towards more holistic and ecological understandings and endeavours characterized by a turn from linear to non-linear biological events; by instability and ongoing changes of state; and from closed systems to open systems. The central purpose of all this seems to be to isolate a sense in which the causal powers of heredity cannot be predicted or explained solely on the basis of the causal powers of constituent parts (e.g., genes.) Genes are described as functioning parts of complex biological processes working in interaction with other cellular structures and are not to be conceived in terms of fixed inert entities, dislocated from their environment and self-identical. Reductionist explanations of hereditary effects in biology and medicine are then viewed as being somehow incomplete.

2.3.1: Cultural Constructions and Genetic Discourse

My contribution to the ensuing discussion begins by examining how postgenomic studies fill a void previously foreseen as being filled by the "genetics-based approach" to medicine. Taking into consideration the lag between theoretical and clinical capability in the application of new scientific knowledge, I then argue that the unfolding of so-called genetic medicine can best be understood against the background of changes in the conceptualizations of applied human genetics in medicine after the 1930s from "related to heredity and constitution" to "related to chromosomes and genes," and then in the 1970s - although only marginally - in relation to the formation of a new medical specialism (i.e., medical genetics) which attended to diseases and disorders which may or may not be strongly familial. In the final section of the paper, I highlight the resemblance of the earlier episode of concept development in which applied human genetics "related to heredity and constitution" to contemporary arguments surrounding "new" postgenomic studies.

2.3.2: Organizing Responsibilities for New Medical Technologies as a Goverance Challenge

The Role of Hybrid Forums in Governing the Introduction of Novel Medical Technologies

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When novel technologies get introduced into society, new social role responsibilities are introduced sideways. It is clear that we can consider these shifting and emerging responsibilities. In some cases the attribution of new role responsibilities is also explicitly discussed by the involved actors and these discussions form part of the introduction trajectory of a novel technology.

The aim of this paper is twofold. First, I aim to contribute to a better understanding of the processes by which configurations of responsibilities change when novelties are introduced into society. Second, I aim to explore means by which it is possible to improve those processes of organizing responsibilities. I will argue that deliberation on shifting configurations of responsibilities requires the definition of scientific facts and technological properties; a discussion on what responsibilities different human actors are able to bear; and a discussion on the balancing of different interests. Because of the broad range of actors, potentially involved in and affected by changing configurations of responsibilities, and because of the relevance of knowledge and expertise on the properties of the novelties, the quality of deliberation will improve by the involvement of a wide range of different actors, who bring in a wide range of different expertises and a wide range of different considerations and interests. Therefore, I focus in my research on the role of hybrid forums as governance arrangements that may contribute productively to the process of organizing responsibilities. I use the term hybrid forum as it was introduced by Callon and Rip (1992) for deliberative settings in which a heterogeneous set of actors is simultaneously involved and in which a heterogeneous set of questions, problems and arguments co-exist and co-evolve.

The research is based on two empirical studies. The first concerns the introduction of prenatal Down Syndrome testing in Dutch healthcare, the second study concerns the issue of insurance selection and pre-symptomatic DNA diagnostic testing. Discursive positioning theory was used as a method to analyze discussions and debates that occurred in the context of these cases. I will conclude on the diverse ways in which interactions in hybrid forums have been productive in organizing responsibilities in these two cases. The results partly confirm my hypothesis on the productive role of hybrid forums, but also draw attention to ways in which hybrid forums may contribute to organizing responsibilities, that were not anticipated beforehand. Finally the two case studies give reason for further reflection on the feasibility and desirability of 'organizing responsibilities' as object of governance.

Callon, M. and A. Rip (1992). Humains, non-humains: morale d'une coexistence. La Terre outragée. Les experts sont formels! J. Theys and B. Kalaora. Paris, Autrement: 140-156.

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Shifting Responsibilities Through New Medical Technologies

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Recent developments in medical technologies impact upon the division of responsibilities and accountabilities within the socio-technical networks in which these technologies thrive. New technologies transgress the traditional boundaries between the public and private domain. Moreover, new actors enter the socio-technical network surrounding medical technology and the mutual positions* of traditional actors change. For instance, homecare technologies that enable patients to spend more time at home instead of in health care institutions may imply new responsibilities not only for health specialists, patients and technology manufacturers, but also for players that enter this field only with the introduction of such technologies, like housing corporations. Another example is the increasing use of self-monitoring devices. Apart from the potential they have for alleviating patients' burden of disease, such devices might, for example, also be used by insurance companies to monitor and control the lifestyle of their clients - with all the predictable (financial) consequences. Likely and/or imaginable developments such as these raise the question whether such shifting responsibilities are desirable and how the divergent roles of the actors within the network should be (re)defined given recent technological developments.

This paper contains a first impression of the changes in the landscape of medical devices that can be expected, along with a prospective analysis of their possible impact on the socio-technical network. This impression is based on interviews and workshops with relevant actors in the field. We ask how diverse actors in this field see their own role within the network and whether they are aware of the shifts in responsibilities that ensue from new medical developments. Given their specific role, do actors take on the responsibilities that can be (or, perhaps more urgently: are) expected of them? Can it be expected that specific actors will strengthen their position within the field, by means of new technologies, at the expense of other actors? Insurance companies or providers of medical technologies might for instance sidetrack traditional health care institutions and medical professionals through the increasing use of e-health devices. The analysis focuses on the consequences of such developments for end-users and preliminarily addresses the question whether/how the socio-technical network organized around new medical technologies should be controlled through governance instruments such as legislation.

How to Improve Anticipation and Societal Embedment of Emerging and Potentially Breakthrough Technologies in the Healthcare Sector?

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The advent of emerging breakthrough technological options of nanoscience and technologies is full of promises and their introduction has the potential to break existing socio-technical order. One example is the advances in the field of miniaturized and autonomous sensor

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systems that will enable people to wear personal Body Area Networks which can provide them with medical, sport and assisted living functions. The process of emergence of such options is complex while the outlook to the future remains obscure and highly uncertain. Decision makers face great challenges while ever increasing perception of risk requires the whole society to continuously assess future possibilities. In this paper we develop a systematic approach based on the philosophy of Constructive Technology Assessment where we integrate strategic intelligence tools informed by dynamics of emergence to enable decision makers to consider both technical and social design as an integrated process.

While the social embedment of new and emerging technological options is principally dependent on external actors in the selection environment (the business environment, regulation environment and the wider society), in product development, attempts at creating alignment with these environments takes place in concentric stages (Deuten et al, 1997). Hence, any serious attempts at valorisation should include broader notion of success and thus anticipate on broader societal context. This requires a broader approach which transcends the technologist's perspective where the promise of options remains powerful. This is necessary because the introduction of novelties that have the potential to break existing socio-technological order, require de-alignments of existing linkages and competencies (Abernathy and Clark, 1985), and to be successful re-alignments at different levels in the value chain are essential. This requires interaction with broader societal actors. Generally, interacting with the environment is important but is difficult to realize. This is because actors function in different worlds and have their own perceptions about how endogenous futures might evolve.

We explore the case of intelligent and context sensitive monitoring systems in various healthcare settings. The applications of "BAN" have the potential to revolutionize the healthcare industry structure and on the social level the presence of small and pervasive monitoring medical devices might tremendously impact our lifestyles. The success of such applications is dependent on various stakeholder strategies and alignments among various actors and factors. With the aim to orchestrate alignment at different levels our first starting point is analyzing the ongoing dynamics to shed light on what might happen. Besides, a mapping methodology is presented to explore different actor perspectives along the healthcare value chain to articulate key changes that should take place and the roles that have to be played by different actors along the value added chain for these options to survive within a future world. This enables us to draw on various social, political, economical and ethical implications which might affect alignments at different levels. These data are used to develop socio-technical scenarios to feed broader interaction processes among various stakeholders in the healthcare sector where actors probe each other's worlds and learning might proceed.

Risk Score Instruments in a Primary Health Care Setting

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Risk scores are being promoted as empirically grounded, standardized, and easily administered instruments for assessing an individual's risk for disease. Usually being

2.3.2: Organizing Responsibilities for New Medical Technologies as a Goverance Challenge

developed in the context of large-scale, clinical studies the transfer of these instruments into primary care setting, however, has proven to be problematic. Those difficulties in implementation are frequently framed as an educational or communication deficit-if the primary care provider (PCP) only knew more about the instrument she would use it. This resembles still common models in public understanding of science (PUS) where the side of scientific knowledge-or in our case: the scientific instrument risk score-is considered to be unproblematic and only the process of transmission to the public (or in our case a community which has both aspects of a lay and an expert public) is problematic. Extensive critiques of the PUS literature have shown their understanding of the public as an "empty vessel" that only needs the right kind of education. In this paper we analyze the assumptions that lay behind the educational efforts and show the complex nature of the scientific object "risk score" from the PCPs point of view.

We have conducted a focus group study with members of a network of primary care providers in Germany to assess their use of and attitudes toward risk score instruments. While PCPs had a good degree of knowledge about these instruments their actual use of them proved to be rather low. In addition to obvious practical considerations (time and cost restraints) three main themes were addressed. First, risk scores proved to be a more elusive thing than we would have expected. Neither their conceptual boundaries, differentiating them e.g. from an individual's medical history, nor their intended and actual scope of application were clear and uncontested. In a different line of argument, certain types of patients (e. g. "the health seeking patient", "the recalcitrant patient") were frequently invoked as decisive factors for the successful-or unsuccessful implementation of risk score instruments. Connected with this, the third set of questions was centered around the physicians' understanding of their role within the health care system and their everyday practice. PCPs assumed that the introduction of risk scores would likely change the nature of PCPs work as well as their patient-doctor relationships.

In our paper we will discuss the consequences of these findings, both from a practical perspective as well as in respect to theoretical debates about the shifts toward a risk-centered view of health and health care and the transfer of medical knowledge and technologies between different contexts. We argue that the different dimensions mentioned above are closely linked to each other, and any successful attempt to introduce risk score instruments into primary health care settings will have to take each of them into account. A merely educational approach that leaves the actual instruments unchanged and fails to take into account PCPs' knowledge and everyday practices is most likely bound to fail.

2.3.3: Political Perspectives on Globalization in Health Care

Acting with Global Science: Pharmaceutical Regulation as Transnational Vision and Strategy

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This paper is an ethnography and cultural critique concerning how East Asia is acting with global science. Focusing on recent development of how drugs' racial effects is regulated in the International Conference on Harmonisation of Technical Requirements for Registration of Pharmaceuticals for Human Use (ICH), a bold project that is attempting to create universal standards for drug approval, this study traces Japan's and Taiwan's responses by analyzing their multi-national clinical trial schemes - how they are proposed and spread and how they intersect each other through regional meetings.

Unlike conventional interpretations that portray the encounter of the local with globalization as simply a "zero-sum" game, in which the former has to accept universal rules by the latter or leave isolated, this study echoes Sheila Jasanoff's notion of "regulatory culture", calling attentions to the processes of each state's situational engagement and their interactions. In addition, considering globalization as defined by deterritorialization and reterritorialization, this study expects to provide with a salient example about on how Japan and Taiwan construct their working platforms of drug regulation. These transnational schemes, from this perspective, are visions from the local and strategies to cope with the global, but they belong to neither of the two.

Relying intensively on interviews with insiders and medical literature, this paper situates itself as an ethnography of globalization and of the state. It hopes to capture what is severely left unstudied beneath a unified world and beyond national boundaries; only with such understandings can we move beyond simple interpretation about globalization and about modern states.

Representation Politics: How Can a Body Matter? Demography and Sexual and Reproductive Health Policy in Columbia.

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There is certainty an important historic relation between demography and policy making. The State has token the demography like an important tool for through quantifications and statistics to standardize the populations. To measure the populations make possible the State control. However, also specific political groups and organizations can to use the demography like a recognition device and an element in a politic strategy, underlying phenomena, constructing facts with a scientific and technical foundation. In the Colombian society, often seems like traditionalist in the minority recognition, the demography has been a field from which "liberal" groups, namely feminist, sexual diversity and human rights activists make visible special actors, groups and matters, in such a way that affairs as the Sexual and Reproductive Health (SRH) Policy, in Colombia has been constructed from the statistic and

2.3.3: Political Perspectives on Globalization in Health Care

demographic shape of populations and actors. The couple Demography and SHR Policy (Politic) making not only make visible certain groups and actors but attributes risk sources and creates risk populations

This paper approaches the relationships between demography and construction of actors and populations that are aims of (SRH) policy; focusing in the demography technology, the National Survey of Sexual and Reproductive Health (ENDS 2005). This survey is the Colombian version of the tool: MEASUREMENT DHS+, a kind of survey developed by Macro International Incorporated. Through this consultant Cooperation Agencies like USAID assembles information about population in developing or Third World countries. This survey makes standard local phenomena and constructs global actors. This paper attempts to show how local interests are translated in global strategies and the roll of standardization devices like statistics, diagrams and anthropometry in this issue.

From Living in the Cracks of Modernity to Creating Spaces in Global Health Research

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This paper describes the challenges of co-producing research products with the research objects and participants of this case in the field of global health. In the last four years I have conducted a study on the origin and evolution of the safe injection movement and the auto-disable syringe in developing countries. The role of reuse of syringes in the transmission of infectious diseases has been brought to the public attention at the beginning of 1980s by the AIDS epidemic (Epstein, 1996). The use of auto-disable syringes is now promoted by organizations like WHO and national governments in Africa and in other parts of the world in order to prevent the transmission of infectious diseases. Using a longitudinal and processual approach based on archive material, interviews and participant observation the key events underpinning the development of the safe injection movement and the adoption of the auto-disable syringe as a technology that could make injections safe were identified. The analysis of this case study points out a number of interesting issues. For instance, the controversial roles of some stakeholders and their positions on specific issues changed over time. The reuse of syringes by WHO in vaccination campaigns caused harm or infected a number of children in developing countries, until the auto-disable syringe became the standard technology for vaccination. Manufacturers of syringes that initially delayed the development and adoption of the auto-disable syringes, are now leading the creation of the market in developing countries.

However, the focus of this paper is a discussion of the effort by key actors involved in this case (e.g. WHO, national policy makers, manufacturers and scientists) to co-create both traditional and innovative research products for different audiences (e.g. safe injection campaigns, scientific papers, policy briefs, movies and photos). Different types of knowledge were co-produced as a result of a dynamic process where roles and identities of the researchers, the research objects and the participants continuously emerged and changed (Jasanoff, 2005; Hess, 2003; Rip, 2003; Bauman, 1992)

2.3.4: Users, Participation and New Technologies

Towards a Generic Style of Participatory Design in Agricultural Innovations Processes

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This paper will present some results of a collective research conducted for 2 years at the INRA, concerning the nature of innovation processes in agriculture when these processes integrate future users as soon as the design of innovations. The very originality of our work - a mix of ergonomics, STS and philosophy -, is that it has been conducted with the active participation of scientists - mainly agronomists - engaged themselves in such processes, mobilizing and interacting with users. Our goal is to identify the very singular, specific and generic elements, caracteristics and constraints of participatory design and innovation processes. We have worked with 7 empirical cases of participatory design, concerning for example the development of technologies in Brasilian poor regions in a context of political reforms, the conception of software for the evaluation of resistance and properties of new corn genomes, the conservation of cow races, or the modelisation of fows of materials, money, food in farms. The generic elements are very diverse and concern the kind of 'image' that scientists have of participatory design and which influences their action, the complicated and rich nature of the links and interactions between scientists and users, the ways of mobilization and confrontation of scientific and non-scientific knowledge, and of course the nature, stabilization and fluidity of the object produced by the processes. We also take in consideration the question of immanent evaluations - by scientists and/or users themselves - of the quality and production of participatory design. Concerning our conceptual approach, we engage here a vision of 'genericity' opposed to the notion of 'generality' : like in leibnizian or more near of us deleuzian traditions, the goal is here to preserve both univocity, for the generic abstractions, and pluralism, for the empiric effectuations. We will try to finish by an explicitation of our specific situation, which is less produce models, concepts or knowledge as a goal in itself, rather than produce effects, in a very pragmatic view, for the orientation of research institutions' and scientist's becomings.

"All Users are Important, but Some Users are More Important than Others." Exploring Diversity in the Domestication Dynamics of Community Innovations.

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Users are 'hot'. In popular media they are seen as the sine-qua-non for new buzzwords such as web 2.0, open source, and community-based innovation. This 'turn to the user' had already taken place earlier in different strands of theoretical innovation literature. This research replaced a static 'diffusion of technology' perspective, framing users as passive recipients of technology, with a dynamic co-construction perspective framing users as active participants in an interactive and iterative innovation process. General consensus nowadays is that for innovation, yes indeed, users are important.

However, all users being important, some are more important than others. At least that is what literature on the innovative agency of users seems to imply. In this literature a bias is identified towards ideal typical users such as the user-inventor, the user-innovator, the user-entrepreneur or the lead user. Often these users are technologically literate, higher-than-average educated, more-than-average income, white middle-class males, aged somewhere between 18-40. Striking examples are HAM radio, car tuning or free/open source software communities that seemingly confirm this homogeneous stereotype. This raises the question into what black hole the innovative agency of children, elderly, women, or more generally those people regarded as non-expert end-users, has disappeared?

To answer this question, a qualitative, explorative case study approach is chosen, describing and analysing the activities of participants and users of a community Wi-Fi initiative offering free Internet access in a medium sized town in the Netherlands. On a conceptual level, it builds on and aims to add to the domestication approach (Silverstone and Haddon 1996; Lie and Sorensen 1996) developed for analyzing active processes of incorporation of innovations into everyday life.

Based on earlier results of an ongoing PhD project on community-based user-initiated innovation, diversity seems to be one of the main characteristics driving user communities to function as a stable commons-based innovation 'ecosystem' enabling communities to 'automagically' self-organize. However, to understand the community innovation magic, the invisible work of end-users needs to be brought front stage. This paper thus addresses the lacuna regarding the role of lay end-users in community-based innovation. Therefore, the focus is on lay end-users (and sometimes even non-users) who are not primarily motivated by the meritocratic peer recognition for technological puzzle-solving, the individualistic 'joy of tinkering' or the ideological 'open sourcing' of technology, but by values or concerns based on other forms of attachment to technology. The central claim is that lay end-users' domestication work is a necessary characteristic of the dynamics of community innovations scaling up from internally focused hobbyist initiatives to larger and more diverse user bases. Especially the domestication of end-users into the innovation at a collective level, simultaneously changing both the identity of users and the innovation, is a crucial element of this growth dynamics.

The Shape of the 'Third Generation'.
Design and User Agency in New Mobile Technologies.

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In this paper, we present the results of a study on the diffusion and adoption of Third Generation (3G) mobile telephony in Austria. Our empirical point of departure is the observation that de-facto usage of precisely those data services that are meant to utilise the newly available bandwidth (mobile Internet, e-mail, location based services etc.) lags behind the increasing dissemination of the devices themselves. Among the possible explanations, we focused our interest on the role that the design of the technology itself might play, and on the ways in which the agency of the users is both modelled in, and reacts to, the design processes.

2.3.4: Users, Participation and New Technologies

In order to strengthen the mobile users' perspective in the development of 3G technology, our study inquired into their perceptions and practices of using (and often not using) those technologies. Findings from an on-line survey (n=632) are critically compared with different design concepts that are discernible in design literature and practice. These concepts are at variance with each other in their preconceptions of users' agency, ranging from approaches that, in the name of convenience and usability, operate restrictively, to open designs encouraging user participation.

Matching users' expectations, attitudes and practices against these preconceptions, we were able to identify three different clusters of users with markedly differential preferences that partly map onto, and partly refute the design concepts identified, suggesting more open approaches to design.

As there has no de-facto standard design of 3G technology been established yet, and as the modes of adoption by users are fairly heterogeneous, the development of 3G telephony offers a useful testbed for observing, in a situation that is still open, the interaction of social and technological processes that may ultimately contribute to the "closure" of a design.

2.3.5: Public Understanding of Science in Europe and the USA

Regulating Scientific Citizenship by Law:
"The Third Assignment" of Swedish universities, 1977 and 1996

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The concept of "scientific citizenship" is useful when analyzing the inclusion and exclusion of actors deemed relevant in their relation to science. By using this concept we investigate how rights and duties in relation to science at different levels in the Swedish university system are regulated by juridical reforms.

A rapid expansion of the Swedish higher education system, as in most western countries, occurred in the mid-20th century. As a result of political initiatives, several parliamentary investigations and lengthy discussions, a new law of higher education was decided upon in 1977. The law did not only stipulate education and research as essential tasks of universities and colleges, but did also regulate the relation between university science and Swedish citizens. This was called the "third assignment" of the universities, supplementing the two former tasks of education and research. Henceforth higher education employees were required by law to inform citizens of R&D results and their possible applications. The third assignment remained unchanged for two decades, but in 1996 an important revision was made. Instead of creating a "general" citizen as the addressee of the information process, the new formulation gave prominence to "collaboration with the surrounding society".

In the perspective of scientific citizenship, parts of the public were no longer conceptualised as a collective in constant state of knowledge deficiency and in that sense as a problem to address in sustaining a sound democratic society. Now society at large (local regions, industry, cultural institutions etc), more than before, would be the beneficiary of cooperation with universities. With the 1996 version a more differentiated public in terms of scientific citizenship was created to accommodate this new political agenda. As a consequence rights and duties in relation to science became more context-sensitive.

Important contexts where the regulation, implementation and their consequences for practices of scientific citizenship in the Swedish higher education system are created are the focus for this project. In both the original formulation and the subsequent reformulation of the higher education law of Sweden, certain rights and obligations are assigned to actors on macro, meso and micro levels.

On a macro level this entails studying the documentation of political, parliamentary and legislative processes, in relation to the formulation of so called third assignment in the Swedish higher education law of 1977 and 1996. The meso level is investigated by the same means to describe how regulative initiatives were managed in local policies at universities and colleges. The practice of actors at university departments, for instance in regulating the general tasks, functions and responsibilities of employees and recruiting new faculty, are studied at the micro level.

We will show how the regulation of scientific citizenship by law is re-contextualized through practices at different levels in the university system. This study of the early Swedish regulation adds new insights to the research of scientific citizenship and the construction of rights and duties in relation to science.

2.3.5: Public Understanding of Science in Europe and the USA

DIY and Delegation in the Governance of Science

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The push for public participation in the governance of science has many and varied supporters, not only STS scholars but also Habermasian sociologists, pragmatic political scientists, enthusiasts for innovation, government officials and international organisations such as OECD. Underpinning this increasingly powerful consensus is an idealised conception of the actual or potential influence which the individual citizen can exert on science and science policy through deliberation and organised exchanges of views. The outcomes of such processes are foreseen to be in some way 'better' as well as more legitimate. Though they are in most cases being provided with new tools (and new information to go with those tools), the participants are being encouraged to expect some direct influence on those outcomes - in effect 'Do It Yourself' science governance. These ambitions are implicitly (and sometimes explicitly) set in sharp (and favourable) contrast to the institutionalised processes of by which decisions are delegated to others - experts, scientists, and not least elected politicians.

The paper will argue that this separation of public participation in science from delegated democracy is problematic on several counts. It will examine the idealist underpinnings of social science enthusiasm for individual participation in science governance, and the unlikely alliance between those views and the neo-liberal enthusiasm for S&T and innovation as the engine of economic growth. It will draw attention to the events and experiences through which the public individuals have their influence limited, and often negated. Though individual participation may in some circumstances have an effect, that will depend on the context. That context includes the contribution of powerful actors such as the state and its institutions , and private corporations. In many cultures and nations, individuals will also act within, and interqct with, the institutions of representative democracy. Drawing on the principal-agent reconceptualisation of the democratic state as a chain of delegation from the individual citizen (Strøm, 2000), and on Hannah Pitkin's analysis of different forms of representation (Pitkin, 1967), the paper will propose a new model of science governance in which delegated representation and individual action can both be legitimately located.

This will be a conceptual paper, though drawing on recent science policy events and experiences. It takes a critical realist approach to both science and to social science (Bhaskar, 1997; Steinmetz, 1998),. It will conclude with proposals for a research approach to science governance which will illuminate interacting mechanisms which shape science, and thereby also point to the roles which social scientists and other citizens can play in those processes.

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2.3.5: Public Understanding of Science in Europe and the USA

Scientists Acting against the Creation Museum

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On May 28, 2007, a group of scientists, activists, students, and others participated in a "Rally for Reason" just outside the perimeter of the Creation Museum opening that day in Kentucky. This paper describes an ethnographic analysis of dialogues and events leading up to, during, and after the rally. Participant observation of the rally, interviews with scientists at the rally, and textual analysis of informal online communication networks provide data from which compelling themes emerged regarding the continuing contentious relationship between some Americans and the concept of evolution.

The 27 million dollar museum portrays the earth as 6000 years old, and links the teaching of evolution to what its founders describe as "societal evils" such as abortion and homosexuality. Museum developers have unsurprisingly mimicked the models and marketing strategies of commercially successful secular science museums, albeit with their own eye-opening message. From this museum's presentation, the terms and stakes of 'science' get blurred, raising the ire of the scientific community.

In reaction to the museum opening, a number of scientists took distinctive stances and actions in the name of science. Outside the museum, lines were drawn along the rural road between rally and museum, patrolled by horse-mounted police, rally goers on one side, Museum and museum patrons on the other. International media documented the rally, further intensifying the polarized scene.

During the day and after, scientists and students were interviewed concerning their motivations for attending. At the same time, a large number of scientists took different stands by vocally advocating ignoring the rally, in fear of bringing more attention to the Museum. A qualitative analysis of the dialogue, observation, and interview data leading up to, during, and after the rally lends to the identification of the following themes embedded in American cultural relations toward science:

1. scientists' concern for science literacy providing the means by which Americans can serve neo-liberal ends in an increasingly international job market and
2. scientific reason as inevitable and necessary ends of the modernist intellectual program.

Considering these themes, this paper identifies a crucial disconnect between a set of scientists and their expectations for science literacy against competing forces at work in American culture. Science literacy policies and programs, such as the American Association for the Advancement of Science's Project 2061 shows this same disconnect. Science literacy for all as a goal cuts across some cultural practices and ideologies in regards to science that are distinctly anti-scientific, such as the messages of the Creation Museum. Ironically, the scientists in question act against a carefully adapted competitor; a competitor prepared and polished in its display. Interestingly, the 'adaptive mimicry' of the Creation Museum may itself advance evolution as a salient concept.

2.3.5: Public Understanding of Science in Europe and the USA

STEM Curriculum Enrichment Activity Evaluation as Co-production: a Case Study

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This paper presents a case study of 'acting with science...' within science education and policy, arguing the value of co-production to pursue socially inclusive STEM curriculum enrichment activities. It considers the methodology, conduct and issues arising from a systematic social science evaluation of a 'Summer School' for secondary school students in the UK. The programme offered three demonstrations based practical projects over three days in one of Europe's most up to date teaching facilities, the new Science Centre of London Metropolitan University. For Summer School sponsors and organisers it represented a step change from monitoring characteristic of previous comparable activities in bio-chemical and chemical sciences. It aimed to stimulate insight and understanding of - actual influences on student learning and orientation to science; relative contributions to effectiveness of key inputs and processes; future development of 'enrichment' practice and also any implications for local and national policies to promote a STEM agenda. This latter evaluation goal reflected a programme priority to address social inclusiveness and diversity including ethnic origin, gender and also ability. The evaluation design intended to capture readily measurable learning outcomes and more expressive 'soft outcome' reactions. An innovative multi-method strategy was adopted involving participatory evaluation elements, and a focus on multiple stakeholder perspectives. This included pre and post student questionnaires, direct observation, school teaching staff collaboration as co-evaluators and qualitative evidence gathering. The methodology rationale is outlined, its' potential considered to shed light on 'what works' for whom in what circumstances, also its flexibility as a framework for use in developmental science engagement activity. The Summer School and Evaluation viewed as a cross disciplinary process involving Social Science, Natural Sciences and Education present interesting questions about the research contribution. How should evaluators' relationship to projects and participants, as 'knowers' with different knowledge and expertise, be regarded? Reflections are offered on this experience of co-production, and the relation of key evaluation findings to different audiences. Recent STEM Programme Reviews note a paucity of evaluations of STEM participation activities and call for their greater use, this paper therefore hopes to contribute to the development of better practice.

2.3.6: Health Promotion and Prevention Programmes in Practice

Body Trajectories of "Wireless Preventive Selves"

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Telemedical solutions for patients with chronic heart disease (e.g. cardiac insufficiency, ischaemic heart failure, metabolic syndrome) are becoming increasingly important in neoliberal health care systems. They not only promise to decrease health-care spendings by making it more transparent and efficient, but also increase patients' awareness of their risk parametres (e.g. weight, blood pressure and pulsory); therefore, telemedicine needs to be understood as part of broader secondary prevention efforts aimed at avoiding a deterioration in patients' health status. This paper reports on an ongoing ethnographic study of two research projects on telemedicine (conducted from Autumn 2007 to Spring 2008) and will specifically focus on data drawn from around 40 qualitative interviews.

From these I will demonstrate the far-reaching practical consequences the telemedical equipment has for patients or, as I call them, wireless preventive selves: blood pressure metres determine daily activities, weight diaries change intimate and even long-term relationships, one-minute ECG episodes are used by patients to assess their current quality of life. In order to transmit these parametres, the bodily functions are dataclized. Patients thus permanently (re)interpret digits and numbers. Therefore, I will specifically focus on the agency of numbers and indicators.

With the process metaphor of body-biography trajectories I aim to demonstrate the entanglement of body and technology, chronic illness and telemedicine, everyday life and numbers while at the same time, considering patients' social worlds. The concept has originally been used by Strauss and Corbin: however, it was recently translated into the interactionist STS-realm (e.g. by Timmermans, Star, Bowker). By using Adele Clarke's suggested method(ology) of situational analaysis, I do not aim to present a linear "basic social process", but rather a more complex concept of body-biography trajectories that emphasises their situatedness.

The New Life-Savers
- Telemedicine and Therapeutic Dominance in South Africa

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New medical technologies are increasingly attracting widespread commentary as to the forms of social and cultural change, with which they are associated. Information and communication technologies (ICT) and telemedicine are said to solve many of the problems the health sectors faces at the moment. In South Africa, like elsewhere in Africa, medical services lack in most areas of the country. Even though it is relatively well supplied with doctors, 77 doctors per 100,000 people, the distribution and funding is skewed in favour of the urban population and those who can afford medical services. Despite the access to health care facilities South Africa is experiencing an HIV/AIDS pandemic of shattering

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dimensions. After more than a decade of economic growth and extensive development, HIV/AIDS has become the new divide, with an estimated 5.41 million people infected. The possibilities that new technologies present to health care are announced to be significant.

The paper examines the attempts to support ARV-treatment through a cell phone based solution at the Hannan Crusaid Treatment Centre in Gugulethu, a township outside of Cape Town. This centre provides ARVs to eligible HIV-positive clients. Around 27% of the approximately 325,000 people living in Gulgulethu are considered as HIV+. In 2002 Cell Life, a non-lucrative company implemented a cell phone based treatment-management program in Gugulethu. By showing the interstices space of the emerging epistemic cultures involved in the development of these technologies it will become clear how the outcome of negotiations lead to a particular therapeutic dominance. By framing the project in the context of South Africa the paper shows how technologies, and in the particular case: an adherence program for HIV treatment, get shaped by its context. Particular issues such as legal or trial phases get neglected with the hope to fast track the implementation of the innovative technologies.

Prevention of Marginalizing Processes in Adult District Psychiatry - Renegotiating "Best Treatment Practice" and Professional Subject Positions

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This paper will investigate the situated enactments of the psychiatric prevention and treatment approach Open Dialogue. Open Dialogue has theoretical roots in constructionist language theory (e.g. Gergen) and systemic therapy (e.g. the Milanoschool; Selvini-Palazzoli et al.). The ideal of prevention in this treatment approach is connected with the existential project of every single member of personnel, that is turned into a project of finding ones own integrity, in order to be able to meet the patient "where she is" and in order to show "respect", rather than being an "expert". The goal the professionals strive for is being able to meet patients as humans rather than meeting them as diagnosed patients.

I will explore how situated and local enactments of these treatment ideals, for example dissolving the role of expert have complex constitutive effects and create alternative subject positions for the professionals involved. In other words I will discuss how situated ways of becoming psychiatric member of personnel is connected with the enactments of ideals in Open Dialogue.

The analysis draws on empirical material collected through observations, interviews and videos dealing with different aspects of the daily work of the psychiatric personnel that has introduced Open Dialogue treatment in the district psychiatry. The paper presents an in-depth analysis which focuses on the relational character of Open Dialogue in the respect that the treatment approach and the personnel constantly (re-) produce each other.

The analysis indicates that an argument of prevention may be a reinforcing motivation factor and possibility of subjectivation for the personnel. A possibility to construct a story about oneself, that facilitates the staff development as self-managing professional, in line with

modern management strategies, where governing strategies are made invisible, and where management strategies are converted to individual existential projects. A central argument is that the individual ethical project of the introduction of a new treatment approach melts together with psychiatric treatment. There is no longer a primary focus on the crucial balance between care and coercion in psychiatric treatment and prevention, but what is at stake is rather sustaining a balance between professionalism and individual existential ethical considerations.

'Naïve' and 'Newly Debuted' : Configurations of the Trial Participant in Phase II-III Clinical Trials

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An increasingly large part of pharmaceutical testing is performed by contract research organisations (CROs). This development is a consequence of the pharmaceutical industry's need to speed up the trial process in order to get drugs out to the market quicker, as well as a result of tighter bureaucracy surrounding clinical trials. Tasks performed by CROs include faster screening and recruitment of test subjects, tasks that traditionally have been done by the clinics themselves. For Sweden and other European countries, such a change implies large scale privatisation of the work performed in clinical trials. This paper discusses the consequences of this privatisation for the configuration of trial participants.

The paper focuses a few of these configurations through analysing the discourses of test subjects in and around contract research organizations as they emerge in one CROs promotional material, as well as in local newspapers' coverage of the company when it was established in a Swedish city in 2004. One of the tasks of the company, dealing with phase II-III trials, is to recruit "naïve" and "newly debuted" participants. This means finding individuals who fit the often narrow inclusion criteria for participating in the trial, but who do not (yet) know that they are "at risk". The multi-layered meanings of this terminology are discussed, and a potential consequence of the argumentation is investigated: a tendency that clinical trials are configured as part of prevention programmes on behalf of public health care practitioners. More broadly, the paper thus focuses how the biomedicalisation of health interrelate with drug testing practice/discourse; and health promotion and prevention initiatives.

The (Re)Production of Future-Oriented Selves a Temporal Perspective on Prenatal Testing Policies

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Prenatal testing policies are increasingly shaped by the outcomes of scientific studies of pregnant women's preferences concerning prenatal testing. By asking women to express a

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preference for a potential future, these preferences studies assume that people can give representative accounts of the future in the present. Moreover, these studies - as well as the subsequent policies - assume that today's acts determine what tomorrow will bring.

The assumptions underlying prenatal testing practices and policies contribute to the enactment of a culture in which pregnant women (and their partners) become shaped as selves that are able to outline and know the potential futures and to express their preferences regarding their future life. Once shaped, these future-oriented selves on their turn sustain and reproduce the assumption that futures can be outlined, chosen and made. The imperative to outline, know and make the future (as introduced among others by prenatal testing policies), combined with the urge felt by women and their partners to turn anticipated bad outcomes instantaneously into something good, encourage prospective parents to insist on information about potential futures and to claim the right to decide for themselves which future must come true. They thereby reinforce the preference- and future-orientedness of prenatal testing practices and policies. To be brief, prenatal testing practices and policies and future-selves shape, interrelate and reinforce each other. In this paper, we will critically explore the following issues:

1. The enactment of future-oriented selves
    What assumptions, methods, norms or instruments in preference-based prenatal testing practices and policies shape future-oriented selves?

2. The illusion of the known future
    The idea of malleability of the future is used in prenatal testing practices and policies as an instrument to produce confidence in the future. Confidence in the future is required to tackle the present uncertainties brought in by prenatal testing practices and policies. However, knowledge of potential futures and the need to decide for one of them, confronts pregnant women in the present with new uncertainties. The desire to eliminate these uncertainties reinforces the wish to control the future.

3. Adaptive preferences
    Even if we know the future today, we cannot be sure that we will prefer then what we prefer today. People's preferences change according to the more general preferences in a given society, as well as because of growing older. How we collectively respond to a Down child today (it's ok to abort it), does not tell much about our future response (Imagine a future in which Down syndrome persons have become full citizens).

2.3.7: On Methods and Politics

Acting with Whom? From Policy to Politics in STS Research.

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This paper attempts to address the political implications of STS research. More specifically we aim to pause on the significance of our work with different partners and participants to sustain viable and effective social interventions. This problem is particularly acute and visible when we turn our attention to the proliferation of institutionalised policy and law oriented STS research.

However, the paper examines what it means to engage with our own research as problematic and asks how STS research can contribute to a radical understanding of knowledge and science politics. With the question 'Acting with whom?' we attempt to shift from policy to politics. The alliances formed in STS research and the selection of certain partners and participants in our studies is not just a methodological issue. Rather it is of central significance for the worlds which STS research can promote. This kind of political attention to the effects of our interventions can be traced through radical approaches in the multiple histories that have built the field of STS. We want to look from the perspective of different radical science (studies) positions at how research's boundaries are both set and transgressed by the very milieu of its production. We start by focusing on the radical science movement and critical positions in the field of STS. Furthermore we discuss how feminist science studies think the possibilities of liveable worlds that are being opened and closed through specific scientific and technological settings. This approach cultivates particular attention to care and accountability, to senses and affects, to questions of justice, marginality and subjectivity within mundane lived practices. In different ways all these radical approaches to science studies foreground the importance of transformation in everyday experience and mundane action. They challenge, for instance, the primacy of expertise and the reduction of people to users or passive recipients of technological and scientific innovations.

In the last part of the paper we will investigate specific sites and practices of new social movements as possible sites for questioning present forms of knowledge production and for reintegrating moments of speculative political imagination into our engagement with STS research.

Does an Informant's Quality Matter?
A Neglected Methodological Problem of Science Studies.

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Many empirical studies of science are based on accounts produced by interviewees or by people we observe. The quality of these sources - the completeness and validity of the information they provide - is a constant worry in all empirical investigations that rely on qualitative methods. However, our informants also differ in another dimension. They are

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good, average, bad scientists. Does this make a difference for our investigations? Do the research abilities of our informants affect the accounts they produce for us? Do our results depend on the scientific quality of the scientists we talk to?

This methodological problem has not yet been addressed by science studies. The aim of our paper is to demonstrate that the 'scientific quality of informants does indeed affect the information we receive from them.

In our empirical investigations we study the influence of institutions on knowledge production. We mainly use qualitative interviews but have also conducted ethnographic observations. We have learned that the quality of our interviewees affects our investigations in two respects: Firstly, good and bad researchers experience different situations. Secondly, they perceive situations differently and thus differ in their descriptions of their situations.

Using examples from our current project about researchers' adaptations to material and institutional conditions of research, we analyse the methodological problem by using two extreme cases of quality-dependent situations and perceptions. We will show that 'good' and 'bad' scientist may provide nearly identical descriptions of different phenomena. For example, excellent researchers may not feel constrained by their resource situation because they have sufficient funding for all their projects, while bad researchers don't feel constrained by their bad resource situation because they have no idea what to investigate, i.e. low aspiration levels. It is also possible that they describe the same phenomenon differently.

In order to interpret our informants' descriptions of their research and conditions of work we had to include quality differences.

If the quality of the informants matter for STS studies, then we must face the methodological problem of 'measuring' this quality. Since the quality of a research can ultimately judged only by their peers, the opportunities of science studies researchers to do so are severely limited. We will discuss which aspects of quality should be included (the actual performance or a researcher's potential) and present the indicators we used to collect the necessary information.

Finally, we will demonstrate how we included information about the quality of our informants in the data analysis and interpretation.

Negotiating Normativities:
Narratives in Innovation of Health Care Practices

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As modern days in the 'industrialized world' demand more professionalized health care practices, new forms of, and new norms for, care practices emerge. Health care is suppposed to be more demand-driven, patient and family-centered, and organized as efficiently as possible, at the same time guaranteeing both quality and safety. A range of government initiatives pursuing quality improvement reform health care governance

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practices, often through large scale quality collaboratives.

In this paper I focus on these initiatives and how they facilitate the innovative reconstruction of care practices by analyzing the development trajectories of the Care for Better collaborative program in the Netherlands. In the development trajectories specific improvement instruments are developed for elderly care. Objective of the collaborative is translation of the recently developed 'norms for responsible care' into actual and improved care practices. By analyzing the development trajectory of the 'care-living-plan', through which 'demand driven care' and 'patient autonomy' are to become integral to common practices of elderly care, I will explore how new narratives of care practices as well as narratives of innovation of care represent the (re-) negotiation of normativities concerning 'good care'.

STS researchers have studied innovation as a (re-) constructive process that claims to structurally change practices. In line with this I will approach the innovation of care as a reconstructive process, in which normativities are (re-) negotiated through the 'improvement initiatives'. In care innovation processes, different kinds of normativities influence the ways problems are conceptualized, solutions are designed, resulting interventions are 'implemented' and the ways in which they are sustained. From this point of view narratives on issues of 'demand-driven care' and 'patient autonomy' can mediate between normativities of existing 'good care' practices and new innovative practices. In this paper I will therefore focus on the question how narratives of good care might change through innovation processes and what the consequences of such analyses are for revisiting the at times stale debates on 'implementation' and 'sustaining change'.

When Is Diversity within a Field Desirable? : A Social-Epistemological Analysis of Current American Sociology.

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American sociologists often refer to the "fragmentation" of sociology in their self-assessments. Fragmentation in this context means the decomposition of sociology into various autonomous fields, and the fragmentation is due to at least three types of differences, namely differences in the subject matter, those in the image of sociology, and those in theory and/or methodology. Some sociologists, such as Jonathan Turner, negatively assess such a trend and advocate for a more unified sociology, while others have more positive attitude.

In this paper, I introduce a social epistemological point of view to analyze the situation, hoping to give some grounds for evaluating fragmentation situations. The point of view is social falsificationism, a socialized version of Popper's theory. Popper himself mentioned this variant of his theory, and we can find more recent versions of the position in David Hull and Helen Longino. My own version incorporates other concerns on the relationship between diversity and mutual checking. In the analysis of fruitfulness of a diversity, I introduce a distinction between constitutive assumptions and replaceable assumptions. Constitutive assumptions are assumptions that are essential for conducting a certain type of research, while replaceable assumptions are not indispensable. Any scientific field has its own

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constitutive assumption. For example, the assumption that the laws of nature do not suddenly change lies behind all types of scientific research; if scientists start to worry about such a thing, they cannot do their business. Similarly, if we take seriously the possibility that all respondents are clever liars, survey research and other similar methods become meaningless. If diversity leads to mutual criticisms of such constitutive assumptions, the debate will impede the development of the field (this is the possibility which George Ritzer worried about 30 years ago). On the other hand, if the diversity leads to mutual criticisms of replaceable assumptions, the result will be positive. From this point of view, we can analyze various cases of diversity. In the case of American sociology, the overall assessment of the current status of the discipline is not particularly negative.

2.3.8: Knowledge-Intensive Practices: Learning Technologies / Technologies of Learning

Social Learning,
Intermediaries and New Open Learning Infrastructures

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STS has not only engaged with the learning processes associated with innovation, but implicitly with the distributed creative processes that occur in innovation. This distributed creativity implies that learning is not a one-way process from producers to consumer, or along the supply chain, but is a multi-dimensional processes that requires methods and structures that facilitate multi-way learning. Building on the Social Shaping of Technology approach, we elaborate a social learning framework for understanding the dynamics of long term development and uptake of new technology (Williams et al, 2005), and explore the role of intermediary actors that link networks of users and producers. We review findings on intermediaries in some of our studies and other available literature. The topics we address include differences between various kinds of established intermediaries, which are often addressed in management and policy literatures, and emerging intermediaries that are created in parallel to new technologies, markets and uses. We show how they map to the supply - use axis, development paths, and roles they play in mediating design and use. Specific roles that we examine include those of Facilitation, Brokering and Configuration. Equipped with these insights, we explore in more depth how intermediaries affect the shape of new information and communication technologies, and how the lack of appropriate intermediaries can severely impede successful innovation.

One area of thinking and increasingly practice that engages with distributed innovation and the need to link creative actors is what has recently been dubbed 'Open Innovation' - where networks of firms and indeed end users are systematically linked together in an innovation process. However, what sort of intermediaries are required to make this happen, especially in areas of disruptive or radical innovation that link previously unrelated actors, and in particular, those that involve the mass market? This paper will look the concept and practice of a new type of intermediary: the 'Living Lab', a type of learning and innovation institution that is being proposed and developed around the world, and attracting the attention of policy makers and firms, particularly in the field of ICT. It will discuss the problems that these 'living labs' are attempting to address, and some issues that arise in practice of trying to create institutions and infrastructures that can promote multi-level learning in practice.

Mundane Governance in Modern Research Work

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Although the rise of so called knowledge economies emphasize the importance of research and development (R&D) functions, there are diverse and conflicting tendencies shaping their development. The target-activities of R&D are rapidly changing, and organizations face the need to re-define their strategies, collaborations and aims.

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The paper examines the current transitional phase in managing research in public research organizations. It participates in the recent discussion on mundane governance, that is, the new techno-scientific arrangements for governing people in public - such as enterprise resource planning systems in the research organizations deployed in order to better direct and control the objectives and resources of research work. The study includes two empirical case studies. The Technical Research Centre of Finland (VTT) and the Finnish Institute of Occupational Health (FIOH) practise applied research (R&D) and are governed by Ministries. The organizations employ together nearly 4000 researchers and other personnel. I contextualize the implementation of the new management tools by briefly highlighting the organizations' previous management practices and compare them with the developmental phases of industrial R&D management. The ethnographic study focuses on the ways in which the work of an operative research unit is measured, evaluated and controlled. I explore the use of the new management practices and tools, and how they are experienced. I trace tensions as well as potential expansive opportunities embedded in the mundane tools for controlling time, space, people, and patterns of organizing practices.

The theoretical framework of learning falls within the contextual and practice-oriented approaches of learning, inspired by socio-cultural theory of learning. Instead of conceptualizing learning as situated social practice in any physical or social context ("weak agenda"), I emphasize learning as a by-product of participation in some durable, socially important practice ("strong agenda") which concerns both individual and collective achievements. The focus is not only on learning individually about single tool-use, but also on learning collectively about the knowledge-artefacts in action.

The following questions are discussed: (1) Will computer-based management systems serve as a tool for practising a new type of research management based on systematic use of rational information? (2) How do the new tools help research team leaders to understand and take action concerning the economic profitability and societal impacts of research work? (3) Will the new tools enhance discussion on the priorities and direction of research between the management and researchers, that is, provide collective knowing and learning?

How Do Practices Live and Die?

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In everyday language it is possible to talk about practices which are living and dead or in terms of STS, to refer to configurations that do and do not work. Working configurations are those which are actively and vigorously reproduced in everyday life while those which are dead or dying are no longer or only rarely enacted. In this presentation we take the distinction between living and dead practices seriously and speculate about what it means to suggest that practices have a life of their own. In playing with this idea we develop a typology of 'living' practices.

Autopoiesis (Maturana,1981) is a biological concept which refers to processes of self reproduction in the domain of the living. Extending the concept to the realm of practice, and of sociotechnical configurations, we use the term to refer to the self-maintenance of a self-

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referential network. We are not the first to do so, for the concept of autopoiesis has already stimulated social scientists like Anthony Giddens and Niklas Luhman.

In this presentation we go further by suggesting that although autopoiesis (reproduction and metabolism) is one aspect of living practices, there are others. Like those who have studied patterns and pathways of technological innovation, we argue that creation and destruction is in essence a matter of making new integrations (and disintegrations) between the elements of practice.

We contrast this model (an integrative framework of practice) with those that refer to spontaneous or unsupervised learning. Unsupervised learning is a paradigm of adaptive systems in which new states and stages emerge from earlier forms in an autonomous manner. Are these concepts of self-organization of any relevance to science studies and to efforts to understand the dynamics of sociotechnical systems?

We bring these ideas and conceptual models together in discussing different ways of analyzing relations between living and dying practices, and between emerging and disintegrating sociotechnical configurations.

Design, Development and Support of Standard Software Packages

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Science and Technology studies has taught us to investigate the beliefs, practices and networks of the various actors involved in developing, implementing, using and supporting innovations. In my area of research into the development and evolution of Standard Software Packages, such studies have been carried out; however an almost exclusive focus has emerged on the moment of technology implementation. Studies of the implementation of packaged solutions (for example Enterprise Resource Planning systems) widely adopted over the last decade, demonstrate over and over again that the local aspects of an organization are too specific to be even approximately reflected in standard software packages and that a misfit is unavoidable between organization practices and the libraries of standard processes contained within the package. Whilst this research has produced some useful insights - there are indeed cases of spectacular failures of standard system implementations - this focus does not help us to explain why companies such as Oracle or SAP have remained so successful. If, as suggested, their products do not match user requirements, how come these companies are two of the biggest independent software companies in the world?

This has been discussed recently by scholars from the University of Edinburgh (Pollock & Williams, 2008), who, by applying a biography, social shaping of technology and social learning approach, aim to answering this question. Following a similar approach, my research is embedded in this line of research at the University of Edinburgh and its demand to open up the black-box 'ERP Systems'.

My ethnographic research, carried out at one of the biggest Enterprise Resource Planning suppliers worldwide, demonstrates for the first time, how these systems are designed

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internally, and how the system is shaped through the efforts of various groups inside and outside the organization throughout its life cycle. The data reveals inter alia, how during a particular moment - when the system re-enters the vendor organization through the customer support channel - a process of co-design takes place, involving the complaining user, the product and the developers within the vendor's organization. This co-evolution occurs within a dynamic and sensitive network of formal structures and policies as well as on the basis of informal communication channels within the vendor organization. The vulnerability and dynamic of this innovation process becomes visible, when new management changes internal processes disturb the sensitive network.

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Objects, Practices and Learning: from Interactions to Biographies and Aggregate Explanations

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"That learning occurs is not problematic. What is learned is always complexly problematic" This quote from Jean Lave is particularly poignant in regard to learning that occurs in the production and appropriation of new technology. Hardly anything is as trivial as noting that technologists and other practitioners continuously learn new things. But few sites are as complex in regard to the objects, practices and conflicting contexts of learning. To explore what this condition entails for attempts to conceptualize learning in STS, two lines of inquiry on learning between developers and users are juxtaposed.

First, findings are discussed from an over ten year line of studies on learning between producers and users of new health technologies. The learning that occurred bore little resemblance to the well-defined and small scale problem-solving tasks typical to behaviorist and cognitive learning research. It was spread over time and place and took its meaning from connections it had within and between activity systems. In this sense learning could be conceptualized as changing participation in communities of practice; it concerns multiple aspects of participation at once and tends to surpass any given problem or event. However, such characterization would underemphasize the strong objectual underpinnings that were at stake. As the technological objects changed both as a material and projected entities, so did the relevant knowledge, partners and efforts at learning. Blending S&TS and activity theory offered more apt conceptual means for grasping such learning and inter-relations. It was also needed as a methodological resource in bridging from minute interactions to biographies of objects and practices that span years and decades, as well as bridging multiple types of data and analysis required.

Second, while these studies offer a positive contribution in conceptualizing and studying learning within S&TS, they raise further issues. Particularly limits in how to a) compare findings that are strongly tied to the shapes of objects, practices and constellation of actors, and b) deal with the amount of sites and places where relevant learning was likely to occur, but which just could not get scrutinized. There are integrative frameworks such as 'learning economy' and 'social learning' in evolutionary economics and economic geography, but also

within the STS, that emphasize the generative nature of learning in science, technology and society relationship, and hence could be helpful here. Yet we need to ask what added value the emphasis on learning provides in these frameworks? It preliminarily seems that the usefulness as integrative models hinges on their capacity to address the variation in the shape of technologies, innovation contexts and the mechanisms by which different development projects and deployments of technologies feed on each other. At this, there is a marked difference between the 'social learning in technological innovation' model and more generic social learning conceptions.

The Will to Learn (and the Tools to Do it): Knowledge Practices among Software Professionals

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'Communities of practices' and 'Organizational learning' represent approaches that mainly focus on strictly social practices and thus neglect the material and technological aspects of learning. Also, they have been less concerned with the fact that knowledge-intensive work employs people that are, by their education and experience, skilled in individual learning practices. In a study of knowledge workers in the software industry we found that learning is considered mainly an individual challenge, not a management issue. People were considered 'trusted workers' with substantial autonomy in relation to problem-solving and work activities. Also, they were skilled in acquiring information and conscious about their need and obligation to learn, using a wide variety of tools and situations.

In this paper, we will analyze this "will to learn". How is it articulated and understood among the software professionals? What kinds of knowledge practices emerge from this dynamic, and what are the consequences in terms of for example boundary work and knowledge hierarchies? In the analysis, we draw on interviews with software professionals in California, Malaysia and Norway.

A main finding is the disciplining of the individual software engineer body to enact software engineering knowing, to reproduce as - literally - a body of knowledge. In the learning process, social interaction was not privileged; rather learning may be characterized as a deeply socio-technical achievement. Social, material and mediated knowledge objects were put together in a bricolage-style process or a re-assembly. These people-machine complexes may be viewed as the backbone of the epistemic cultures of the software industry, and they involve a particular disciplining of the knowing body in software engineering. Drawing on Foucault, we may term this sociotechnical disciplining as a technology of learning.

2.3.9: Markets for Public Goods, III

Access to Medication for HIV/AIDS and Malaria in Cameroon: Illustrating The Social Construction of Healthcare Markets

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Social scientists construct markets by combining two models of societal control: the market-plus-framework model and the opportunity-set model of power. The former focuses on the role of economics and the moral rules of society while the latter emphasises the opportunity available to every actor (legal rights, obligations and choices). By combining these two frameworks, social constructivists create an objective order of importance for each actor's welfare in relation to the customs and interests of all actors. They also formulate governance structures, through which decisions made by a given actor impact on the opportunity set of other actors within the system. Very little has been written on the applicability of this approach in African countries, as much of the discussion on 'markets' is still dominated by neoclassical economics.

This paper therefore, discusses the applicability of the social construction of markets approach in explaining the historical attempts to establish a sustainable market for healthcare (as a public, private or public-private good) in Cameroon. The objective is to present a model of how healthcare market is created in African countries, how they function and how they can be modified. The empirical section explores the model further to consider the potential for free and/or discounted medication policy currently implemented by the government, to create a sustainable market for HIV/AIDS and Malaria treatment. The analysis focuses on open-ended interviews with representatives of bilateral and multilateral organizations, research and academia, international NGOs and donors, pharmaceutical companies, Ministry of Health, selected health care providers and civil society organizations involved with HIV/AIDS and malaria treatment and control in Cameroon. Analysis of the narratives from these stakeholders within the framework of the social construction of markets reveal important details about the characteristics of patients' choices of healthcare providers in relation to their illness, health care delivery practices and costs of treatment, the nature and costs of agency in relation to actors' behaviour and the diversity of healthcare markets that can be created.

Market-Making in Health Insurance: Framing Patients as Market Players

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The introduction of the Dutch Health Insurance Act had to enhance market competition in health insurance and in health care at large. In the case of Dutch health insurance, market-making is an intricate process, demanding new governance arrangements in which market incentives are combined with governmental constraints to market behaviour in order to preserve public goods and values. Although it may seem as if the government takes a step back to create more room for market competition, in fact it remains closely involved in health

2.3.9: Markets for Public Goods, III

insurance by dictating preconditions for competition and by supervising the market-making process.

The Dutch government tends to consider market competition in health care as a panacea. Policymakers embrace economic theories and conceptions to predict and direct the behaviour of the parties involved in health care. In the new policy lingo, patients became 'consumers' and 'demand-driven care' became one of the keywords. Neo-classical economic theories that presuppose rational market behaviour - for example that individual consumers' pursuit of the best product for the best price keeps providers at their toes and stimulates competition - became basic policy principles.

The question is how a group that was labelled as a major market player - patients - frames its role in a competitive health care system. In this paper, the emphasis will be on patients' associations. How do they fulfil their newly allotted role as market player? Moreover, do they employ economic terms and theories to shape and strengthen their new role?

Document research and in-depth interviews with key figures of patient organizations suggest that patients' associations seek new ways to shape their role. Compared with other more experienced market players like health insurers, health care suppliers and the pharmaceutical industry, patient organizations lack negotiating power. However, they try to strengthen their position by fitting their activities in the current market paradigm. Whereas patient organizations' focus used to be on introducing patients to fellow-sufferers, they now increasingly start to act like market players. They try to influence health care purchasing, negotiate collective health insurance contracts for their members and adopted the corresponding economic terminology. Transparency of health care quality and costs, customer satisfaction, demand-driven health care: these are just examples of terms that they started to employ. They started to utilize cost-benefit analyses and quantitative measurements of consumer satisfaction to enforce their claims.

Patients' associations try to live up to the role assigned to them in the health care market. In the market-making process, economic theories are not only utilized in a descriptive manner, but also act in a normative way. Economic theorizing frames the latitude of patient organizations by setting a standard that patients have to live up to - at least if they want to accept their pre-defined role as market player. By accepting that role, patients also further the constitution of a health care market.

Is Health Economics an Intervention Science? About (Un)Expected Performative Effects of Calculative Devices in Dutch Health Care.

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Health economists are well aware that the health care market does not always operate according to the tenets of neoclassical theory. Recognizing market failures does not mean that economists give up the idea of introducing market mechanisms in health care. They suppose that a well-designed and regulated health care market could more or less produce the same mechanisms as in neoclassical theory, without the negative social effects of a

2.3.9: Markets for Public Goods, III

market.

Many STS scholars suppose that economists have a non-interventionist epistemology. However, the gap between economists and STS scholars might be smaller than ever since health economists started to suggest instruments that could contribute to the making of markets. Is there a bridge between radical constructivism and health economics?

Inspired by the work of health economists, policy makers have introduced financial market instruments, like vouchers, client-linked budgets and performance payments, to empower the user of health care. The idea behind these calculative devices is that if clients know better their rights or their budget, they have more chance to realize their needs and wishes, because it improves their position in the relationship with the provider. How should we, as researchers of science, evaluate the effects of the proposed market instruments and the role of economists?

Economists suppose that shaping markets is primarily a technical problem. However, we are more interested in the 'performative' effects of technical market instruments. These instruments do not simply steer the market, but help to create a market in which these instruments fit.

We researched the effects of financial instruments on the daily practice of health care in the Netherlands. We will show how these technical instruments stimulate a new way of budgetary control, influence the motivational structure of actors, strengthen both the position clients and providers, influence ideas about solidarity in health care and create a new form of distributive justice. Changes in the instruments can explain a great deal about other forms of social change.

If we acknowledge the performative effects of financial instruments, we need to rethink the role of economic science. Our analysis shows, for instance, that the preferences of economic actors are not stable but the outcome of calculative devices. However, economists are well aware that their proposed instruments aim to make consumers of health care cost conscious. The toolbox of health economists is already filled with lots of intervention instruments. Economists only need to acknowledge more the (unexpected) normative aspects of these tools.

2.3.10: Genetic Testing

Genetic Testing, Geneticization and Social Change

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Drawing ispiration from some pioneer studies on biomedicalisation and geneticization, this paper conducts an exploratory analysis of some of the social and political challenges that the diffusion of genetic testing technologies (GTTs) increasingly poses to the current policies of biomedical innovation and healthcare. Drawing on a series of semi-structured interviews with experts in genetics, the paper specifically explores the Spanish context. The outcomes of the analysis seem to suggest that GTTs are playing a crucial role in the complex interaction between biomedicalisation and geneticization. Fueling on the rapid increase of health expenditure, GTTs also seem to encourage the emergence of new health care policies, based on an individualistic and consumeristic conception of health, disease and healthcare. Although the clinical practice has been so far almost unaffected, the research agenda seems to be increasingly shaped by a narrow approach to common diseases, focusing on genetic predispositions whilst neglecting social and environmental factors. Although we haven't found any evidence of existing genetic discrimination practices, the possibility that a wrong social perception and use of genetic information may give rise to discrimination in insurance and employment cannot be entirely ruled out. In contrast, the diffusion of pre-natal and pre-implantation genetic testing is actually endorsing so called 'weak eugenics' processes that are gradually shifting the emphasis from primary to secundary prevention. These results urge current systems of genetic technology regulation, generally focusing on bioethical or technical considerations, to broaden the dominant cognitive approach with new insights from empirical and prospective studies on the social and political implications of a large-scale implementation of the new biomedical technologies.

'Choice' and Empowerment Regarding Prenatal Genetic Testing in India

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The overt and covert pressure faced by Indian women from the family and society regarding the number and sex of their children is well-known. Lesser known are the pressures on women to give birth to a 'healthy' child. Evidence indicates that women's choices are highly circumscribed.

Pregnant women are being jettisoned into the role of autonomous and responsible decision-makers regarding genetic testing whereas the information which they possess is highly inadequate and their life circumstances too constraining for them to make autonomous and considered decisions.

'Choice' is influenced by various factors including information regarding screening tests, diagnosis or possibility of treatment, social and moral pressure from immediate surroundings and society; possible financial and economic consequences of choices made; time pressure

in which choices made be made; definition of health/illness, the nature and level of disability, and possibilities of care. The role of genetic counsellors in providing information is crucial with respect to prenatal decision-making. The ideology underlying genetic counselling, offered in a mode known as non-directive counselling, is based on the idea that knowledge enables individuals to make informed choices. Empirical research conducted in two genetic clinics in Delhi revealed that pregnant women do not possess the required understanding of prenatal tests to be able to make an informed choice. They generally rely on the counsellor's knowledge for decision-making regarding testing and thereafter whether to continue the pregnancy. Often they are unable to articulate appropriate questions or may refrain from asking questions perhaps due to the perceived social distance between themselves and the service provider based on various factors in an individual case, but mainly that of medical authority of the latter, and their own inability to understand medical jargon, including medical statistics and probability calculations regarding risks. Low 'genetic literacy', even among highly educated clients, and fear of negative reactions, characterise clinical encounters.

Measures to meet women's needs for adequate information are, therefore, crucial in order to ensure informed reproductive decisions/choices. Decision aids can help to meet this need. At the end of the research the researcher decided to work together with the genetic counsellors to develop flyers based on frequently asked questions posed to her by pregnant women to cater to this need and to empower women for them to be able to make informed choices.

Neo-Socratic Dialogues for Improved Genetic Counselling

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The growing knowledge about the human genome provides the basis for the rapidly increasing number of available genetic tests. Amongst other areas of medical and non-medical applications, such tests are more and more used in the field of predictive (or pre-symptomatic) genetic diagnosis, i.e. the use of genetic tests to diagnose an inheritable disease which is not yet clinically manifest, to diagnose an individual's status as carrier of such a disease or to predict the course of a disease already manifest.

Predictive genetic testing is connected to a number of ethical, legal and social issues, which are also addressed in genetic counselling. Genetic counselling is to help patients and their relatives to plan their lives adequately on the basis of genetic test results. Yet, both counsellors and patients describe genetic counselling as problematic for various reasons.

Genetic tests may reveal a genetic disposition for a disease a long time before its symptomatic manifestation. This knowledge may seriously destabilise tested people and their relatives psychologically and socially, particularly when there is neither cure nor prevention.

The degree of certainty whether and when a genetic disposition will actually become manifest varies, depending on diseases and tests. The assessment is done in terms of statistical probabilities and does not allow for conclusions, how severely the disease will actually manifest. Users of predictive genetic testing may be left with a strong feeling of disorientation and a weak basis for informed decision-making.

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Diagnoses of inheritable disease and of a person's status as a carrier does not only concern the tested person, but also his/her relatives. This applies particularly to testing of children (or foetuses/embryos), because the parents are the ones who decide on genetic testing. In effect this may seriously affect partnership and gender relations, family issues, reproductive decisions and the tested children's' life.

Genetic testing poses important questions on data protection and "genetic discrimination" since insurance companies, employers, school authorities and even the families of the tested individual might discriminate the tested person because of this information.

Against this background the research-project "Neo-Socratic Dialogues for Improved Genetic Counselling" has the goal to formulate suggestions to improve genetic counselling by the application of the Neo-Socratic Dialogue (NSD) as a form of intervention and to evaluate the NSD as a trans-disciplinary tool for dialogue and problem solving, as well as means for participatory policy making.

The NSD is a conversation method in which a small group of participants, guided by a facilitator, reflects systematically on their personal experiences in order to address normative questions. Participants are required to clarify the normative setting of concrete actions, attitudes, or values and principles that underlie their reasoned decisions.

The paper will present results of four Neo-Socratic Dialogues on ethical problems of genetic testing, which were organised in 2007/08 in Germany and Austria. Participants in this trans-disciplinary dialogue were human geneticists, physicians, patient representatives, patients, social scientists, as well as civil servants.

The Socio-Technical Framework of Newborn Screening for Cystic Fibrosis: Effects on the Parental Management of the Disease

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What are implications of genetic testing for the people involved? How do in case of newborn screening, parents rearrange their lives according to the diagnosis of their young child? Our empirical study focuses on parents whose children have been diagnosed with Cystic Fibrosis (CF). The empirical sample includes parents whose child was diagnosed either before or after the implementation of a nationwide screening programme for CF.

In Austria newborn screening is carried out as a nationwide, centrally organized programme, allowing to opt out on the basis of "informed dissent". The introduction of a nationwide screening for CF has changed the organisational framework, in which the initial diagnosis is contextualised. This paper intends to focus on the organisation of this screening (IRT-IRT-sweat test) and how the change in the socio-technical arrangement affects the parental understanding of the diagnosis and their management of the disease.

Medical experts claim that the early point of diagnosis has lead to changes in parental compliance, because at this time the children usually do not show any symptoms. From our empirical study we can point out that parent's perception of the disease and management of

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therapy and medical treatment can be linked to the organisational context of newborn screening for Cystic Fibrosis. One can argue that the implementation of a new diagnostic method changes the socio-technical arrangement of the screening programme. This refers to the relationship between parents and medical experts in the process of confirming Cystic Fibrosis and the management of the disease in their family.

Social Legitimacy of Genetic Tests for Obesity: Result of Focus Group Interviews of Lay People

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Should genetic tests always have clinical validity and clinical utility?

As the field of human genetics develops, various new findings about the correlation between genes and somatic conditions are introduced on the scientific papers. Since most of somatic conditions are determined by the complex of multiple genes and environmental factors, it is natural that such findings to be merely suggestive. However, today genetic tests based on such suggestive papers are marketed in various countries. There are controversies especially among experts in the field of genetic medicine about the social legitimacy of such genetic tests, concerning their clinical validity and clinical utility. Yet, clinical validity and clinical utility, focused by the experts of genetic medicine, may not be the only factors that determine the social legitimacy of genetic tests.

In order to examine if lay people find the genetic tests, criticized for not having enough clinical validity and clinical utility, legitimate, and the factors of their views, we conducted the four Focus Group Interviews of six lay people with different back grounds in Japan. We took the genetic test for obesity as an example. Genetic test for obesity is today sold directly to consumers on the websites in Japan and elsewhere. In the United States, the government has warned consumers that such test could be misleading. In Britain, there have been reviews of the test by a governmental organization. In Japan, there has not been an official claim about the test, but there are several companies that sell such test.

One of our findings is that there is a gap between what lay people expect and what experts generally expect to genetic tests. Lay people not necessarily expect advanced scientific knowledge to have advanced clinical utility. It is possible to argue that genetic tests without clinical utility could be socially legitimate if they meet the expectation of users.

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Websites: Locations where Assisted Reproduction is (Re)Produced

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The first (in)fertility clinic opened in Mexico in 1985. Today, 50 clinics through out the country and a number of independent gynaecologists offer a variety of assisted reproductive services; the majority of them within the private health sector. Although the use of these services is growing, there still is no legal regulation, the lay public has little scientific literacy on the subject, and there is nearly no public debate on the ethical and social implications of these technologies. In the last few years, it has become common practice among (in)fertility clinics to use marketing schemes to attract more patients. Most have elaborate websites containing information about infertility, assisted reproduction, and the services available at their clinic; a few even offer online consultations. Some clinics, for example, organize five hour-long information sessions with an average audience of 450 people. Through these websites and public events, the professional community strives to convey what assisted reproduction is while the users attempt at understanding what these techniques imply and select whom they will go to for help. These marketing schemes act as locations where assisted reproduction is being performed through the interaction between the professional community and the users. In this process, the meaning of what a parent is and how he or she becomes one, are being contested and redefined.

The aim of this study is to analyze how assisted reproduction is being assembled in Mexico and the influences it is having on the local culture. I will do this by focusing on the role the clinic's marketing schemes are playing in this process. Specifically, I will look at the images and the words used within their websites and their printed information, in order to see how they depict assisted reproduction, infertility, who is an eligible user and who a qualified service provider, as well as what a proper clinic should look like and what services should be offered by them. Particular attention will be given to the use of metaphors or references to Nature, digitalization, technology, artificiality, life, society, family, motherhood, fatherhood, the individual, and science. By studying the way assisted reproduction is being constructed, it is possible to unveil the new meaning assigned to kin concepts such as motherhood, fatherhood and family.

This study will complement the existing socio-anthropological literature on assisted reproduction by presenting the way a developing country is assimilating a foreign technology.

The Internet as a Support Community and Information Resource for Older Adults: a Global Comparison

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In 2000, DeOllos and Morris (Journal of Educational Technology Systems) noted two trends in our rapidly changing, postmodern society: 1. The emergence of the PC, 2. The aging of our population. These two arenas might seem to be incongruous. The PC epitomizes modern

2.3.11: People and Technologies Mediating Health Information, II

technology and everyone knows the maxim, "you can't teach an old dog new tricks." Pertinent literature dispels this cultural myth; the point is, this stereotype is widely accepted by society and many older adults. Kominski and Newberger observe that virtually no life is left completely untouched by computer-driven technology. Certainly, computers are integrated into many aspects of daily life. Newberger notes that only 13 percent of those over 65 use the Internet. The U.S. Department of Commerce warns that not having access to the PC puts individuals at a severe disadvantage, e.g. those over 55 are more likely than any other age group to check health information online.

AARP's Modern Maturity (Nov-Dec, 1998) noted that "only a computer can make you feel alternately so powerful and so helpless." A major problem of the Internet is the often overwhelming excess of information generated when a general term is entered into a "Google search." This is termed the "Information Frustration Syndrome." The objective is to differentiate useful websites from trivial and irrelevant ones. This may be a problem, particularly for the elderly PC user. Elderly users may be inundated with irrelevant, misleading, inaccurate and potentially deceptive websites. There are other practical and functional considerations: 1) the cost of owning a computer and subscribing to an Internet provider; 2) many web pages use colors and fonts that may be difficult for older adults to read.

This study investigates actual web sites to determine barriers that exist for elderly users. Of particular interest are governmental sites, e.g. Social Security sites from the U.S., the U.K., and Ireland; and other agencies, e.g. AARP (US) and Alzheimer's related groups. These web pages will be analyzed for 1) appearance, in terms of the combination of colors and fonts that make the page appear out of focus or fuzzy; 2) background appearance which needs to be simple and uncluttered; 3) jargon which may be a major hurdle; 4) user access: employing complete, accurate descriptions of the location of information.

This study will conduct a comparative analysis contrasted with the findings of our earlier 2000 article. A discussion of effective web site characteristics will be emphasized.

Translating Interests in Collaboration:
Library Services and Patient Care

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This paper will present the preliminary findings of a socio-technical study investigating the setup and development of a recently completed collaborative research project among practitioners and researchers in Information Science (IS) in UK. The research questions guiding the study are:

How do practitioners and researchers translate their interests in a collaborative project across geographical distances where ICT plays a role? How do socio-technical aspects of work organization interplay with the heterogeneous interests of different actors?

The focus of the case study is a collaborative project whose goal was the development of a survey toolkit to be used to assess the impact of the library services including provision of

electronic information, in clinical and hospital library settings, on patient care. This project was conduced in June 2004 through June 2007 by a team of IS researchers and a group of library practitioners. To develop and validate the toolkit, the team used a mix of quantitative and qualitative methods. A randomly but stratified sample of professional staff at different sites participated in a survey. Interviews with volunteers from that sample provided further details about their use of information provided through the library services. Sites included in the sample were district general hospitals, clinical librarian services, National Health Service-Higher Education (NHS-HE) within a University Hospital, etc. The stratified staff group included medical consultants, GPs, and qualified nurses, among the others.

Research data include semi-structured interviews with project team members and multiple types of literary inscriptions (e.g., journal papers, presentations, meeting minutes, etc.).

Data analysis is informed by actor-network theory (ANT), especially Callon's model of translation of interests. In accordance with ANT, collaboration is conceptualized as a heterogeneous network of human and nonhuman actors, whose interests must be aligned in order for the actors to work together and accomplish a common goal. Callon's model provides a framework to analyse the process of constructing a temporary social order, by examining the activities that have been pursued by the stakeholders to include and exclude social and technological actors from their collaborative project. In addition, the analysis examines the associations between events involved in the translation process and socio-technical aspects of work emerged from previously reported research.

The results from this case study will be combined with results from two additional case studies to develop policy and best practice recommendations for universities and organizations to facilitate collaboration between academia and practice.

There are some good reasons for IS to pay more attention to STS. First, STS can help IS reconceptualize collaboration, from a process centered around individuals interacting with one another and with tools and artifacts, to a process of construction involving many heterogeneous interacting materials. In the design of information and communication technologies' (ICT) systems and services, this means attention to actual practices and sensitivity to the situated, social, distributed and embodied construction of collaboration and collaborators. Second, STS has the potential to reduce IS's isolation from other areas of research concerned with knowledge.

Working with Electronic Medical Records:
Some Results from Research at Japanese Regional Hospitals.

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The accelerated adoption of EMR by healthcare providers in recent days seems to have shifted the discussion about EMR from whether we should introduce EMR to how we can promote and accelerate the adoption process. EMR has become regarded as a potentially powerful tool to improve the efficiency and safety of health care services. Confronted with the increasing prevalence of information technology in other professional areas, it is hard to believe that EMR won't become widespread in health care services in the near future. How

2.3.11: People and Technologies Mediating Health Information, II

will this change affect medical professions especially physicians? Some sociologists have long insisted on the deprofessionalization effects of information technology on medicine (Haug 1977, McKinlay & Marceau 2002) while others are cautious about such a straightforward argument (Abbot 1988) or emphasize social constructive aspects of technology (Berg 1997). Using some results from our research at three Japanese hospitals, we focus on the possible long-term effects of EMR on medical practice. The research includes data from questionnaires for the entire hospital staff and interviews with physicians, nurses and other staff members. The results show both negative and positive evaluations of EMR by the hospital staff. Positive evaluations came mostly from nurses with respect to improved communication with physicians, increased retrievability of clinical information and liberation from various clerical tasks that are not their primary duties. Negative or critical evaluation of EMR came from physicians regarding the increased volume of their work, decreased oral communication with other hospital staff and possible adverse influences of EMR on the education of young clinicians. Our focus here is on the last two concerns: decreased oral communication and the influence of EMR on young physicians. Although those who critically evaluated EMR are a minority (ca. 10% of all the hospital staff) and their concerns about EMR's adverse effects have never been a major issue for contemporary healthcare services, the effect could exert a long term influence both on healthcare professionals and the future medical information technology. In this respect, neither deprofessionalization theory nor social construction theory is satisfactory because both arguments tend to emphasize only one aspect of the phenomenon. A more plausible account would be a kind of coevolution of technology and professionals. We also presume that the introduction of EMR could affect doctor-patient relationships in the sense that both physicians and patients will expect consultations to be more informative and less communicative than they are today. This may eventually move the doctor-patient relationship towards an engineering or contractual model.

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Governing Dying: Acting Online Through Intimacy

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"We perhaps shock you, but we want help you to manage the dying (...) let us speak about your fears and wishes": that is how the Czech non-governmental organization "Homecoming" describes the main goal of the internet initiative "dying.cz". In a "postmodern" society, where dying has been hidden behind the walls of hospitals, this internet server offers mediatory services about care for dying people and claims to help to manage especially the emotional part of dying. In my paper , I will show how technologically mediated dying services create new political spaces and new forms of governing of dying through intimacy. I shall investigate

2.3.11: People and Technologies Mediating Health Information, II

the heuristic value of intimacy for policy analysts and policy-makers. As the emotional awareness of innermost reality, intimacy includes an important political dimension: the space where intimacy can be encrypted by being mentioned or discussed becomes the field of intervention for practices and processes generated by political actors.

"Homecoming's" services are structured into two parts: (1) in the "expert section" the consulting modus operates (2) in the "mourner-section", questions of clients are not always answered, but rather discussed or commented on. This interaction confirms the acknowledgement of intimacy as one of the main concerns when the situation of dying is publically regulated. Methodologically, my paper pursues a (linguistically oriented) discourse analysis in the tradition of argumentative policy analysis. Semi-structured interviews of involved experts as well as of mourners using "dying.cz" regularly will help to illustrate intervention strategies related to the management of the situation of dying patients.

2.3.12: Research Collaboration and Collaboratories

Researching Cyberinfrastructure

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This paper will discuss my efforts as a social scientist in the United States to conduct research on the work practices and collaborative structures of cyberinfrastructure development projects. Over a period of three years I have conducted empirical research in the domains of bioinformatics and genomics and am currently negotiation to study a cyberinfrastructure development project that will support nanotechnology. The diversity of cyberinfrastructure building projects themselves and their composition, presents the social scientist with a unique set of opportunities and challenges. This paper will discuss my empirical research on cyberinfrastructure and my personal experiences as a young researcher moving up the academic hierarchy and the concomitant struggle to define an appropriate role for myself as a social science researcher in relationship to the shifting landscape of cyberinfrastructure building efforts and the agencies that fund them.

The vision of cyberinfrastructure is one of information and data intensive, large-scale, distributed, interdisciplinary collaboration. The aim is to bring about a radical transformation in research practice. National funding bodies in the United States, such as the US National Institutes of Health (NIH) and the National Science Foundation, argue strongly for the involvement of domain scientists in the development of new cyberinfrastructures. Accordingly, we see a shift where domain experts who will be the first users of the cyberinfrastructures are involved, with varying degrees of involvement, in the development process. These domain scientists are sometimes project executives in addition to being end users. While the domain scientists involved may indeed have very different scientific interests, the technologists involved have similarly diverse interests. In addition to defining my own role as a researcher, I am helping the scientists and technologists reflect on their roles as well.

Data Access in Astronomy and Strategies of Collaboration

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Many astronomers and space scientists use sets of data stemming from different observatories and instruments, including ground-based telescopes and satellites. These data sets often include digital images. Assembling, analysing and interpreting these data sets requires various specific skills and expertise which no individual alone possesses. Moreover, most observatories employed by the scientists are public facilities. As such their data products become public after fixed proprietary periods.

Given these circumstances many astronomers join to form collaborations in order to divide labour, define and enforce boundaries to data access, share benefits, as well as cope strategically with the temporality of exclusive access to the data. These collaborations are typically short-lived in comparison to collaborations centred on large facilities, such as

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accelerator experiments in high-energy physics. Sociologically and anthropologically, they raise questions about the practices involved in their operation, modes of creativity (individual versus collaborative), as well as issues pertaining to intellectual property in the face of open data access and the interoperability of data and software.

In my presentation I shall review briefly the specifics of (public) data access and data exchangeability in astronomy and its history. Drawing on (ongoing) ethnographic fieldwork in a research collaboration in observational cosmology, I shall then consider some of its practices of coping with the aforementioned challenges and relate these to the field of competing teams. I will then compare my findings with previous sociological studies of research collaborations which are centred at specific facilities or experiments, such as those found, for instance, in high-energy physics.

Towards Bottom-Up, Stakeholder-Driven Research Funding - Open Source Funding, Open Peer Review

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Nowadays scientific research is regarded as the main source of economic wealth (Kline and Rosenberg, 1986; Lundvall et al., 2002) and as a means expected to solve ecological and social problems (Beck, 1992; Beck, 1999). These expectations the public and the politicians is addressing towards science question the notion of an autonomous science system concerning its mechanisms of evaluating the "relevance" and even the "quality" of research projects. We observe an ongoing trend of increasingly incorporating prospective societal impacts into the decisions about funding of research projects and proposals (Guston and Keniston, 1994; Nowotny et al., 2001).

Societal impacts consist of all the demands, expectations, and interests the various stakeholders, actors, institutions and social movements have. These include the commercialization of research results, supporting knowledge transfer between geographical regions, organizations or groups of people, strengthening the competitiveness of enterprises on the one hand and interests formulated by actors of a civil society like organization of the general welfare (Unicef), environmentalists, or humanitarian activists (Hess, 2005) on the other. Such objectives appear reasonable with regard to the fact that research is often ultimately funded by tax payers and consequently scientific communities should be accountable on how they contribute to the societal advancement.

When analyzing the practices of funding agencies (such as the European Union, national or federal ministries or private foundations), however, we gain the impression that the measures used to trigger societal impacts are not always very efficient: Funded research projects tend to be large since funding agencies believe a big impact requires big investments (cf. Münch, 2007). Large science projects are due to the uncertain nature of scientific progress very hard to plan a priori. Scientists tend to write proposals in such ways they think maximize their chances to get funded - but a pretty proposal does not guarantee excellent results. The few evaluators and reviewers of a specific proposal or project might often be experts in the area but are usually not direct stakeholders of that project and thus their valuation of the potential

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impact or success of a project is a rather rough estimate. Collaboration and interdisciplinary were identified as success factors for innovation (Hollingsworth, 2002), but each additional partners also potentiates communication and management overhead (cf. the case study of: Latour, 1996).

In order to overcome the mentioned obstacles we argue that new ways of research funding should be sought, which are stakeholder-driven, spur bottom-up innovations and complement thus existing funding instruments. We envision a funding model, which is based on a platform for the discussion of research ideas and their prospective outcomes. The actual funding decision should be based on the number of votes from stakeholders, i.e. users/applicants of the research result or companies interested in their commercialization. In order to not disadvantage research projects, with a small but strong number of stakeholders, participants could be equipped with a number of votes, which can be either spread across several project ideas or awarded bundled to one.

Such a system would have a number of advantages: it will precisely reveal the stakeholders of certain research results; it will make the interfaces between research results clearer; researchers are better accountable for really achieving the initially defined requirements; the model would have a very low overhead, since communities of researchers, stakeholders could organize themselves, given a Web platform which facilitates the description, browsing, searching of projects and automates the voting processes. This platform probably enables an arena for communications and funding decisions that is satisfying the demands of the stakeholders and the community of scientific practices as well, and this to such an extent that goes beyond the already existing funding procedures. Moreover, from our point of view it could be worth to discuss how this platform can really comply with the norms, like transparency, equality, free exchange of knowledge (cf. the normative approach of: Merton, 1973 [i.O. 1942])) of a science perceived as a democratic institution.

In order to showcase the practicability of such a model we implemented such a platform and in order to test their feasibility we adopted the platform firstly for the development of open-source software. The platform works as outlined, but participants are users and developers of open-source software and the funding of projects is provided by pooling donations from stakeholders. The platform is online at http://Cofundos.org and is actively used.

It is expected that our proposal will address the following questions of the conference:
How is the use of peer review in evaluation systems changing in respect to the possibilities new communication technologies offer?
To what degree are "transnational" practices emerging?
Which alternative instruments of peer review are in use and how do they impact on the governance of university and research systems?

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The Effects of Institutions on International Research Collaboration in the Life Sciences

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This paper discusses an empirical study on the effects of institutions-in this case those of a research funding council in Australia- on international research collaboration in the life sciences. One of the most significant trends in modern scientific research is the rapid increase of collaborative research, particularly international collaborative research. International activities are a core part of scientific endeavor in the 21st century with collaborating with international research colleagues being viewed as having a range of benefits. Research councils have been indentified as playing a larger role in the science funding system and there has recently been a significant increase in the number and type of funding schemes available to support international collaborative research in many countries including Australia. Collaborating with international colleagues is particularly important for Australia as it produces only 3 per cent of the world's science and technology and as a result cannot source all of its science and technology needs domestically.

Despite the recognised importance of the need to increase support for Australian researchers to engage in international collaborative activities and the increase in funding schemes, there has not been a sociological analysis of the different institutions by which the internationalisation of research is taking place and any investigation of the different consequences of these institutions on the conduct and content of research. As a result, the effects of institutions aimed at increasing international research collaboration in Australia are largely unknown. Therefore questions such as what types of funding schemes are most effective and what are the key elements required to support high quality international collaborative research cannot be answered based on empirical evidence.

Current attempts to explain influences on knowledge production have only investigated part of the picture and are therefore insufficient. Studies by the social constructivist school in the sociology of science have focused on a micro approach to explain effects on knowledge production while attempts within the political science literature have focussed on macro level analysis of science policy. In addition, both the general social theory of collaboration and the

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sociology of science emphasis influences that inhibit or even prevent collaborative action. Therefore the inconsistency between empirical observations and theory implies that it is not able to be applied to collaboration in research.

This study bridges the gap between micro and macro forms of analysis through applying the analytical framework of actor-centred institutionalism with a view to developing a preliminary theory of research collaboration. This analytical framework of actor-centred institutionalism focuses on exploring the role of institutions in the context of other conditions of action and how these translate to effect collaboration and the research produced.

This paper outlines the preliminary results of an empirical study based on in-depth interviews with twenty-two Australian researchers and ten of their international collaborators working in the life sciences funded under five different types Australian National Health and Medical Research Council funding schemes.

Rethinking Research:
the Social Implications of e-Research Technologies

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The increasing role that advanced ICTs play in the practice of scientific research promises the potential to transform the way facts about the physical and social world are acquired, shared, analyzed, and translated into useful knowledge. Advances in research are increasingly coming to be seen as critically dependent upon effective access to shared digital research data and the advanced information tools that enable data storage, search, retrieval, visualization, and higher level analysis.

Many key scientific questions facing the world today cannot be answered by the stereotypical lone researcher. Scientists, social scientists and humanities scholars today are much more likely than in the past to work in teams (Wuchty et al. 2007).Examples of new e-Research applications abound, but building large collaborative systems is not just a technical challenge. There are also important social, ethical, legal and organizational issues that must be considered. By looking at e-Research from a social shaping perspective, this paper addresses how researchers shape the technologies they use, and how they in turn have their behaviour shaped by the technologies and by social forces.

This paper will address these issues, focusing on several cases. One is the increasing use of technology to share medical datasets. The technology in this case is relatively simple, and many researchers would benefit from access to large databases of patient information, including geneticists, epidemiologists, and public health researchers. The data for this case comes from a U.S. NIH public-private partnership called the Genetic Association Information Network (GAIN). A key feature of GAIN is that academic researchers were enticed to contribute data collected over many years to a dataset accessible to any qualified researcher, including private pharmaceutical companies, in exchange for access to expensive genotyping on their subjects. This study raises issues of the control individuals have over their data, ownership of research data, and downstream control of the uses of

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valuable information.

Another case that illustrates the legal barriers to the uptake of e-Research is GeoVue. This project created an application called Virtual London, which offered users a virtual fly-through of London using Google Earth as a platform. Their target audience was urban planners and policy makers, but project members also saw the potential for public interest that would draw attention to their work. However, the 3-D representation of London required data drawn from the UK Ordnance Survey. This data, which was collected using public money, is protected by Crown Copyright, and GeoVue and Google found that even after extended negotiations they were unable to get the Ordnance Survey to agree to any terms that would allow release of the application. This was not a case of economics: Ordnance Survey was apparently unwilling to allow the use of their data at any price for this type of application.

Detailing the practices of researchers and practitioners in these cases allows us to reflect on the outlook for e-Research in the broader context of how knowledge production is changing, as well as the limits to these changes.

2.3.13: Genetics - Speaking Positions and Research Methods

Can the Embryo Act?

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Concepts such as 'moral landscape' (Svendsen and Koch, 2008; Helgason and Pálsson, 1997), 'ethical boundary work' (Wainwright et al 2006, Williams et al 2008), and 'moral work object' (Ehrich, Williams and Farsides 2008) have been used in relation to understanding the 'work' embryos and others do in the social relations of the clinic and laboratory. In a moral landscape, clinical and laboratory actors negotiate pathways around ethical obstacles and particular problems, such as using fresh embryos for research that might have been used in treatment. Ethical boundary work involves a similar set of issues and negotiations where actors see grey areas and places where they 'draw the line'. The embryo is defined and used according to professional relations, economic considerations, the goals of science, political will and so on. Drawing on a previous study on PGD, we argued that staff construct embryos in a variety of ways as 'moral work objects' that allows them to shift attention between micro-level and overarching institutional work goals, building on Casper's (1998a,b) concept of 'work objects' and focusing on negotiation of the social order in a morally contested field.

In our current study of ethical frameworks for embryo donation for stem cell research, we use the methods of interviews with clinical and laboratory staff, observations and ethics discussion groups to investigate these ideas further from the perspectives of professional staff.

At the same time and in this paper, we consider the question (after Mitchell, 2002), 'Can the embryo speak?, in recognition of the current debates in science and technology studies around what counts as an agent, actor or object (e.g. human, non-human), and the resistance that nature offers to understanding. Is an in-vitro embryo human or not? Does it have intentions? As an object of science, does it offer resistance to understanding, definition, and transformation? And if the embryo can speak, what is it telling us?

Concealing and Revealing:
Exemplifying Strategies for Managing Anonymity

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This paper addresses how those in STS engaged in interventionist research agendas can offer accounts of their experiences.

The anonymity of identities in research accounts poses practical, ethical and representational issues for researchers. When investigations are undertaken in conditions of highly negotiated access involving relations bound by terms of secrecy, then the difficulties faced in offering accounts are all the more acute.

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In this paper, I will discuss the situated efforts I have taken in response to such disclosure considerations. The substantive matter in question relates to a particular topic of current security deliberations; specifically international attempts to devise a code of conduct for civilian life scientists to prevent their work from facilitating the development of biological weapons. The argument is based on an ethnographic-related engagement with these attempts over a five-year period. I want to consider the representational implications of the disclosure rules, security clearances, informal arrangements, etc. associated with security controls; in particular their implications for how knowledge claims are circulated and reproduction. I also want to go further though and ask how researchers immersed in conditions of concealment can offer accounts of the relations they study without reproducing the knowledge dynamics of those conditions.

The basic orientation of my response has been to seek forms of writing that exemplify the negotiation of disclosure and concealment in the relations of actors-analyst within the relation between readers-analyst. In doing so, a goal of mine has been to determine how limits to disclosure can be a productive part of researchers' accounts. In other words, how can such limits be resources, rather than just topics, for our analysis. As part of the consideration of these issues in this presentation, attention will be given to the potential of autobiographical forms of writing in disturbing conventional relations between researchers and those they study.

Bioethics and the Web of Governance of Biotechnologies in the EU: the Case of Commercial Cord Blood Stem Cell Banking

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Controversies and disagreements about the uses of stem cells for research have in recent years challenged the cherished assumption of a unified set of European values, and threatened the European Commission's emphasis on biotechnology as key to its economic strategy. This paper is concerned with the ways in which formal bioethics advisory groups, such as the European Group on Ethics in Science and New Technologies (EGE), have been enjoined in governing the terms under which stem cells can be used in research and transplant medicine. In particular, we focus on the case of commercial cord blood stem cell banking. This activity involves the advertising to parents of the possibility of paying to store their newborn's cord blood cells. The advertising invokes both the possibility of a child's or family's future need for cord blood cells for transplants, and the possibility of future developments in cell based therapies - in a field of science characterised by great uncertainty.

We explore how the advertising of private cord blood banks raised concerns about public health and consumer safety, and about the erosion of the social values associated with blood and tissue banking, seen by many as important to the European project. This paper traces the story of how commercial cord blood banking was constructed as an ethical problem, and considers the EGE's role in the governance response to this. Drawing on the EGE's opinion on cord blood banking and on interviews with its members, we consider how looking at the wider controversy surrounding cord blood banking might elaborate the account of bioethics

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and governance in the EU.

In clarifying the role of the EGE in EU policy-making process we approach the EGE as one element of a web of governance surrounding biotechnologies in the EU. The centrality of biotechnologies to European social and economic development and the particularly sensitive social and ethical issues it raises has necessitated a flexible approach to its regulation. Creating a network or web of governance around these issues is seen as a way for the EC to develop informal yet continuous linkages with the required sources of expertise and knowledge. Using concepts drawn from STS, we explore the assumption of whether bioethical bodies such as the EGE, that operate at the 'boundaries of regulation' and that have no formal legal basis, derive their legitimacy from the network of relations that they operate within and, in turn, whether this creates a mutual supply of legitimacy to the EC.

Pluripotent Projections - Stem Cells and Identity

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Promise is the very stuff that stem cells are made of - the pluripotent hESC is by definition a tentative future projection. Human embryonic stem cells (hESCs) are pluripotent, which separates them from adult, or somatic, stem cells. Pluripotency is commonly defined as the ability to differentiate into almost any human cell type in the body. Recently, reports that two independent teams of scientists have managed to reprogram skin cells to behave like embryonic cells - e.g. demonstrate an ability to self-renew and displaying pluripotency - has caused much excitement. In this paper, I examine the concept of pluripotency and discuss its different meanings and uses. Briefly, it can be seen to work in at least three different ways. Firstly, pluripotency works to protect a somewhat embattled research community sandwiched between two powerful discursive continents. Ethical objections from anti-abortion groups as well as queries regarding viability of hESCs raised by proponents of adult stem cell research can be countered by way of pluripotency. Pluripotency can also serve as a gold standard bench mark to uphold quality assurance and credibility within already accredited networks, such as the UK Stem Cell Bank. Such quality assurance does however presuppose access to particular resources and skills, and thus serves to outline a laboratory infrastructure. To define a particular set of quality standards is therefore also effectively to define what a stem cell laboratory should look like and by extension who should be doing it. Finally, pluripotency can, if configured to fit a more functionalist definition, aid hESCs entering into a clinical future.

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Opening up the Epistemology of Judical Gatekeeping: Newman vs. Motorolla, Inc. (2003)

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The US case of Newman vs Motorolla, Inc. (2002) (affirmed on appeal in 2003) constitutes one of the most important recent examples of litigation concerning the question of health risks of electric and magnetic fields (EMF). The action was dismissed in a (pre-trial) Daubert hearing. One of the cases many noteworthy features was the willingness of the court to take on an extremely active role in relation to its scientific gate-keeping obligations, this included critical judicial consideration of editorial correspondence relating to the peer review of relevant scientific papers submitted by various expert witnesses to refereed journals. The manner in which the case proceeded and its outcome have previously been identified as a good example of what could be described as an 'exclusionary ethos': part of a trajectory displayed by US federal courts from the mid 1980's, in the wake of Daubert, to restrict the admissibility of novel plaintiff expert evidence in toxic tort litigation (Edmond and Mercer, 'Law and Policy', 26(2)2004). The failure of Newman's action against Motorolla has dampened the prospects of future EMF litigation. The following discussion moves beyond questions of interpreting trajectories of federal judicial admissibility interpretations and uses Newman v Motorolla as a vehicle to reflect on a number of more general theoretical issues pertinent to questions surrounding the role of science and expertise in law. Issues to be considered include: the way the court legitimated the extent of its scientific gate-keeping, the explicit and tacit images of science it supported, the way expert witnesses responded to the challenges of active judicial gate-keeping, the views of experts and various commentators on the significance of the case and the way it was conducted, and the significance of courts as sites for the closure of scientific controversies.

The Regulatory Process of Brazilian Contemporary Biomedical Research Dynamics: Limits and Challenges

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The development of novel biomedical technologies, such as vaccines and drugs for tropical diseases, still depend upon animal testing. The argument that research on animals provides necessary information to predict how a new drug or procedure will affect a human plays an important role in the design and organization of regulatory regimes on the use of animals in biomedical research. Brazil does not have a Federal law concerning animal experimentation and, on the municipal level, legal decision-making have been generating controversies among researchers, legislators, politicians and animal rights groups opposed to the use of animals in experimentation. At the present time, the norms and regulations on using animals in research are established internally by the Ethical Committees that Brazilian scientific institutions have been implementing gradually from mid 90's. Although public participation still very limited across Brazilian regulatory domains, animal regulation controversies are

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changing the notions of animal, health and medicine embedded in the Brazilian culture. Furthermore, the overflow of international principles, standards, guidelines and regulations on the use of animal in research is shaping the regulatory outcomes in Brazil. In order to understand the rationales and mechanisms embodied in animal regulation regimes (regulatory mark) that have been in construction for the last 20 years in Brazil, we are conducting a content analysis of legal documentations concerning legislations on Federal, State and Municipal levels, Federal Environmental resolutions and Scientific Institutions Ethical Committees assessments reports. The investigation is part of a case study in progress, concerning the implications of animal welfare regulations on research practices of a centenarian Brazilian biomedical research institution, FIOCRUZ. The analysis has been showing that over the years there is a growing polarized power relationship among regulatory actors. In one extreme, the animal rights defenders who fight to ban the use of animals in teaching and testing, arguing that animals have the right to live (accordingly to the Brazilian Federal Constitution article on Environment). On the other extreme, the biomedical research institutions stressing the dangerous and threats to the public health that outcomes a regulatory regime that prohibits the use of animal in research, arguing that vaccines and medicines will not be produced as an outcome. As we analyze the limits and the challenges in the process of regulation of the dynamics of the Brazilian contemporary biomedical research, we are not worried in examining the conflict between science and ethics. Our contribution to the STS literature consists of trying to demonstrate the hypothesis that the values of a given science are intrinsically linked to the society values that is embedded. Therefore, our investigation aims to contribute to the improvement of Fiocruz research projects governance because in the public sector the governance reports to norms, processes and conducts through which interests are articulated, resources are managed and power is employed in society, in other words, it means the State capacity to serve society.

Can a Weapon be Immortal?

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Joe Masco describes the U.S. nuclear weapons lab's current project as one of "nuclear gerontology." In a situation where the labs cannot test new weapons designs, they are preoccupied with the aging and death of their weapons, their weapons scientists, and of the weapons labs themselves. What is the shelf-life of a weapon? Can it be refurbished indefinitely? Is weapons design knowledge, often tacit, immortal or will it pass away with its progenitors? Can the arts of design and experiment be separated so that new weapons can be designed and built despite the test ban treaty? And can the geopolitical order nuclear weapons regulated through the cold war be preserved in the face of nuclear proliferation by upstart countries in the Third World?

At a moment when the life sciences are able to manipulate the codes of life with unprecedented facility, promising brave new worlds of high crop yields, replaceable body parts and extended lifespans, nuclear weapons scientists are preoccupied with decay: the decay of plutonium, of their communal knowledge, and of the nonproliferation regime. In a context where machinic evolution is problematic and decay is a persistent threat, reliability - the machinic version of immortality - has emerged as the weapons scientists' collective project, a project to forestall entropy. U.S. weapons scientists are proposing a new weapons

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- the "Reliable Replacement Warhead" - that they hope will be closer to immortal. However, some scientists fear that an untested weapon will have what they call "birth defects." The attempt to create a longer-lived weapon, then, just creates problems at the other end of the lie cycle.

Tropical Medicine Research Practices in Brazil Encounter the Animal Rights and the Animal Welfare Groups: the Articulation of Science and Society in Oswaldo Cruz Foundation (FIOCRUZ)

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We are conducting a case study that investigates the changes and trends in the Brazilian Tropical Medicine unfolded in the last two decades by the new forms of regulating scientific knowledge production. Historically, biomedical studies on tropical diseases are trans-epistemic, integrating or complementing knowledge produced by disciplines such as zoology and entomology. Scientific research practices on tropical diseases are dependent upon animal experiments: laboratory-based research and field studies.

Our investigation analysis the implications of regulatory processes upon research practices on tropical diseases, geographically situated in a centenarian biomedical research institution in Brazil, Oswaldo Cruz Foundation (FIOCRUZ/Health Minister). Adopting a socio-anthropological approach, we are studying the relationships among recent chance in the guidelines, legislations and regulations on the use of animals in research and the scientific practices held on three Fiocruz tropical diseases research laboratories. Internationally, the standards set by agencies for the care and use of experimental animals are based on the Three Rs ethical principles - that stands for Reduction, Replacement and Refinement - proposed Russell and Burch in 1959, in their book The Principles of Humane Experimental Technique. Investigators are required to consider the implementation of Three Rs during the design of experiments that will use animals. The principal investigator has to submit a protocol to the Animal Care Committee, specifying the rationale for using animals and list the databases that were searched to confirm that there are alternatives to animals. Fiocruz implemented its Ethical Committee on Animal Experiments (CEUA), in mid 90's. We are investigating how the Three Rs are locally introduced, adopted and become integrated in the tropical diseases researchers' practices and in the laboratories routines. Furthermore, we investigate how alternative testing methods such as computer models, cell cultures, and a number of research methods that complement animal studies are changing the processes and instruments of biomedical scientific practices as well as the research and technicians qualification profile.

Considering that research funding and Laboratory Animal accreditation are become deeply entangled, we are analyzing the institutional approval of the protocols that have been submitted to CEUA by the tropical diseases laboratories. In Brazil, there is more than one decade, the debate around the didactic-scientific experimentation in animals has been frequent and controversial and, more recently, intense, in function of Bills that ban the use of animals for scientific ends when it causes pain, stress or discomfort. Fiocruz has been participating very intensively on the legislation processes debate.

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As a contribution to STS reflections on the "acting with" debate, our investigation question if it is acceptable that researchers financed by public funds produce local knowledge without integrating them to society concerns? How Tropical Medicine research practices changes under the pressure set by the animal rights and the animal welfare groups over the regulatory actors, taking into account the transformational context that scientific research and biomedicine in particular, have been submitted?

Living Changes in Scientific Careers:
an Explorative Analysis of the Co-Production of Visions of Career and Epistemic and Social Change in the Life Sciences

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The culture and practice of doing research in the life sciences is changing in close co-evolution with its societal context. These transformations may be expected to impinge on very different aspects of scientific work, as for example epistemic practices or the socialization of junior researchers. One of these aspects especially vividly debated also within the life sciences are the changing visions and boundary conditions of scientific careers.

Frequent topics addressed in these debates are the ever-closer intertwinedness of academic and industrial career trajectories, evolving research methods, increasing mobility, high competition for funds and employment opportunities, as well as shifting contract cultures. Nature recently hinted at the inseparability of "internal" and "external" changes by stating: "Both employers and employees are constantly reacting to changes caused by globalization, new technology and shifting scientific and political fortunes." (NATURE, Vol 446/1 March 2007: Temporary display, 108) Hence visions and models of scientific careers are closely interrelated with perceptions of a changing social and epistemic research environment.

Our paper explores these issues in two different empirical settings. First, we will analyze debates on scientific careers in key journals such as Nature and Science. Second, we will build on a participant observation of the "Career Programme" at the large interdisciplinary conference "European Science Open Forum 2008". Combining these two approaches enables us to trace both official discourse and the performance of these debates in advice to young researchers. Concretely, we will on the one hand analyze which visions and models of (ideal) scientific careers are referred to. On the other hand, we will look at how these models are debated in relation (tension?) to perceived changes in the research environment.

This paper is based on data collected in the context of the research project "Living Changes in the Life Sciences: Tracing the Ethical and the Social in Scientific Practice and Work Culture " carried out in Austria (project lead by Ulrike Felt, financed by GEN-AU).

Doing Research: Current Practices of Biomedical Scientists and Competitive Federal Grants

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Most academic scientists in Canada, as in the U.S., are dependent on federal research funding. Despite this, the effects of funding arrangements on the organization of research have not been systematically examined. Concern about autonomy in academic science has focused primarily on constraints on the choice of research topics and the content of research.

2.3.16: Shifting Work Cultures in Science

Based on findings from over 70 work history interviews with graduate students, postdocs, technicians and professors in the biomedical sciences done during an ethnographic case study of biomedical labs at leading Canadian research universities, this paper argues that the dependence on competitive standard federal grants limits autonomy for biomedical scientists because of the constraints in places of the conduct of research in their labs. The paper builds on an earlier paper (Salonius, forthcoming Social Studies of Science), which showed that an increase in competition in the 1980s for federal grants led biomedical scientists in Canada to change their work and organizing practices; applying for multiple grants (instead of relying on the renewal of one grant), and recruiting trainees (graduate students and post-doctoral researchers) as research assistants, instead of technicians. In this paper, findings show that the current dependence of biomedical scientists on competitive federal grants is associated with the full incorporation of trainees' research into the production of faculty research, such that the scientific productivity of the professor depends on them, using several institutionalized practices;

1. delegation of the experimental work on projects to trainees as the trainees' main project,
2. sharing scientific credit with trainees
3. informal integration of scientific credit into the structure of training.

These practices, findings suggest, were not institutionalized before investigators became dependent on competitive funding. The main argument is that dependence on competitive standard federal grants, which leads biomedical scientists to attempt to obtain multiple grants, and if successful, gives them little choice but to delegate the experimental work on the multiple projects to others, means that they must do research on an organizational basis. The need to maximize productivity, given the conditions of the grants, means delegation of this work to trainees, which findings suggest has resulted in significant changes to the structure of post-graduate training.

Chemical Science and its Changing Societal Contract

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The relation between science and society appears to be undergoing change. Influential scholars report the rise of new modes of knowledge production and the replacement of Mertonian norms by those of 'post-academic science'. Beyond doubt, societal sponsors of science are increasingly demanding relevant research, research which promises applications outside academia. However, claims that science's culture of work, its social organization and normative structure have profoundly changed still lack sufficient empirical evidence. In addition, notions dominating the debate such as 'Mode 2 knowledge production' provide limited guidance, due to their conceptual weakness.

I aim to contribute to the understanding of the changing relation between science and society by analyzing the changing way in which chemical scientists and their societal stakeholders deal with the relevance of research. My theoretical framework contains two central elements, the contract between science and society and the credibility cycle (Latour and Woolgar, 1979), as a model for scientific practice.

2.3.16: Shifting Work Cultures in Science

The work presented is a case study of chemical research conducted at universities in the Netherlands in the period 1975-2005. It is based on in-depth interviews with scientists, policy-makers (national government and the research council NWO) and other relevant parties, an analysis of annual science policy budgets, funding data, foresight studies, academic publications and other important documents.

My study shows that scientists are exposed to conflicting norms. Societal relevance becomes increasingly important at one part of the credibility cycle, namely in funding acquisition. Most other 'conversions of credibility', however, remain dominated by considerations of (scientific) quality. Societal relevance is still hardly a significant criterion in peer review of journal contributions, one of the most decisive processes in scientific practice. The shifts observed result in a diversity of cultures of work, with different orientations towards relevance.

Research Identity and Practice in New and Emerging Science and Technology

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Collaboration has become a major pillar for academic research and the perception of its progress. Generally, the practice of knowledge production in academia is in flux due to increasing complexity and costs of research; the move towards applicability in academic research; and the strong emergence of accountability processes. Cross-disciplinary research, especially in new and emergent science and technology (NEST), has emerged as a core approach, with varying integration levels among the participating disciplines (multi/inter/trans). At the same time, the way knowledge and technology production is conducted tends to influence the way research identity is constructed. This identity, more a process of group-referencing than a result of individualisation, is connected to and reflected in research practice and the perception of potential interface points with fellow researchers. Thus, the construction of different dimensions of research identity presents an attempt to accommodate institutional scripts with practical research requirements. In addition, in the context of a "Mode 2 society" (Nowotny et al, 2001), the "co-evolution" of science and society (Schot and Rip, 1997) and the "triple helix" (Etzkowitz and Leydesdorff, 2000), knowledge and technology production - and research collaboration - does not take place in academia alone, but in and between many forms of institutions and societal sectors. Especially in NEST, cross-disciplinary and crossinstitutional research collaborations affect and blur the boundaries between established institutions within and without academia.

The aims of this paper is to contribute to the understanding of change in academia that is reflected in scientists' identity and experiences with collaboration. What meaning does input from the 'real world' outside the laboratory have for scientists? How might this affect their research, the understanding of collaboration and their own identity as researchers? The paper at hand is based on an interpretative-qualitative case study of academic scientists conducting nanoscale research in the North of England.

Multiple-Group Memberships in Knowledge Work

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Science policy and research assessments increasingly emphasize both scientific excellence and societal and economic benefits in the Netherlands. This asks for research strategies and policy conditions promoting the co-evolution of international scientific performance and local valorisation of knowledge production and diffusion in society. The production and flow of knowledge is not an isolated process, as is illustrated by researchers' multiple memberships to various social and professional groups and networks. To gain insight in possibilities to cope with this challenge, we studied individual researchers' connections to multiple groups and networks related to knowledge production and flow.

Firstly, from a qualitative review of the literature on research groups we detected four perspectives on memberships to groups and networks, that we interpreted as research work settings in science and society. These four research work settings are distinguished by two dimensions; 1) the level of formality (formal versus informal organized groups or networks) and 2) the research focus (academic versus practical orientation of groups or networks). Secondly, we conducted semi-structured interviews with 15 researchers from two organisational research groups in the social sciences with a focus on the following research questions: how are memberships to groups and networks of individual researchers configured in the various work settings; what are the personal reasons behind these individual connections; and what are the perceptions of researchers about the relevance of these connections for their knowledge production and valorisation? And finally, how do researchers perceive current policy conditions and measures influencing their networking possibilities? We present results on the multiple memberships of individual researchers, the perceived relevance for their knowledge production and valorisation, policy supports and constraints.

The Games Afoot: Performative Games that British, Danish and USA Crop and Plant Scientists Play

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Since the 1980s, the governments of Organisation for Economic Co-operation and Development (OECD) countries have adopted science and research policies that sanctioned social-and-user-relevance norms in public academic universities or research institutions, which have been studied extensively in science and technology studies (cf. Calvert 2004, 2006; Dresner, 2002; Etzkowitz, 2003a, 2003b; Gibbons et al., 1994; Hellstrom & Jacob, 2005; Jang, 2000; Nowotny, 2001; OECD, 2006; Slaughter & Rhoades, 2005 or Vallas and Kleinman, 2007). In this paper, we extend the existing body of knowledge by engaging with no less than 80 British, Danish and American crop and plant scientists' self-representation and understanding of their practices, and interpreting interviewees "discursive acts and practices, through selected performativity theories. How our interviewees" simultaneously re-

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articulated and constituted traditional academic- norms and self, and social-and-user-relevance norms and self are explored. The 'playing-the-game' notion introduced to us by interviewees is presented, outlining how interviewees appropriate and reconstitute political and industrial routes and spaces. Eight games through which interviewed scientists get places first and quicker - capture how scientists strategically manipulate social, political, and economic desiderata (Godin, 1998) as resources for accessing and attracting their lifeblood: funding. Games are understood as 'social intelligence' or 'situational adjustment', interrogating patterned ways in which interviewees create distance, or excuse behavioural practices that do not appeal to collective and mutually aligned, adjusted, coordinated and productive practices of the subculture of the crop and plant scientists' community. Games real effects are captured too, in particular, how they determine who the winners are and who losers are. Thus, despite the ratification of neo-liberal desiderata in Britain, Denmark and USA as the legitimate 21st-century character and values of academic scientists, interviewees sustain and defend traditional academic norms and notions of the self, even when they appropriate extra-scientific spaces, and try to meet funders' social-and-user relevance demands and expectations.

2.3.17: Understanding Architecture, Accounting Society, II

Architecting Communication:
Cybernetics and Post-War American Design

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Gilles Deleuze in his essay "Post-script to the Control Society" suggests a historic transformation in the relationship between knowledge, power, and space that he frames as a movement from spaces of enclosure to the temporal modulations of a networked system. Such a change, he argues, transforms the nature of space and representation.

And while there are many locations to begin considering this transformation in the nature of both knowledge and the image, one of the most interesting emerges at the locus of science, design, and architecture in the works of Charles and Ray Eames and Gyorgy Kepes for the Center for Advanced Visual Study at MIT and in the interests of science education. In these works the nature of the image, the materiality of vision, and the relationship between documentation and communication was aggressively being rethought. All of these projects were deeply invested in the emergent terms of cybernetics and electronic media. Ontology, documentation, and representation were seemingly replaced by terms of communication, performance, and modularity. The world as interface for the mediation of on-going, lively communicative exchanges. In their work we can find evidence of a more global reformulation of the work of the document, the relationship between abstraction and materiality, and between science, aesthetics, and visuality.

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Dispersing Ideals in Fabric: Building Design and Physical Spaces on Campus at MIT

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My talk is based on fieldwork I conducted as a social anthropologist at the Massachusetts Institute of Technology (MIT) amongst graduate students, staff and faculty at the Computer Science and Artificial Intelligence Laboratory between 2003-2005. It explores concepts, models and discourses that underscore the architectural layout of the labs on the MIT campus. I examine the built environment of my interlocutors and compare and contrast the uses and perceptions of researchers who moved from the building of NE43 to the Stata Center (a newly designed building on the MIT campus designed by Frank Gehry architect). Here, both innovative AI and robotic researchers met innovation in architecture (Gehry is renowned for his unusual architectural projects) and design - and rather than form a happy union - there were many protests about Gehry's building by those first researchers who occupied the space in early 2004. CSAIL researchers reacted to the new building and many expressed hostility at this new setting. I explore building design and ask why CSAIL researchers protested so vigorously at the organization of the Stata design of space. Since the building was first used in early 2004, it has undergone many alterations with users making clearer demarcations in their interior spaces. The internal protests about Stata design came to some as a surprise - as the research done by this diverse group of researchers is conceived of as boundary blurring in other ways, via the creation of relational robots and artificially intelligent machines. My talk will explore, how and why boundaries so contested in the Stata Center amongst these researchers.

Buildings as Quasi-Technologies: Change of Use

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For an analysis of the design, production, and use of buildings in the context of STS, it seems fruitful to me, to ask in which sense buildings can be considered to be technologies. In my paper I would like to show first, that if technologies are defined as strict couplings or as black boxes, then buildings are only partially technologies, or, as I would like to call it: they are "quasi-technologies". The term quasi-technology derives from Michel Serres' concept of "quasi-object", a mixture between a subject and an object. Quasi-technologies, as I define them, are objects that are at some point in time real, normal technologies, but at other points they loose this quality and they are turned from technologies into "mere" masses of materials (and, sometimes, other technologies again). "Quasi-technologies" are not objects that prefigure actions, but objects that are sometimes technologies and sometimes not, depending on who is using them and how. Quasi-technologies depend much less on the pre-programming of designers and inventors than other technologies. Buildings are always quasi-technologies, if only because they are such complex objects on their inside and on their outside, the interface.

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My paper tries to elaborate on this aspect of "quasi-technologies" by looking at different cases of change use of buildings. Change of use is specifically pertinent case for analyzing the quasi-technicality of buildings, because it requires that buildings are thought to be belong to "types" (such as church, museum, parliament etc.) which are believed to be technologies. But then, during the process of change of use, these buildings loose their type and acquire another one. The article analyses the change of use of buildings as a process in which different actors and different types of discourses are involved which render the technicality of buildings different in different steps. The analysis starts with public controversies surrounding specific building types and shows how these are made to be technical or non-technical in public discourse. Further on, it includes zoning laws and monument protection laws as stabilisers of types and therewith of the technicality of buildings, and it shows how zoning law and monument protection deals with change of use. Then it goes on to look into how architects deal with change of use and how change of use is different from other architectural design problems. Last it looks at the use of buildings that undergo change of use and which kind of problems they constitute for users. The article draws in an exploratory way on interviews and ethnographical material from an ongoing study of change of use of mosque and churches in Berlin.

2.3.18: Citizens, Scientists and Consumers

Food, Science, Publics:
Taking Political Consumerism Seriously

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This paper draws attention to food as a site in which a historically particular public formation has emerged. Via an increasing politicization of consumption, people are increasingly 'voting with their forks', thereby blurring the distinction between citizen and consumer. Indeed, some of the most lively debates and policy actions for science and publics have focused around food: first with BSE and subsequently with environmental and health concerns over genetically modified organisms (GMOs). Even though much of the literature surrounding publics and science acknowledges that the very definition of 'publics' is shifting, little attention has been paid to food as a significant arena in which publics are engaging in politically motivated challenges to techno-scientific practices, policies and institutions.

This paper aims to contribute to the public understanding of science by situating food and publics within a broader context of political consumerism. As many scholars have argued, we are witnessing a new global consumer activism that is signaling changes in the very definitions of citizenship, democracy and public engagement. Since the turn in the 1960s towards a politics of the personal (or lifestyle politics), we can no longer draw a clear separation between citizens and consumers, or more generally, between politics and markets. Moreover, the globalization of economic and communications systems have motivated and enabled 'citizen consumers' to make political claims in increasingly international arenas, where broad coalitions of groups use campaigns to press for public accountability in trade regimes, labor practices, human rights, environmental issues and other areas of corporate social responsibility. Since eating is a necessary, quotidian activity, it provides a site of control where individuals can link their efforts with emergent collective concerns. Taking political consumerism seriously means engaging with a definition of 'publics' that is both historically grounded as well as responsive to the shifts in our increasingly globalized, commodified and networked political environments.

Crisis and Collaborations in Drug Production

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In recent years MSF, UAEM, Oxfam, and other medical humanitarian organizations have made visible the problem of 'neglected diseases,' that is, those infectious diseases largely affecting low-income regions that have had no new drugs produced in decades to treat them. With the increasing commercialization of new drug development and production, pharmaceutical companies do not want to expend resources on drugs with limited market potential. The result is a gulf between market logic and patterns of morbidity. Yet now, new relationships are forming transnationally among various nonprofit organizations, biotechnology companies, universities, and pharmaceutical companies to find ways to develop and disseminate drugs intended primarily for low-income populations. These

relationships do not necessarily challenge the primacy of intellectual property rights, but they do sometimes use innovative scientific, marketing, and manufacturing means to create alternative markets for existent drugs or to finance the development of new ones. The diverse assemblage of interests at the center of organizations such as the TB Alliance for example include universities, foundations, pharmaceutical companies, biotechnology firms, contract research organizations, governments, scientists, and trial participants, indicating the complexity involved in getting new drugs researched and developed for a disease primarily affecting the poor, but also pointing to the possibilities for entities like pharmaceutical companies to add their expertise to address diseases they have typically ignored. GlaxoSmithKline and Bayer, for example, have both signed agreements with TB Alliance to 'lend' their scientists and laboratories in an effort to develop new or existing drugs to combat tuberculosis, agreements that stand to gain them little profit. While illustrating Rajan's (2006) suggestion that the pharmaceutical industry is monolithic neither in its philosophy nor its practices, these newer approaches also raise questions about the possibilities as well as limitations of collaborations within a framework of regulation, activism, and high costs of drug production.

Initiating the Commercialization of Biomedical Research in Japan: Implications for University as a Public Domain

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Throughout the last few decades, university-industry research relationships (UIRRs) have been expanding enormously and intensifying. The Bayh-Dole Act of 1980 allowed universities and other types of non-profit research organizations in the US to retain title to their inventions under federally funded research programs. In exchange for that advantage, these institutions were obliged to disclose new inventions, encourage researchers to file patents on their achievements, and attempt to license those inventions to the business sector. As a result, universities have become enthusiastically involved with the commercialization of their research and have begun to seek more financial connections with. The commercialization and privatization of academic works, which S. Slaughter and L. Leslie reprovingly called as "Academic Capitalism," is most obvious in biomedicine, where substantial technical advances, coupled with great demand for new medical technologies, predicted significant commercial potential. Since the early 1990s a heated debate has emerged in the US on the aggravated impacts of UIRRs on academia. For example, industrial sponsors, it is often alleged, tend to press academic researchers to delay or restrict research results so that they can fill out patent applications. More seriously, the licensing of basic research tools has discouraged subsequent scientific investigations. In response to this, R. Cook-Deegan, the author of The Gene Wars, began a campaign for protecting the public domain in academia. S. Krimsky has warned that corporate funding has distorted academic values and scientific integrity. Similarly, D. Blumental, D. Campbell and others have conducted national surveys several times since the late 1980s regarding the impact of UIRRs on the academic medicine, and their results, highlight the importance of the ideas of "trade secrecy" and "conflicts of interests between academia and industry." Sharing parallel concerns with these scholars, we have pursued a cross-national study on the commercialization of biomedicine in the US, EU, and Japan: we interviewed eminent scholars including Nobel laureates and constructed a database of journal articles, newspaper

clippings, and guidelines for UIRRs which universities and hospitals have established. As part of the project, in 2006-2007 we also conducted a survey of 1982 faculty who investigate biomedical research at leading national and private universities in Japan. To allow for the possibility of expanding the survey into a comparative study, the questions largely correspond to those adopted by American scholars like Blumenthal. It is generally accepted that the commercial exploitation of biomedical research has greater impact on Japanese scholars. On the other hand, however, there seems to emerge a recognizable, albeit somewhat clandestine, idiosyncrasy among these researchers. Their mindset toward UIRRs is complicated and ambivalent: the slow pace of UIRRs frustrates them, while they show very strong vigilance to patenting and licensing. Also attitudes are diverse among different groups of scholars including basic and clinical research, genetic research and other biotech-studies. Based on the empirical data we collected, this paper reconsiders the benefits, risks and challenges of initiating "private science" in Japan. In so doing, we would like to spotlight the traditional raison d'être and open-academia norms of universities.

Building Markets for Technoscience:
Should Science be No More Considered a Public Good?

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A new challenge for STS studies is suggested in focusing on the performative role economics is playing in shaping the markets for science itself.

The "new economics of science" has identified a theoretical ground for revising the received view of science as a public good in the diminishing uncertainty and time lag linking scientific knowledge to profitable applications. What STS scholars call "technoscience" - blurring boundaries within continuous processes and networks through which pieces of knowledge and of social practices, action contexts, interests, concerns and meanings, inscriptions and artefacts are drawn together in new configurations - is actually being transformed in the most rich source of exchangeable goods for markets whose regulation becomes the key issue in the design of local, national and international "innovation systems".

Drawing on an important contribution by Michel Callon, where he went on questioning the standard definition of what a "public good" is in economics and reversing the revised stance of the new economics of science & technology about the varying degrees of appropriability and rivalry of technoscientific products, an alternative definition of what may be considered a "public good" is pursued. According to this new definition, technoscience functions either as a commodity or as a public good, depending on the conditions and rules of its production and stucturation and on the ways in which its markets are shaped by normative regulation. Science is a public good when its being a crucial source of diversity and flexibility deploys itself contrasting market driven tendencies to convergence and irreversibility. It is a public good as an unexhausted resources base for the reflexive reproduction of the co-existence of human and non-human environments.

The paper tries to re-conceptualise the technological transfer process from research universities to industry as a process of market building and stabilisation for scientific knowledge and new technological artefacts. Important results obtained by STS studies,

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social studies of finance and of economics performativity over the last years are drawn together in what may be conceived as a new theoretical framework for STS studies on the performativity of economics, finance and law in the modelling of markets for technoscience.

This theoretical framework is then put at work in a field work (in progress, at the moment) following the first moves of a so-called Industrial Liason Office, a network linking together four Italian Universities' Technology Transfer Offices.

2.3.19: Acting with Telecare Technologies, II

Acting with Care? Tales from the Interventionist Trenches in Canadian Telehealth.

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After several years of conducting research within a feminist and action research framework as an academic, I had an opportunity to work more closely with health sector institutions that have been the subject of my change-oriented academic work. I accepted an opportunity to work within the health sector, and spent 3 years as a researcher on a management team in a health care provider agency. After leaving that position, I remained as a senior research scientist within a research centre at the same facility. Over the past 5 years I have been able to develop extensive relationships both within management structures of regional health provider agencies, and with senior decision makers provincially and federally in Canada. Throughout this research-intensive period of my academic life, I have both been able to observe the co-production of science and technology with policy, law and the organization of health care, and I have actively engaged in healthcare technology governance and policy issues.

In this paper, I discuss the approach to interventionist method my research group and I have practiced over the last several years. I begin by identifying the theoretical positions within science, technology and society studies which, combined with insights from feminist and action research, fostered my own interventionist approach. Subsequently, I discuss the challenges of interventionist STS by reflecting on several interventionist projects and activities undertaken by my research group over nearly a decade of research undertaken in relation to computerization of Canada's health sector. Reflecting on a range of projects such as a study of low utilization of a provincial health promotion web site, use of a national health web site which differed from stated policy objectives, several studies concerned with computerization of emergency rooms, a study of computerization of a community clinic, and reflection on our efforts to disseminate results to policy and decision makers, I suggest that acting with science, technology and medicine is akin to co-production of an improvisation routine, where other actors and audience play significant roles as co-producers of science, technology and society projects, often yielding unwitting results.

Learning in Interconnections: Sites of Standardization

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The paper reports from a study of ICT-enabled collaboration between a municipal care team and a team of rehabilitation specialists. Through videoconferencing session these teams sought to exchange competency relevant to working with patients with acquired traumatic brain damage. This pilot project was a learning opportunity for the rehabilitation hospital before this model was "scaled up" and offered to other municipalities. The researcher approached this pilot with the aim of exploring what was implicated in the "intra-actions"

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(Barad, 2007) where the video-conferencing technology enabled different kinds of "knowing-in-practice" (Gherardi and Nicolini, 2002) to meet.

The study sought to address these questions: How was the collaboration configured? Which relationships were performed? What role did the characteristics of technology play in this? Participant observation during the transmissions, alternating between the two sites, as well as interviews with core participants served as data gathering strategies. The paper zooms in on situations where the participants perceived that they needed to develop new insights and practices. Using video-conferencing technology enforced disciplining of the participants' location in time and space, as well as demanded new technical-logistic skills (specific skills in dealing with the technical setup) from the involved individuals. New insights and practices also emerged on a collective or systemic level. For instance, after the first session the participants started to take a short break after each presentation where the microphones on both sides were shut off. This allowed the members of the municipal care team to discuss freely and polish their tentative questions before asking the "experts" on the "other side". Simultaneously, during these breaks the specialists discussed their performances and suggested improvement. This "mic-off" practice is an example of an emerging configuration that mixed "coupled" and "decoupled" ways of using the video-conferencing technology. Taking a practice-based approach the paper focuses on such attempts at configuring the socio-material assemblage. These activities are analyzed as learning; as tentative designs of new collaboration forms and routines, moving through temporary stages of stabilization and standardization.

Thus the study contributes to the stream of research with a practice-oriented, performative basis, and offers an exploration that focuses on how learning in co-production of socio-material configurations are related to the interconnectedness of the whole assemblage, as well as the diversity of practices and interests (Antonacopoulou, 2006).

Good Nursing at a Distance. Can it Be Done?

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Nurses using telecare worry that this caring at a distance is not 'as good' as the care they would be able to provide when they would actually be present. They fear that 'not being present' would take the heart out of their work. Meanwhile, in the literature attention is focussed on the destiny of patients in the practices of telecare, whereas the role of professionals is relatively neglected.

In this paper I will study 'nursing in action', as it is shaped in daily care practices using telecare devices, and ask if and why this could be called 'good nursing'. I will work through some practical examples from our ethnographic research, in order to see how 'good nursing' is at stake for the nurses in their actual dealings with telecare technologies. The following questions will be adressed: How do nurses deal with the fact that they are not physically present when caring for a patient? Do they see this alternative as 'good nursing' and in what sense? What alternative ways of caring for patients do the telecare devices help bringing into being? Are there reasons for concern?

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The research develops the concern for normativities and the political or ethical role of STS research. First, by studying the way responsibilities and expertise are re-shuffled in health care practices by using medical technologies in the home. How do these new healthcare practices incorporate new norms, ideals and definitions of goodness? Second, one might ask in what ways STS researchers may deal with the normativity of their own research. In what ways may we (want to) intervene in the practices we study?

Technology and 'Good' Dementia Care

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What is the "role" of technology in everyday dementia care, and how does technology contribute to "good" care? These are the two leading questions that I will address in this paper. In relation to STS-literature, my contribution is first of all studies of care-practices and technology in practice, rather than design/technological development and innovation.

Drawing on theoretical tools and resources from STS, as well as empirical data from studies of dementia care practices, the aim is to show that dementia care can be understood as a process of trying out different "care-arrangements". These "care-arrangements" are techno-social in the sense that they involve different constellations of humans and technologies. The argument I develop is that the carers work to achive "good" care by constantly attuning the different variables to each other in an ongoing process. This is a creative and highly unpredictable process, as it involves trials and errors as well as endless work of monitoring, observation and fine-tuning.

But what makes a "good" (or "less good") care-arrangement? Through different case-studies of "fall-prevention", I will show that all care-arrangements involve both limiting and enabling aspects. The process of trying out different care-arrangements is hence also a way of weighing and balancing "goods" and "bads". This is however not a rational process of choosing between different clearly defined alternatives, but a process of creatively attuning to the task at hand. An important point is that it is the specific configurations of the arrangements that enact the different "goods" and "bads". Whether or not an arrangement is "good" is hence not given, but has to be decided in context.

This study is based on ethnographic fieldwork in four different group homes for people with dementia over a period of more than a year. The fieldwork consisted of participant observation as well as structured- and non-structured interviews different actors. Also an extensive literature-analysis has been conducted as a part of the project.

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Modest Witnesses. Acting with Technology, Users and Industry in Assessing User Requirements for The PERSONA Program in Ambient Assisted Living.

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Health Services in Norway are 90% publicly funded and there is a strong political drive to change the practical production of services by introducing telemedicine, telehealthcare and electronic communication, implying a stronger emphasis on low level and home care. Changes are expected to increase the effectiveness and quality of services and promote health outcome through co-operation and combinations of self care, patient organisation resources, social networks and health care professions at different levels. The ultimate objective is to create relevant services for enrolled patients and at the same time relieve the increasing pressure on health services. A dilemma emerges, as health services simultaneously are growing markets for ICT's and also growing businesses, which impose ever broader definitions of illness in order to enhance production.

When introducing communication channels and co-operation, different interests, values and resources are mobilised and made visible for each other. The ICT R&D sector argues that an amount of experimental pilots has to be conducted in order to assess good use of ICT's in different settings, the ICT industry promotes use for business purposes, established and emerging new professions are struggling for influence and positions along with the processes. The development is also of great importance to actors in the pharmaceutical industry and to patients that are expected to self-check, seek necessary help for illness, avoid excess consumption of health services and promote healthy behaviour. Telemedicine could coordinate self care, voluntary care, private and governmental services, as well as mediate responsibilities, tasks and benefits in order to obtain goals of effectiveness and relevance. Interaction thus prepares for both tensions and possibilities. In this complex situation, scientists are enrolled by governmental institutions to produce relevant knowledge of the benefits and pitfalls of the emerging health care networks, as well as how to govern the development.

Through a methodology of enactments (Law) we investigated different emerging telemediated healthcare networks and the ways in which responsibility and relevance were enacted and delimited. Cases included 1. "The interpretation assistant"; a teleradiology and multimedia service for multiple-site hospital cooperation on advanced neuroradiology for acute stroke diagnostics. 2. Teledermatology between GP-practices and a University Hospital and 3. Test pilots for ambient assisted living for elderly at home.

The paper reflects on emerging and manifest challenges concerning methodology and knowledge claims that emerged while acting with these cases and on behalf of a policy agency. The resources present in Donna Haraway's notion of situated knowledges and the concept of the modest witness are sensitizing concepts for the reflections: Historical contingency for knowledge claims and knowing subjects, the semiotic technologies used to make meanings and the way the researcher commit to accounts of a real world that can be partly shared. We aim at presenting examples to further elaborate these concepts.

2.3.20: Rethinking the Science / Policy Nexus

Scientific Advice and Public Policy:
Boundary Workers' Perspectives

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This article, based on interviews with 22 boundary workers in a Q-method research design, empirically explores the little researched question of how boundary workers between science and politics/policymaking think about their own jobs; and especially, about dealing with important tensions between these two institutional spheres. The respondents were all involved with science advice to Dutch public policy. Several of them were involved with the advisory organisations studied in the other research projects of the programme Rethinking Political Judgment And Science-Based Expertise: Boundary Work At The Science/Politics Nexus Of Dutch Knowledge Institutes.

The research finds considerable variety and diversity among discourses on their own jobs of boundary workers of several major Dutch institutes for science-based policy advice. Except for enlightenment, all types of boundary arrangements/work in the Wittrock-typology (1991) do occur. 'Divergers' experience a gap between science and politics/policymaking; and it is their self-evident task to act as a bridge. They spread over four discourses: 'rational facilitators', 'knowledge brokers', 'megapolicy strategists', and 'policy analysts'. Others aspire to 'convergence'; they believe science and politics ought to be natural allies in preparing collective decisions. But 'policy advisors' excepted, 'postnormalists' and 'deliberative proceduralists' find this very hard to achieve.

These various repertoires to understand science/policy boundaries show a variety of task conceptions of advisors. These repertoires seem to be clustered in different parts of the advisory sector and/or policy sector. For example, the post-normalist repertoire can be found particularly in environmental advice, while the 'megapolicy strategists' were found in general and strategic advice to government policy. The range and variety itself seems to confirm the range described in Wittrock's typology.

Environmental Ideologies: the Political Role of
the Netherlands Environmental Assessment Agency

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In this paper we will present the implicit 'policy ideology' of MNP, the Netherlands Environmental Assessment Agency. MNP is an organisation that provides policy-relevant information on the environment to the Dutch government, as one of the crucial 'planning bureaus' that provide crucial functions in Dutch policy as sources of authoritative knowledge. We will elucidate how institutional practices, scientific methods, and other boundary work activities manifest implicit ideas about which goals policy can pressumably achieve; what criteria policies have to fulfill in order to achieve these goals; what the role of expertise knowledge can and should be in such policies; what kinds of knowledge is scientifically valid;

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and finally, what these ideas mean for the understanding of MNPs own role. These ideas will be distilled from a number of MNPs practices, most notably the environmental problem of particulate matter and the calculation of election manifestoes. The task conception of these science-based advisers therefore extends well beyond the provision of instrumental data or reviews of existing research. In stead, the advisers structure problems as well as policy options, based on strong convictions of what their role in environmental policy should be.

Our analysis shows that the policy ideology of MNP is, as all ideologies, characterised by both inconsistency and stability that, on the one hand, enables MNP to react in a flexible way to new political and environmental challenges, and, on the other hand, maintain the perception of a coherent identity. Overall, this has assisted MNP to build and maintain its prominent position in the advisory sector.

What Ecological Networks and Market Based Health Programs have in Common: Discussing the Role of Scientific Models in Dutch Policy Making

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In this article we discuss the roles and performativity of (computer) models in policy making. Whereas earlier studies focused on the role of models between disciplines, models play an increasingly important role in the realm of policy making and often cannot and should not be seen in isolation from policy and the influence of policy makers: their influence on or non-influence on for example model parameters is important for the further process. We look closely at the interaction between science and policy - boundary work-. By comparing two partly contrasting cases/models, we investigate the differences and similarities in the performativity of models in the interaction of science and policy making.

Performativity as discussed by Callon or MacKenzie and other tries to gasp and interpret the interaction between models (making) and the complex context in which (computer) models are developed and used. It emphasizes the role of available knowledge or science, policy makers, experts, data sources, political desirability of certain model outcomes and policy messages, and so on. Our central questions are therefore: how do scientific models for policy making come about? What is the performativity of such models in the narrow and wider context of the models? To what consequences? And, what would provide a workable science and policy interaction for other countries?

The models we have studied were developed by health economists and ecologists in the context of Dutch policy advice. The research projects were part of the Rethinking Political Judgment And Science-Based Expertise: Boundary Work At The Science/Politics Nexus Of Dutch Knowledge Institutes.

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Boundary Work as Policy Strategy: an Explorative Study of the Role of Social Scientists in Immigrant Policy-Making in the Netherlands, France, and Great Britain

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Immigrant integration has become an intractable policy controversy in most West-European countries by now. Yet, there are important differences in how immigrant integration is defined and understood in various countries and what institutional settings have been created for coping with this social problem. This also involves very different sorts of policy involvement of social researchers and also different national traditions of social research on immigrant integration. For instance, whereas in Great-Britain there has been a long tradition of close policy-involvement of the sociology of race ('the race-relations industry'), in France the boundaries between science and politics appear to have been much sharper in spite of a strong presence in public debate of researchers with a more philosophical background. Such differences also seem to affect how immigrant integration is 'framed' in the policy field, with a more multiculturalist perspective emerging in Great Britain and a more assimilationist perspective emerging in France.

This paper explores how different ways of constituting research-policy relations in the field of immigrant integration have affected the framing of this social problem in policy as well as research in the Netherlands, France and Great-Britain. Following the sociologist Gusfield (1981), I will explore the relation between the 'structure' and the 'culture' of immigrant integration as a social problem. Using the theoretical notion of 'boundary work' (Gieryn, 1999, Jasanoff, 1995), I will analyse how research and policy actors have constructed their mutual relations: how where science-policy boundaries constituted, and why? Furthermore, using the notion of 'problem framing' (Schön and Rein, 1994), I will analyse how these structures of science-policy relations have affected the framing of immigrant integration in policy-making as well as scientific research. First, an in-depth analysis will be made, based on interviews and documents study, of boundary work practices and research-policy relations in the domain of immigrant integration in the Netherlands. From this in-depth case, patterns will be derived of the relation between science-policy boundaries and frames of immigrant integration in policy and research. Subsequently, explorative case-studies will be made of two other countries, France and Great-Britain, based on analysis of secondary literature (and possibly interviews). Through pattern matching, I will test to what extent the patterns found in the Dutch case can be found in the other countries as well.

Uncertainty Heuristics in Dutch Advice to Economic and Environmental Policy

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As many policy decisions are being made on the base of actually uncertain scientific findings, dealing with uncertainty is a very "hot" topic to explore. Many scholars have classified

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uncertainties, made typologies, and formulated possible solutions. However, in looking at what uncertainty heuristics are applied in practice, a striking observation becomes clear. There seems to be a contrast between what advisory government agencies say or want to cope with uncertainty, and how they actually do this. Rather than to apply promising methods with a frame-reflecting approach or to approach uncertainty with a highly scientific incline, these agencies actually employ the same meta-heuristics. Instead of managing uncertainty in a way that corresponds to their vision and their task in the policy making process, they both deal with uncertainty in a -very human- fast and frugal way. Concisely, a contrast exists between the uncertainty discourses of advisory bodies and the actual uncertainty management.

2.3.21: Tracking the Human: Technologies of Collecting, Ordering and Comparing, or the Problem of Relevant Knowledge

Unmet Medical Needs
- Concepts and Realities in the Rational Drug Design

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Both, the drug development strategies as well as the conception of health have changed considerably during the last century. The former change manifested through the advances in the informatics, chemistry and biology in a shift from a "trial-and-error" to a "rational drug design approach". Computer-aided molecular design proposed a rational approach in drug development, which in concept comes close to Nobel Laureate Paul Ehrlich's early 20th Century vision of the "personal pill" (1901). As today, a ligand can be designed to fit and bind strongly to the 3D shape of the protein's active or binding side and as such influences its target specifically. Nevertheless, in practice just a couple of these drugs reached the market. While the pharmaceutical industry faces steadily growing research expenses, it achieves a reciprocally proportional number of market launches. Consequently, in the search for alternatives the focus shifts slowly back on "drugs with a rich pharmacology", or as they were pejoratively called "dirty drugs" - as opposed to the rationally developed "clean drugs". The former actually represent the overwhelming part of known drugs.

Lack-of-efficiency, next to toxicity, is regarded as the main reason for failure of rationally designed drugs in medical trials. Does therefore the lack-of-efficiency represent a lack-of-causality in the conception of diseases in phenomenological and molecular terms? How can a reductionist linear model be applied to a non-linear dynamic system? Which is the relevant level of comprehension? Isn't a system exposed to a drug different from the system alone?

New initiatives in the integrative system biology, as the Swiss System-X, are expected to tackle such questions. The latter change lays in the comprehension of health, which can be summarized in a transition from pathogenesis to salutogenesis. This manifests through an increased demand of products and services of complimentary medicine as well as of prevention (functional food). Thus it may be argued that the altered definition of disease and health influences the use and range of a pharmaceutical product. The definition of health, the consequences of the demographic trend (older population) and the "diseases of civilisation" (obesity) influence the medical demand and the "unmet medical needs" respectively. What is needed and what is demanded in this changing framework? How are these needs established (consumer vs. producer)?

The aim of the study is to track the concepts of biological systems applied at various levels of the drug development process, as there are amongst others software engineers of drug design applications, pharmacologists and research officers in the industry. Through interviews and field studies a broad fundament is to be established addressing the relation of theoretical concepts and practical acting. This basis of evidence is to be used to sensitize these actors concerning their now hypothesized conceptual shortcomings.

At the current early stage this paper intends to discuss the research project itself rather than results.

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In Defence of a Human Brain?
The Analysis of a Paradigm Shift in Neurobiological Research.

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primate brain, once established during development, would leave little space and opportunity for the addition of novel neuronal cells later in life. In the recent past however, there has been an increasing recognition of the cellular plasticity of the adult primate brain. The extent to which brain circuitry might be modified by experience and the quality of these changes is an area of intense research activity in neurobiology. For this presentation the investigations on the de novo generation of neurons (neurogenesis) have been chosen as an instructive example to study the changes in the understanding of the primate brain. Based on a series of interviews with experts in neurobiological research and a complementary survey of the scientific literature, it is being investigated in which ways the occurrences of neurogenesis in the mature brain, after either being neglected or even overtly rejected for almost a century, have been gaining validity. This analysis should help to explain how the long cherished assumption of cellular immutability has been abolished in favor of a more dynamic understanding of the adult brain. From an analytical point of view this study will explore if, and in which ways, the altered understanding of neurogenesis amounts to a paradigm shift in neurobiological research. Thereby, neurobiological research is not regarded as an isolated activity. In contrast the project aims to situate the altered scientific understanding of the primate brain in a broader societal context. Therefore the factors within biological research in general, but also social changes, which might have favored a modified scientific understanding of the primate brain, will be integrated into the analysis. In this context it will be discussed to which extent the changes in the understanding of plasticity might reflect a change in the understanding of the human brain and its unique position in evolution.

Changing Collecting Practices of Biological Materials:
Keeping Track of the Shift from
Phenotype to Genotype (1940-today)

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The phenotype of whole organisms and their morphology, the corporeal characteristics like body height, hair, eye color, have lost their prominence in biological research. Over a couple of decades the interests have moved towards the molecular level of living beings. Thus the skins, skeletons, birds, reptiles, embryos on show in natural history museums, have lost much of their scientific significance. At the same time researchers in the biomedical sciences increasingly gathered biological tissues, biochemical components, proteins, nucleic acids and thus changed the style of science collections.

On the background of the fundamental changes taking place in the biological sciences since at least the second half of the 20th century, the talk will be focusing the collections of biological materials that have been part of these shifts. Unlike other current historical

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research on the life sciences it is less interested in the actors and institutions but in the methodological and practical contiguities yielding a new goal: The biological research has increasingly been dedicated to improving knowledge about the human body and thus to contributing to the enhancement of the quality of life.

The novel compilations of biological materials were accompanied by the creation of specific societal hopes concerning human lives, striving to connect the scientific analyses with medical diagnostics and treatments yet to be developed. However, it was this sort of living, but fading objects that exactly triggered a re-organization of the collections of natural materials as they are sought to bring together with the search for useful compounds in the biomedical and the life sciences.

For this paper, the history of biological materials collections will lead us back to the Serological Museum, founded by Alan Boyden at Rutgers University, N.Y., towards the end of the 1940ies. Boyden was a pioneer in preserving tissues and making them accessible for molecular analyses. Whether and in which way Boyden was successful in building up this "world centre for the study of comparative serology" (Boyden, 1953, 58), will be a starting point of analysis. The traces left behind by actors involved in this undertaking (the Serological Bulletin for example) and the studies founded upon the data gathered in this museum, will allow delving into the transition period contributing to the changes in the biomedical sciences.

Although the serologists' insights on the human body differ widely from the results in molecular biology and genomics today, I will argue that on one side the ways how the materials were collected and handled did not differ so strongly to methodologies of current days as we would expect and I will reflect on the other side how the material aspects of gaining insights into the human body have lead to problems research in the life sciences still is facing today. Conference proceedings, manuals, interviews with scientists, and an inspection of some of the collections themselves will help to pick up some of the information leading up to the assemblages of the materials of the living beings as they are accomplished today.

"Culture and Personality" - Genesis and Development of an Interdisciplinary Research Field in US-American Social Science

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This historical paper analyses the rise of "culture and personality studies", a prominent field of knowledge and research within the social sciences of mid-20th century USA. Originating in epistemic and institutional attempts to connect psychiatry and the social sciences more closely, "culture and personality" emerged during the interwar years as an interdisciplinary and comprehensive program to track how specific forms of culture coined human behavior patterns. Under its headings figured influential and far-reaching studies by Ruth Benedict, Erik Erikson, Erich Fromm, Margaret Mead, and Edward Sapir - to name just a few of the most famous exponents.

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Without doubt, the fundamental questions "culture and personality" aimed at answering were not novel ones. In terms of history and sociology of scientific knowledge. It therefore appears promising to ask, what actually made this successful field appear so innovative.

In their search for cultural patterns, personality types and national characters, researchers involved with "culture and personality" collected data in western and non-western societies to integrate their case studies comparatively into a psychological anthropology. They embraced and debated a multitude of theories and methods from all disciplines dealing with human nature and human relations. Correspondingly their audiences and supporters covered a wide and varying spectrum. In order to secure funding for their research over time, leaders in the field allied with private foundations and governmental agencies, providing a broad range of expertise for example on juvenile delinquency, on gender and sexuality, or on morale.

The proposed presentation focuses on the identity, organization and alimentation of a field in the making, and it relates the knowledge producing strategies and the practices of researchers and funding agencies to developments in the social, cultural and political regimes of the USA.

2.3.22: Representing the Self: Bodies, Identity and Truth

Representing the Self: the Surveillant Identity

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The surveillance society is an increasingly well documented theoretical position, and has been elucidated by authors across many disciplines. However, surveillance has been too frequently theorised under Foucauldian concepts, though new approaches are gaining momentum. A further problem lies in the dominance of analysis of particular technologies, such as CCTV. This presentation will move away from these, perhaps stultifying, themes and asks: what is the truth of identity in the digital age and the surveillance society? This presentation proceeds by utilising the theoretical position that there are various competing understandings of identity and that surveillance practices operate with a specific operational understanding of identity. It contends that anti-essentialist and subjectivity accounts of identity have gained theoretical support. However it argues that contrary to this, across a number of discourses, including those of government, the media, and the banking and finance industry, a fundamentally essentialist understanding of 'identity' as relations with structured society, has become the dominant conception. The presentation suggests that this identity is mediated through the massive collection and processing of personal data that is so characteristic of contemporary surveillance practices.

This paper, the product of the author's PhD research, draws upon discourse theory, governmentality and textual analysis to examine the structure of this articulation of identity and examine some of its consequences for social and political life. One such example of the consequences regards how difficult it may be to contest or resist attributed identities that are the product of technological processes. The paper asks: is it problematic if these identities are constructed as authoritative despite the insecurity and inaccuracy of the data upon which they are predicated?

Capturing the Lie: the Polygraph and Grotesque Knowledge

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This paper traces the intriguing attempt that has been made to render one of the most elusive of social acts the lie as a knowable entity culminating in the development of the polygraph in the 1920s. The transformation of the lie into a measurable entity has been crucially dependent upon the identity of the liar whose lies are meant to be detected. In other words, the development of the polygraph examination has relied upon two interrelated complexes: on one side the constellation of scientific disciplines (experimental psychology, criminology, and forensic science); and on the other side a configuration of institutions of social control.

The paper shows how the polygraph examination has come to operate as a switch-point between psychological knowledge and systems of social control. As the logic of the latter moves from reform to increased containment and control the polygraph examination is

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transformed from a confessional technique mediating the efficient processing of a delinquent population from the 1920s, to a disciplinary technique controlling employee behaviour from the 1930s. In recent years it has become a truth facilitator in the management and containment of the monstrous individual: the sex offender. The polygraph examination has remained continually contested and the efforts at scientifically capturing the lie have continued. In its 100-year journey the lie has thus travelled from being a treacherous word, a sign that can be read in the bodys viscera to most recently being identified as a minute electrical fluctuation in the brain. On the basis of an historical critique, the paper concludes that the polygraph examination as well as most recent efforts at detecting the lie in the brain can be understood according to Foucaults notion of grotesque knowledge - they are marked by the maximisation of effects of power which are accompanied by their simultaneous disqualification. As a result, the paper demonstrates the significance of historical critique in sociological engagements with current techniques of knowledge production and intervention.

fMR-Eye: are Brain Imaging Technologies being Connected to the Surveillant Apparatus

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Surveillance studies has historically been critical in its approach to technologies and, on occasion, has been highly technologically determinist. More recent scholarship in the discipline, such as that utilising Deleuze and Guattari's concept of the rhizome, analyses surveillance technologies in a way that allows their description as both oppressive and resistible. This approach posits the key feature of contemporary surveillance to be the networking of previously unconnected elements for the prediction of behaviour.

This new direction opens up STS and surveillance studies to find mutual benefit. The contention is that STS provides a useful interdisciplinary approach for analysing technologies, their embedded practices, and coproduction; surveillance studies claims to offer more in terms of grappling with macro social structures in which these technologies are deployed.

Functional magnetic resonance imaging (fMRI) has been one technological means by which neuroscience has proliferated its fields of enquiry over the past decade. One new outgrowth is that of fMRI lie detection, an application developing in the UK and USA. New companies are promoting the technique for use as evidence in courts; others proclaim it to be a novel and powerful solider in the war on terror; generally it claims to read the mind for guilty knowledge.

This presentation will give an overview of the concept 'rhizome', and indicate parallels in STS, and will give outline how lie detection technologies presently form part of surveillance networks. It will ask if STS could benefit from investigating this concept and presents empirical data from discourse analysis of scientific research, policy documents, HANSARD debates etc. and interviews with UK scientists involved in fMRI lie detection. It suggests that the discourse supporting the technology posits it as capable of objectively exposing the lie in the brain. However, the surveillance implications of the technology are being pushed to the fringes of the science discourse, which serves to conceal the coproduction of this field and its

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objects of study. It shows how funding priorities, political tropes and social taboos encourage the construction of the brain-based lie. The construction utilises a medicalisation and neuralisation strategy such that the lie becomes a natural object of study, amenable to the objective, scientific gaze. Using the concept of 'boundary object' the presentation treats the neuro-lie as such and argues that it enables translation of fMRI images from the lab to other spaces. It contends that if the fMRI machine is connected to the surveillant apparatus, at first, perhaps, to monitor dangerous persons, it will bring with it embedded conceptions that may render its representation of the individual difficult to resist. This conception of the lie represents another way in which the neuralisation of society is proceeding.

The paper will conclude with a brief analysis of the Channel 4 documentary 'Lie Lab' to demonstrate how guilty identities are ascribed to individuals using brain images and how those featured in the documentary accept or resist these ascriptions.

3.1.2: Lost (and Found) in Transnationalism

From Health Travel To Health Tourism: a Discursive Analysis

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While still a nascent industry, "medical tourism" represents an increasingly popular alternative for medical care and an expanding motivation for the economic and political restructuring of healthcare resources in some developing nations. Nevertheless it remains a largely undocumented practice. The term "Medical tourism" defines a specific transnational institution, referring to an industry with components spread across wide gulfs of distance and culture, and thus presents new challenges for analysis. The ongoing process of formation and definitional construction has implications for those who will directly be future participants and for those indirectly affected by the structural changes it contributes to.

I analyze the contemporary discourse of "medical tourism" to understand its constituent institutions and practices, the effect of its formation on preexisting systems and conceptions of healthcare, and its distinction from earlier discourses of "health travel." Through discursive analysis I inquire into medical tourism as a site marked by liminal tensions, between multi-local discourse and locally situated practices, multiple definitions of the industry, justifications constructed as individual choice and as an economically necessary alternative to national healthcare, and in power relations between destination countries (largely in the Nonwestern developing world) and departure countries (Richer, Western nations). Medical tourism offers STS a fertile new system of relations between multiple cultures and biomedical/technoscience knowledge(s) and practice(s) that constitute new liminal interactions and offers an ideal site for observations about conflicts and negotiations that arise.

Looking at the notional industry as a network of new relationships currently under construction as participants negotiate these tensions, I focus on the discursive shift between historical "health travel" (i.e. relocation for the treatment of TB, or to access a natural bathes) to the re-inscription of "medical tourism" in its current form of institutional discourse today. Examining media and textual representations as evidence of differing conceptions of patients and the complex dynamic of agency and empowerment as this new form intersects with ongoing tensions around healthcare access, individual choice and expertise.

Becoming Empowered and Confused:
Discourses Surrounding Medicalization of Menopause in Turkey

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One of the recent discussions in the field of feminist technoscience studies is how to go beyond the analyses of gender performed mostly in the Western settings, and including other salient categories of analysis like race, class, ethnicity, sexuality, or ability. Paying more attention to non-Western contexts and the interactions between national borders is also of importance for a more sophisticated analysis.Transnational feminist studies of science and

technology is an attempt to answer this need to focus on the interactions between gender, globalization, and technoscientific practices. In this juncture, gendered biomedical technologies and the discourses surrounding them provide an important subject of research for contributing to the discussions of the co-construction of users and technologies (Oudshoorn 1999), and furthering this discussion to the ways this co-construction occurs in settings where the technologies are transferred.

By centering on the contentious technology of hormone replacement therapy (HRT) as a case study, this paper aims to discuss transferring of the dominant Western medical discourses on risk, aging, and empowered/informed consumer -which are co-constructed with the technology itself - into a non-Western context. The focus of this paper will be medicalization of menopause in Turkey through an analysis of the concepts like the risk of osteoporosis, anti-aging, and awareness about menopause. Some of the relavant questions for this analysis are: How and where these discourses are produced? How do they travel and how they are adopted or rejected by women, who are the end-users of HRT? What does it mean to be empowered at the face of controversial medical information? What is the role of responsibility in deciding on potentially risky situations of taking or rejecting HRT?

The empirical base of the paper draws on ethnographic research done in Istanbul, Turkey between June 2006 and March 2007, which involved participant observation in gynecology clinics, and interviews with clinicians and menopausal women; and supplemented by archival research on the presentations of menopause and HRT in the Turkish media between 1999 and 2006. Excerpts from interviews and news stories will follow the discussions of the perception and presentation of risk, construction of the neoliberal ideal of the empowered healthcare consumer and criticisms of the concept of successful aging, as examples of the reconstruction of these discourses in the Turkish context.

Oudshoorn, Nelly. 1999. On Masculinities, Technologies, and Pain: The Testing of Male Contraceptives in the Clinic and the Media. Science, Technology, and Human Values 24 (2):265-289.

From the Brain Drain to the Global Indian: Shifting Understandings around the Emigration of Indian Scientists and Engineers

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The departure of "skilled" professionals - usually scientists, engineers, and health-care professionals - has been of great concern in many parts of the world. Historically, the emigration of scientists and engineers from a nation has been framed in terms of the "brain drain." The notion of the brain drain signifies the loss of a nation's valuable manpower and the resources invested in training it, to other countries; and it has often been deployed as a reason for the lack of indigenous development.

In India, as in much of the South Asian peninsula, the brain drain was a cause of significant concern during the decade of the 60s and 70s. While the state never took strong measures to check emigration itself, policies to utilize its scientific personnel in different ways (such as creating visiting positions) were formulated. The concern over the brain drain also

3.1.2: Lost (and Found) in Transnationalism

occasioned a few trans-national conferences among various South Asian nations to jointly address the issue.

Yet, the discourse of the brain drain has all but disappeared today in both, official and public imaginaries, in spite of an exponential growth in the number of the skilled Indian emigrants. Instead, discourses celebrating the "Global Indian" can be witnessed in both, official discourses, and the popular press. Members of the diaspora now become "Overseas Indians," and India itself is recast as the "land of their ancestors." (PBD 07) The emergence of this discourse has also been accompanied by material-institutional changes such as the organization of the state-sponsored Pravasi Bharatiya Divas (The day of the traveling Indian) - an annual conference that seeks to connect with the Indian diaspora and address issues of mutual interest, a movement towards establishing dual citizenship rights, and establishing mechanisms for leveraging diasporic investments towards developmental projects.

What happened? How can we understand the discursive shift from one lamenting the brain drain to one celebrating the global Indian? What social, cultural, and political-economic changes underwrite this shift? This paper seeks to address these questions by analyzing the shifting discourses around the emigration of Indian scientists and engineers. It will draw on official publications and representations in the popular media to locate this shift.

Proceedings & Pravasi Bharatiya Divas 2007. Feb 1, 2008 [cited; Available electronically from http://www.pbd2007.org/live_pbd/photogallery/more_images/proceeding.pdf.

Environmental Struggles in a Transnational Economy: a Critical Analysis of NAFTA's Impact on US-Canadian Water Politics

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The proliferation of diverse global networks has drastically reorganized the character of ecological relations in and between national borders. This paper will examine questions regarding the ownership, rights and entitlements to water - the ultimate fugitive resource that both transcends and is transcended by national borders. For example, as a Cree community in Kashechewan, Ontario struggles to find safe potable supplies, the Nestle Corporation is permitted to profit from the withdrawal of up 250,000 gallons per day from Lake Michigan. These and other political ecologies tie together social processes, hierarchies, and life-worlds that cannot be understood outside of the larger institutional relations in which they are embedded. In North America, the North American Free Trade Agreement (NAFTA) has been the primary legislative vehicle to liberate and govern the transnationalism of diverse water networks between Canada, the United States, and Mexico. This paper will examine the impact of NAFTA on contemporary transnational water issues that transcend and subsequently challenge US-Canadian political ecology.

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Weaving Culture into the Transnational Web of Science

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The contemporary practice of science involves scientific communication and exchange networks that cut across national boundaries, a worldwide system of journals, organizations, and conferences, and transnational interpersonal and institutional ties. In this paper, I describe science from a transnational perspective as a process of cultural traversals occurring between local discourses and practices. Such traversals create "new networks, new couplings, connections and interdependencies" and an enlarged repertoire of possibilities for practice and meaning-making (Lemke, 2002). From this vantage point, the standardization of scientific language and methods is reconstituted as a continuing, dynamic process that challenges the universality of science even as it enables the transnational practice of scientific inquiry.

The most advanced centers for social robotics research, along with the potential markets for its products, can be found in locations as culturally diverse as the U.S. and Japan. The influence of cultural values and assumptions is apparent in the practices and discussions of social roboticists in the lab. For example, when roboticists consider how to apply their scientific as well as tacit knowledge of sociality to the design of robots, choices are often drawn from their personal experience rather than hard logic. These factors get masked in publications through standardization of research language, problems, and practices within the transnational scientific community. While acting as a resource for facilitating cross-cultural collaboration between researchers through the "culturally neutral" exchange of research results, frameworks, methods, and people, standardization is a transcultural process allowing for negotiation and hybridization between multiple cultural practices and imaginaries.

The transnational practice of social robotics is also a process of constructing "future imaginaries" (Fujimura, 2003)-cultural narratives about human behavior, cognition, and life in technologically mediated societies. Social robotics, constructed through the interplay of global, local and disciplinary cultures, opens up possibilities for critical work and the remaking of science in a direction that challenges technological determinism and puts increased emphasis on socially responsive and responsible technological designs. A "transcultural turn" in STS calls attention to the decentering of science (Traweek, 2000) through the integration of approaches, values, and practices from non-Western as well as Western countries. In the case of robotics, this is visible in Japan's placement at the vanguard of "robot culture." I discuss how the differences between Japanese and U.S. foci and practices in robotics show the possibility of alternative constructions of robots and emphasize responsibilities for technological choice.

In order to gain a broad understanding of the transnational networks in social robotics, I use organizational and social network data (Carley 2007; Shrum, et al. 2007) from collaborations, publications, and conference proceedings in social robotics. Social network projections of the community are built using citation data, records of extended research visits or exchanges of personnel, and collaboration on the organization of conferences and workshops. The quantitative results are combined with qualitative data from two years of participatory observation and interviews conducted with social roboticists in Japan and the U.S.

3.1.3: Governing Multiple Tissue Economies? Exploring the Practices and Policies Shaping the Uses of Human Tissues and Cells in the European Union.

Spanish Position on the Globalisation of Tissue Economy

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Trends towards the globalisation of science and emerging "tissue economies" do not seem to be matched by the culturally determined and self-directed policies of individual member states in Europe. Within the EU, there remains considerable uncertainty around key harmonisation features to promote exchange of human tissue and cells. Standardisation attempts such as EU Tissue Directive reveal many inner contradictions, in particular, tensions between private and public modes of governance.

As a matter of principle, the Directive endeavours tissue and cell application programmes to be founded on the philosophy of "voluntary and unpaid donation, anonymity of both donor and recipient, altruism of the donor and solidarity between donor and recipient" (EU Tissue Directive C 18). Member States are urged to take steps to encourage a strong public and non profit sector involvement in the provision of tissue and cell application services and in related research and development.

Where the cultural context is sympathetic, as in Spain, proud to be the world leader in organ donations, the state has implemented the Directive relaying on a gift relationship model and private-public collaboration. Principles of anonymity, solidarity and altruism, which characterize the Spanish transplant model, are also invoked for tissue donation. This paper attempts to delineate the main tenets of Spanish implementation of the Tissue Directive, which, arguably constitute the "ideal" model traced by the Directive. But it also highlights the difficulties and conflicts that the application of this pattern has already revealed, as for example, in the governance of oocyte donation and private cord blood baking.

Private Cord Blood Stem Cell Banking in the UK: Consumer Enterprise in a Global Tissue Economy?

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Stem cells are the subject of intense scientific, commercial, clinical, patient, and consumer interest, and seen by some as holding the promise of future regenerative therapies. Amongst these promissory tissues are the stem cells from umbilical cord blood, collected during or after birth and stored or 'banked'.

Taking inspiration from, amongst others, Charis Thompson's ethnographic work and emphasis on the importance of 'private implication' in new (reproductive) technologies (Thompson, 2004), this paper draws on interviews with parents in the UK who have some stake or interest in cord blood banking. These interviews were conducted with parents with varying experiences of or relationships to cord blood banking, including some who have deposited or 'banked' cord blood cells privately.

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Whilst the style of individual consumerism depicted by the advertising of these services is the subject of considerable criticism, this novel form of cell banking can also be seen to mesh with an emerging 'de-mutualised vision of the future' (Waldby, 2006). However, an intense interest in autologous stem cell therapies is less prominent in these interviews than a forward looking precautionary stance and an interest in 'recycling' cells: rather than disposing of cells that are the subject of great scientific interest and investment at present, these parents wish to preserve them in case they may be of use in the future.

Within a small sample, several parents have banked umbilical cord cells with companies or in premises outside the UK, and some outside the EU. This admittedly small scale enterprise in a global tissue economy resonates with the thrust of the Commission's strategies on biotechnologies and further with the growing trend of conceptualising patients as consumers.

The management of commercial cord blood banking can be seen to mirror tensions between different policy commitments (viz 'altruism', 'solidarity', 'competitiveness') within EU institutions and across different states. The paper will conclude with a consideration of the constraints on the Human Tissue Authority, the competent authority in the UK, with respect to promoting principles of altruism and solidarity in its domain.

Safety and Supply: Regulating Bone Exchange in Denmark

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This paper will discuss the implementation of the tissue directive from the perspective of Danish bone banking. Human bone has been used in surgery on a routine basis for more than 30 years. It is typically procured from people getting a hip prosthesis and stored in a bone bank until somebody else needs bone. With the EU Tissue Directive (2004/23/EC) these procedures are currently being restructured, ostensibly to ensure recipient safety as well as regular supplies of bone. To reach the latter end, standards are being introduced to facilitate international exchange.

The directive is analyzed by following its translation into practice. I have been following translations of the directive at the Danish Medicines Agency, in the bone banks, at the surgery units procuring and using bones, and among donors and recipients. Specifically, methods used include document analysis, interviews with key actors, and the undertaking of observation of practices in the clinics, on a daily basis.

'Acting with' the directive is part of enacting bone transplants as a medical technology. The technology is co-produced with the regulatory changes surrounding it, and its implications are engrained in the political mechanisms of the bone banks, the surgery units, and the political agencies. It is the purpose of this paper to tease out how the materiality of bone banking becomes shaped in a particular political context in a tension between ambitions of a safe and a stable supply. This focus on a more established, 'mundane' form of tissue banking will contribute to the wider discussion of tissue economies.

Recycling Cells and Making Cakes in Britain and Germany: the Regulatory Shaping of Stem Cell Applications in Cardiac Repair

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Over the past ten years a number of diverse research strands in biology and medicine have merged into one major evolving scientific field: stem cell research. This field of scientific inquiry carries immense hopes for the future treatments of a range of degenerative diseases, but it is contested in ethical debates, especially regarding the use of human embryos in research. Within the EU, its development has made for intersecting yet distinct national pathways, which have been the basis of scholarly discussions on the role of different systems of governance and regulatory policies (see for instance Nowotny, Scott and Gibbons, 2007; Salter and Jones, 2002). The effects of regulation, however, depend on its implementation. To date, little knowledge exists on how national governance frameworks are shaping everyday practice in different settings and national contexts. In this paper we present empirical findings on the influence of regulation on clinical research in Britain and Germany - two countries with opposite research cultures regarding the development of therapies with adult stem cells.

This paper offers a comparative analysis of institutional backgrounds and the everyday organization of clinical practice in one of the first areas in which stem cell research has moved into clinical application after 1998: the use of autologous stem cells in cardiac repair. The analysis is based on data produced in ethnographic observations at laboratories and clinics and in-depth qualitative interviews with staff engaged in the conduct of clinical trials at different levels of seniority. We discuss the similarities and differences in the implementation of the EU tissue directive in both countries and evaluate the impact of the two different regulatory regimes on the design, set-up and everyday running of these trials. We outline the dynamic between institutional frameworks, professional cultures and strategies adopted in the translation of legislation into application.

Connecting ethnographic data to a broader analysis of the 'regulatory ordering' (Faulkner et al., 2004, 2006) of emergent autologous stem cell treatments, we argue that the impact of regulation can be understood only through a micro-sociology of governance 'in action' as encapsulated in the imagery of scientific and regulatory practices. This makes it possible to address broader questions on the development of stem cell technologies and the challenges of implementing global regulations.

From (Public?) Waste to (Private?) Value: the Controversy over Commercial Cord Blood Banking in Spain

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Since the first successful umbilical cord blood (UCB) transplantation was made in 1989, haematopoietic stem cells found in UCB have been increasingly used as an alternative to

3.1.3: Governing Multiple Tissue Economies? Exploring the Practices and Policies Shaping the Uses of Human Tissues and Cells in the European Union.

bone marrow transplantation in the treatment of child leukaemias and other blood disorders, and specifically on transplantation between unrelated though genetically matched donors and hosts ('allogenic transplantation'). The potential utility of UCB stem cells in 'autologous' (self-to-self) therapies remains limited and mainly unproven. Nonetheless, expectations of future developments in autologous transplantation have been the driving force behind the development of a transnational commercial sector which stores cord blood for exclusive use of the donor or donor's relatives. As Waldby (2006) and Brown and Kraft (2006) have shown, questions of altruism, national solidarity and the 'gift economy' of donation (Titmuss), commodification of bodily tissues, and reconfiguration of familial and social ties have all been central in the debates over UCB private banking. In addition, there is also a question of contending temporal perspectives ("contested futures": Brown, Rappert and Webster, 2000), as the commercial sector stores UCB for hypothetical autologous use in the future, while public banking is focused on allogenic present-day uses.

UCB banking poses some pertinent questions for social science analysis of "tissue economies" in our biopolitical age, and is gaining attention from STS scholars. In particular, and given the increasing involvement of STS "with practices of technology development, policymaking, legal decision-making and governance in different fields" (as is stated in the call for papers of the conference), there is a growing concern with modes of governance and regulatory frames of UCB. The on-going regulation of these novel forms of biomedical entrepreneurship is taking different forms through EU member nations. This paper will focus on the Spanish case, finding it somehow representative of the tension and/or interweaving between public systems of donation (based on communitarian altruism inside national borders) and commercial forms of tissue storage (private, familial and transnational). The Spanish example seems particularly appropriate given the success here of the "gift" regime, that has made Spain world leader in organ, tissue and bone marrow donations.

The paper will be based in an analysis of media coverage of the cord blood controversy that started in Spain in early 2006, after news of the Princes' firstborn cord blood being sent to a private American bank broke. Following the debate over one year, until a new law over Cells and Tissues and a Public Plan for Cord Blood were enacted (which put severe restrictions on private banking), we will see how different notions of 'waste' and 'value' are put into play, modified and negotiated in public discourses, through rethorics that bring together very diverse temporalities: from biographical narratives and socioeconomic prospects to technological expectations and cryogenic futures. In a sense, we will argue, UCB banks (just like other tissue banks) act as a sort of 'social time machines', and any reflection upon its governance has to take into account the variety of temporal dimensions involved.

3.1.4: Reflecting on Nanotechnologies

The Move Towards the 'Nanos' :
Transformations of a Laboratory in the Field of the Microsystems

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The investment in "nano" labelled research is often presented either as the logical result of a programmed technological evolution, a heavy tendency which imposes upon the actors, or as an opportunist labelling of research projects sometimes slightly rewrited to obtain new resources. Without questioning these interpretations, we will try however to understand locally how is made the "passage towards the nanos" in a particular laboratory. We are interested in the mechanisms and the on-going process, no matter they are a local translation of a heavy tendency, an opportunist strategy or quite other observable dynamics.

The laboratory studied through our ethnographical investigation shows a case where we can see the construction of an original articulation between several internal and external dynamics. They are processes of transformation and invention, which, after all seem to join the big tendencies, but, manifestly were not dictated by these. Working into a technological trajectory regarding microsystems, its members asserted, in 2004, that the "nano" affair does not really concern them. However, on one year later, the nanosystems become a strategic priority of the lab which arouses change and enthuses. The lab members who asserted not feeling concerned by the "nano" affair move into a collective craze for the challenges connected to the nanosystems. The history does not however stop with this "happy end" of a passage into the nanos. On the contrary, one year later, again the situation turns around. The researchers are demotivated and a new orientation is outlined. For the second time in three years, we observe the construction of a new collective orientation. Then they tend to stabilize three research lines. Our communication tries to report on-going dynamics and to understand the reasons of such reversals and re-orientation of the research programmes. The examination of the scientific dynamics consists in studying the chain of choices regarding the research topics and the methodology. Such analyses suppose to be closer to the researchers, to follow them in their activities or to reconstitute them with them. The communication concerns the local dynamics of reorientation of the research programmes. The inquiry is based on a work of direct in situ observation and formal and informal interviews with the actors, within a laboratory of applied research, observed between 2004 and 2008. The observed laboratory belongs to a governmental research organism which the mission is the realization of researches for public interest and the transfer of the research results towards the industrial development.

Performing Ethical Boundary Work with
Experts in Genetic Medicine

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ELSA research has become an integral part of genome research. As accompanying measure it is meant to investigate the implications of what has been labelled as the lead science of the

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21st century. Funding bodies do not only encourage STS researchers to choose genomics for a research subject, but they expect them to engage with science in the making and even actively shape its development. "Acting with" genome research transgresses conventional forms of scientific practices and well-established epistemologies, but it also raises fundamental questions for the researchers involved.

Genomics operates in a field of intersecting demands. Scientists are urged to contribute to health care policy goals, to innovation and economic growth, but they must also meet academic performance indicators. STS researchers on the other hand are asked to explore ethical, social and legal implications of genome research. However, this task cannot be undertaken from a privileged position where there is no influence from societal forces or political agendas. Occasionally ELSA researchers are confronted with rather instrumental demands of various stakeholders engaged with genome research and consequently at risk to act for somebody else's agenda rather than to act with them. But researchers may also pursue their own agendas or feel committed to ethical principles. However, ones own stake as a researcher is not merely an issue of personal choice, but it is also subject to attribution by others. Against this backdrop I will address such normative undercurrents which run through any "acting with" or interventionist approaches. In this paper I will do so by proposing a methodological reflexion of expert interviews with researchers and clinicians in the contested field of the new genetics.

Having carried out a series of expert interviews I will make my case on an empirical basis. These guideline based interviews were carried out in the framework of ELSA research on genetic testing, the interviewees were recruited from all of Austria comprising various medical disciplines such as genetics, obstetrics, gynaecology, neonatology, paediatrics, haematology, oncology, pathology and hygiene medicine, all of which carry out genetic analysis for diagnostic and research purposes. The interviews were audio-taped, transcribed and analysed using computer software for data management. In the data analysis I focused on "ethical boundary work" (cf. Gieryn 1999, Wainwright et al. 2006) which brings legitimation discourses and normative assumptions to the fore.

On this basis I analyse how the interviewees draw on both policy goals and construct ethical arguments, how they conceptualize their own work and thereby demarcate it against others kinds of medical practice. Furthermore I will explore how the interviewed experts establish boundaries against interviewing social scientists and in so doing attribute social functions to ELSA research. In such a way I aim to contribute to the study of ethical boundary work in genetic medicine and to the methodological reflexion of expert interviews.

Unintended Consequences?
Effects of STS Engagement through Boundary Organizations.

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Assessing potential societal outcomes of nanoscale science and engineering (NSE) research has been of increasing interest among policy, academic, and technoscientific circles in recent years. But very little has been said about the unanticipated consequences of STS engagement. How do new types of technology assessment (TA) activities affect the way we

3.1.4: Reflecting on Nanotechnologies

do STS, and what are the effects on our collaborators in science and engineering? One challenge to social scientists and humanists in the field is how to navigate issues of confidentiality and be dispassionate observers while simultaneously acting as agents of institutional change. Field research conducted at the Center for Nanotechnology in Society at Arizona State University (CNS-ASU) is discussed in order to illuminate these themes. The assessment component of the program is meant to probe scientists' awareness of the broader societal systems within which they operate; and also because it is meant to result in social learning on the part of the network of social scientists performing the engagement work, for instance, regarding their own

interrelation to the scientific networks they study. Through a repertoire of activities, including forming interdisciplinary research teams, planning retreats and field trips to discuss science "outside the lab" including broader socio-political contexts of science and policy, we hope to positively influence the way scientists are trained and educated. We are particularly interested in how our activities and interventions affect graduate student researchers in NSE. We found that graduate students respond in a number of ways, ranging from shifting career goals to actively creating multiple roles in order to address personal concerns of the effects of their work.

3.1.6: Participation in Health Care, I: New Ways of Assessing Technologies

Volunteer Engagement and the Construction of Technologies: a Comparative Study of a UK and US Projects Developing Optical Imaging Techniques for Diagnosing Breast Cancer

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This paper draws on an empirical study of two similar projects in the United States and the United Kingdom that are developing breast cancer diagnostic technologies using optical imaging techniques. The aim of the project is to assess how, and the extent to which, the female volunteers participate in the development of these new technologies.

Social interactions in research involving human subjects are often overlooked, however, the intimate nature of the personal encounter between researcher and research subject in our study requires careful handling in order to produce an acceptable working relationship. Issues of exposure, privacy and pain with regards to the encounter between the volunteers and researchers fundamentally shape the terms of the research protocol and the form of the emerging diagnostic technology.

Moreover, as our comparative study of the two projects demonstrates, the terms of the engagement between the researcher, volunteer and technology are not only individual, but also, concurrently highly contextual. The health status, research experience and techno-scientific interest of the volunteer converge with the broader context of the research project, such as the design of the patient interface, the environment of the laboratory and the socio-cultural expectations of health services delivery. Drawing on interviews with (the) volunteers and researchers and participant observation in the laboratories where both of these projects take place, this paper will present the initial findings of this comparative research. Commonalities and differences across these two contexts will be explored and evaluated in terms of the issues and types of engagement the volunteers have with the developing technologies.

Finally, in response to this data, the role of qualitative social scientific research in mediating the feedback between volunteers and researchers will be assessed. What, if any, is the practical value of such an endeavor? Does the inclusion of social scientific research improve the experience of the volunteers who take part in such projects? In what ways does this type of engaged research change the product of STS work?

Shaping Emergency Healthcare Technologies: How May STS Approaches Contribute to 'Inclusive' Design?

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Technologies for delivering urgent and emergency healthcare are being radically reconfigured in a number of countries in response to rapid changes in healthcare systems. Accident and emergency departments are struggling to cope with increasing demands, and

ambulance services are under strain as a consequence of high public expectations and audit systems calling for greater efficiencies and effectiveness. At the same time, there is an increasing number of directives to involve patients and the public in designing future services to improve and expand services and make them more accessible to diverse user communities. As is evident from recent key reports and research programs, technology has been attributed a key role in changing the organisational culture and practices of urgent and emergency care. In the UK and some other countries the focus has turned to new technologies and systems for 'taking healthcare to the patient', by bridging the gap between hospital-based and community-based service provision (DoH, 2005). An inclusive approach to the design of technologies for urgent and emergency healthcare would seem to present a considerable challenge to the way technologies are currently developed in healthcare systems, dominated as they are by biomedical frameworks and top-down technocratic approaches to resolving systemic problems.

As the technology-in-practice perspective suggests, 'technologies' cannot be dissociated from the socio-political contexts in which are embedded and find application. Technologies are subject to ongoing political negotiation and are always designed with particular assumed uses and users in mind. As this paper argues, STS approaches can be fruitfully employed to reveal how technologies contribute to the changing organisational culture and governance of urgent and emergency healthcare. The co-production concept acknowledges a potential role for STS researchers in shaping the technologies and associated systems that are likely to profoundly affect how urgent and emergency healthcare is delivered. Drawing on data from a two-year UK Engineering and Physical Sciences Research Council project exploring design options ('Smartpods') for delivering urgent and emergency care, the paper explores how STS research may contribute to 'inclusive' design in this field. As a sociologist working on the socio-technical work package of this project, the author will offer their reflections on working in a large multidisciplinary research team, including designers from the Royal College of Arts, London, and outlines some conceptual challenges associated with shaping the technologies in development. The paper will also draw on a survey of the views of practitioners working in accident and emergency services about the organisational, socio-cultural and political factors shaping the implementation of new models of urgent and emergency healthcare delivery. In conclusion, the paper will outline an agenda for future STS research in this field, in particular in relation to shaping crucial decisions affecting the design of technologies.

The Cultural Framing of Regenerative Medicine Products: a Documentary Analysis of Media Coverage Since 2000

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Tissue engineering (TE) and regenerative medicine (RM) offer a potential solution to the morbidity problems facing an increasingly ageing and unhealthy population in which progressively fewer organs are available for transplantation. The success of these emerging technologies rests not only on scientific breakthroughs, but on the acceptance of RM products (RMPs) by the patients who will receive them.

Sociological research suggests that public reactions to new technologies (traditionally thought to derive from emotional responses) involve perceptions of risk, benefit and utility

and confidence in the integrity, intent and past behaviour of stakeholder institutions. A 2003 MORI poll indicates that the UK public is generally supportive of stem cell research, yet public attitudes to RM have so far been largely ignored. Media headlines highlighting ethical concerns compete with accounts exaggerating the success of RM by claiming that amazing new treatments 'will help us live to 100 and beyond' (Symons and Hagen, 2006). It is therefore uncertain whether the public will embrace RMPs or dwell on anxieties that recall responses to past products of biotechnology (e.g. consumer willingness to pay a premium to avoid GM food). This gap in understanding has recently been acknowledged at a policy level: the UK government has commissioned a public dialogue on social and ethical issues relating to stem cell research and its clinical applications.

To help develop our understanding of public attitudes to RM and determine whether they represent a significant barrier to the successful marketing of RMPs, this paper will explore one potentially decisive factor: the portrayal of RM in the media. It will present the results of a documentary analysis drawing on content from one of the world's largest archives of newspapers, legal documents and other printed sources to chart coverage of RM, RMPs and TE.

A sample of RM-specific documents, published from 2000 onwards and obtained through iterative searches of the Lexis Nexis database, will be subjected to rigorous content and discourse analyses in order to identify and compare their emergent themes. The journalistic practice of framing, which involves selecting and organising key facts and employing symbolic and rhetorical devices (e.g. anecdotes and personalisation) to characterise particular topics and influence the reader's perspective on a controversial issue, will also be investigated.

Media framing techniques will be analysed in light of important sociological literatures on hype, moral panics, the dynamics of expectations and the construction of ethical issues and social concerns. Existing studies of public and patient responses to emerging technologies (e.g. GM food and nanotechnology) and emerging medical technologies (e.g. gene therapy, xenotransplantation and stem cell therapy) will also be taken into account.

The discussion will draw on evidence that suggests media hyperbole (and subsequent steps to manage public expectations of RM) follow the pattern of visibility and maturity depicted in the Gartner Curve. There will also be some consideration of the different types of RM products available (e.g. human versus non-human, autologous versus allogeneic and stem cell versus non-stem cell therapies, including orthopaedic, metabolic and cardiovascular treatments and techniques for wound repair).

Relational Evaluation of the Patient Aspects of Health Technology

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This theoretical paper aims at defining an alternative, relational ontology and methodology for the field of Health Technology Assessment (HTA) by utilizing the concepts of socio-material and material heterogeneity. The paper utilizes the general idea of the co-production

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of technology and context and especially actor-network theory. The relational approach will be applied to evaluate the social and psychological aspects of health technology.

The traditional HTA aims at producing objective and universal evidence of the health effects, other benefits, costs, harms, etc. for the decision-makers. The traditional HTA is based on technological determinism, that is, on a linear, unidirectional conception of causality. It assumes a causal order between variables; an independent variable technology with its "effects" (impact) on patients as well as on organisational and other levels. HTA considers technology as an exogenous and independent entity which is separate from the social or organisational.

This paper argues that HTA needs an ontological shift to be able to assess the dynamic and network character of different technologies. HTA needs to take steps toward a co-production model that sees technology as endogenous, as a part of the organisational process. Technology cannot be separated from the organisation and its users; it is not an independent and stable entity. Technology does not only include the hardware used in performing work, but also the skills and knowledge of workers, even the characteristics of the objects on which the work is performed. Technology is a network of human and non-human elements. The implementation of new health technology requires co-construction in different ways in an organization and later in the daily life-activities of a patient; other new technical devices, changes in the work processes, activities and structures of the organizations, changes in the amount, skills and knowledge of professionals, arrangements in the work place, support from the family members, specific activities from the patient, etc.

For the evaluation of social and psychological aspects of health technology, the paper defines two sets of a priori study issues on the basis of a literature review, expert interviews as well as patient interviews. The interviews concerned two technologies in coronary artery disease: treatment with drug eluting stents and diagnosis by a multi-slice computed tomography. The first set of a priori study issues focuses on what kinds of resources (self-care, practices of lay persons, money etc.) have to be mobilized and organized for the support of a patient before, during and after the patient's actual "use" of a given technology. The second set of a priori study issues focuses on the social and psychological change that the utilization process of a given technology may generate before, during and after the actual "use" of the technology in a patient's life, for example with respect to a patient's self-conception, social relationships and working capacity. These two sets of study issues may be used in HTA as a general frame for appraising social and psychological aspects of a technology.

Sociology of Breast Tissue

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Breast cancer, mastectomy and treatment in oncology injure body and self. In this field study concerns, needs, anxieties and decision-making processes of patients after they are diagnosed with breast cancer are investigated. I am particularly interested in how women in such life threatening and vulnerable situations rebuild their body-selves and their female contours with the help of plastic and reconstructive surgery.

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Six patients, who underwent immediate breast reconstruction and six with secondary plastic surgeries after mastectomy, tell their stories. They share their experiences and histories with me, a sociologist and communication scientist, who accompanies them during surgical treatment and beyond. The individual body of each of these women writes different stories. Each singular story is written from different bodies. With the documentation of subjective breast reconstruction narratives I aim at deepening an understanding of socio-cultural, political and symbolic meanings of female body tissue. I argue that psycho-societal issues are deeply connected with our physical wellbeing. The patients' decisions for particular surgical methods often are influenced by the information they get from their surgeons. Through negotiations with their physicians, women learn to see themselves in new ways.

For this field study approaches in narrative medicine, ethnography, sociology and communication studies are combined. I use participant observations and narrative, biographical interviews as research tools. The crucial aim of this long-term project is the exploration of emotional, social, cultural and gender specific aspects, which determine the life quality of breast reconstruction patients - including these categories into therapeutic concepts. Decisions for immediate or secondary breast reconstruction are for all twelve interviewed and accompanied patients dependent on the information they get from their responsible surgeons. In the narratives of these women the scientific conceptions of their physicians are mirrored. During the period of treatment breast reconstruction patients learn to examine themselves with the eyes of their physicians. They perceive their breast tissue as mouldable object. The (multimedia) documentation of subjective definitions, decision making processes, experiences, perceptions and needs of breast reconstruction patients unfolds a deeper understanding of the requirements of women, who are in this particular life situation. Physicians learn more about the subjective expectations of their patients. With the help of this research data indications and therapeutic conceptions can be individually improved. A mutual translation and mediation process is inspired. Surgeons strengthen their understanding of the patients' voices and languages. Treated women plunge into the imaginary worlds of their doctors.

3.1.7: Identity, Culture and Social Order

Fashion, Mediations and Method Assemblages

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This paper discusses relations between aesthetics of fashion and the sociality of fashion. It takes as its premise that aesthetics and sociality are co-constructed, and cannot be regarded as separate - although this has been the norm in the academic traditions of aesthetics and sociology, respectively. The paper thus takes on aesthetics and the social in a manner closely related to a core argument of STS - namely that the scientific fact, and the social processes of constructing, distributing, and using that fact, are co-constructed (Callon, 1986; Latour, 1993). The paper thus contributes to STS literature by expanding one of its central debates to a new empirical setting; fashion specifically, and the aesthetic-cultural field on a more general level.

In trying to make a theoretical connection between aesthetics and sociality of fashion, the paper suggests the term of "mediator" (Hennion, 1997). "Mediation" is an activity rather than an actor; a co-constructive relation that creates what it mediates - the producer and the consumer. Hennion argues "that something effectively 'happens' in this process, which transforms the ways things were before" (Hennion & Grenier 2000, p. 346). Hennion belongs to a small but growing group of post-critical cultural sociologists, much inspired by contributions of STS.

Methodologically, however, there seems to be a shortage of tools of approaching "that which effectively happens" within this post-critical movement of cultural sociology, and therefore, it is an important ambition of this paper to go into a methodological discussion of how "that which effectively happens" can be approached. To this end, the paper will combine Hennion's term of the "mediator" with John Laws methodological term of "method assemblages". Method assemblages is a suggested as a way of handling multiple, fluid realities with multiple, fluid methods.

Empirically, the paper works with mediation in fashion - that is efforts the active shaping of relations between producer and consumer through communication, marketing and PR. Fashion mediation is by no means simple, but organise complex relations between individuals and social contexts, aesthetics and production, distribution and consumption, as well as relations between fluidity and stability. By addressing the field of fashion, the paper proposes to shed light on an empirical setting which has so far been studied either as a purely aesthetic-cultural phenomenon, or as a purely economic-sociological one. Moreover, the paper proposes to contribute to the debate in the STS community and literature by expanding the reach and breadth of some of its core arguments.

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3.1.7: Identity, Culture and Social Order

Awakening the Dead? Bringing 'Life' Back to the Mummy.

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This paper draws upon the notions of 'working together' and 'ecology of practices' as outlined by Isabelle Stengers (1997, 2000, 2005) and the way in which these 'tools for thinking' may contribute to and disrupt the way in which the social sciences construe the 'field' and the 'object' respectively. The empirical material, which constitutes the point of departure in this paper, draws upon field work done in the spring of 2008. Methodologically, this field work has been, and continues to be experimental in its character. This presentation however will draw upon material that has been generated through encounters, talks, images and texts. Thus, following the way in which a seemingly mute and since long lifeless object - a mummy kept in the Ashmolean museum in Oxford - was scanned (using CT) at a hospital; transformed in the hands of an artist; treated and analysed by a dentist who specialises in paediatrics; how it entered into an art gallery in London; and back to the museum (and, not to forget, how it ended up in a PhD thesis in geography!) I will try to tease out some remarks on how relations and connections are established during the course of the transformation and displacement of objects. Drawing upon non-representational theory and performance studies in geography (Thrift 2004, 2007; McCormack 2005, 2004; Dewsbury 2003) I will thus try to outline a way of thinking through the relation as such, i.e. as a mode, or tool, of thought that goes beyond the subject/object dialectics. This mode of thought would imply thinking with the world (instead of disconnected or disinterested contemplation from afar), paying as close attention as possible to the creation of novelty in experience. This mode of thought, I argue, implies that the interventionist approach does not merely imply that we work with a human (all too human) research agenda, one which could imply that the co-worker is the scientist, the artist or the museum curator. It should equally put the focus on the material to be worked with, meaning the object or the thing. But this shift of attention from human subject to artefact raises another issue: how are we to think the object? Lastly then, I will try to work through these questions of relations by drawing upon what has been called the (re)turn to materiality (Miller 2005; Bennett 2004; Whatmore 2006; Daston ed. 2004; Hanare, Wastell, Holbraad eds. 2006). At the heart of this turn lies the idea that matter and materiality 'speaks' and 'moves' (us) in many voices, thus making way for multiple connections and relations to emerge with bodies, spaces and times.

From Social to System Identities

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While much has been written on the question of identity, its growing connection with technological systems is theoretically underdeveloped. Between two separate sets of literature focused on social identity on the one hand and systems of identification (fingerprints, biometric information) on the other, there is a new development in the construction of identity: dynamically changing profiles based on credit, health, education and other information, which have gained more importance in predicting one's life chances than

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one's social capital. Based on extended research on India's call centers, this paper investigates how global communication, while appearing to involve persons, goes beyond social identity, revealing the neutralization of experience by a multiplicity of systems: economic, media, computer code, medical, and legal. Thus, the shift from a social to system identity does not affect only Indian calling agents who need to change accents, acquire pseudonyms, work hard to know a place they would never visit, learn work skills not portable to any other industry, and work at night when the city outside their building is asleep. Their American customers are also turned into their profiles. Indeed, a call center agent is not the one who dials the number. It is a software program called the "Dialer," which targets specific American profiles, according to credit history, age, gender, region, education, and buying patterns. This paper seeks to theorize this global conversation as occurring not between persons but their activated profiles, in which persons find themselves implicated. Through the distinction between social and system identities, the notion of social embeddedness will be re-examined.

Acting with Social Sciences:
Diagnosing the Present in a Functionally Differentiated World

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Since nearly 40 years STS is mainly engaged in demystifying techno-science. Yet, we still lack clear theoretical and methodological tools to analyze social sciences from an STS perspective. Although this restriction has been reflected by some approaches (Nowotny and Guggenheim 2003, Felt 2000, Bloor 1991) , we still use to think of social sciences as mere tools for analyzing hard sciences. In my paper, I develop a methodology for turning social sciences into objects of inquiry for STS. Here, my aim is to relate the argumentative structures of social scientific texts to the wider social structure they are embedded in. How can this be done? First of all, I will show that in the course of institutionalization of sociology, a distinctive genre of texts emerged which can be called "Diagnoses of the Present". This particular genre, which in German is called "Zeitdiagnose", can be definied as a field of theories which describe unprecedented social change on a comprehensive societal level. Insofar, they are neither general theories nor historical philosophy or fiction. Rather, these approaches are ways of describing in what way the Present is a new epoch. Examples are David Riesman's "Lonely Crowd", Daniel Bell's "Post-industrial Society", or Ulrich Beck's "Risk Society", only to state a few. This genre of sociological thought can be linked with social structures in a three-step procedure. The first step is to ask why societies are interested in their Present at all. Here we can rely on the "History of Ideas" approach (Koselleck 1979) which would suggest that only in modern societies there emerges the notion of an open future. Insofar, the Present is not only a pre-stage of an already defined future, but an unknown, ever changing state of societal affairs. In a second step, we should analyze the argumentative strategies or moves of those texts which are predominantly about diagnosing the Present. Here we can rely on two methodologies which can be combined though. The one is the sociological genre analysis (Guenthner and Knoblauch 1995), the other is the analysis of rhetorics (Perelman and Olbrechts-Tyteca 1969). In a third step the rhetorical and argumentative strategies the authors use can be assigned to funtional systems of society (Luhmann 1997). As I will show, the argumentative style of "Diagnoses of the Present" makes the genre a hybrid one. It is setteled on the border separating science and

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mass media. Yet in such a border position, the genre can be used both in science and mass media. In my presentation I want to propose three theoretical concepts of dealing with such a hybrid genre:

1. Boundary Object (Galison 1997)
2. Boundary Role (Sociology of Organizations)
3. Strctural Coupling (Systems Theory)

Either way, "Diagnoses of the Present" seem to be a flexible object which enables sociologists to act as public intellectuals. It is a way of doing public social science.

Tech's, Drugs and Rock and Roll:
Technological Complicity in Domestication of Gaming

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Although a stereotypical view of digital games is that they are isolating technologies, contemporary gaming research shows that gamers are actually incredibly social beings who see collaboration and socialisation as a necessary and integral part of game play. In recent years, digital games have increasingly become a way of mediating social activity involving several members of a household (and beyond) in much the same way as earlier board games like Monopoly. However, it has recently been suggested that there is little in the way of understanding the gaming experience which goes beyond the playing of the game itself (Crawford and Rutter 2007). Tied to this, we believe is somewhat of an implicit attachment to the design fallacy whereby game developers are positioned as determining the possibilities for the enactment of such technologies a-priori. In this paper, our starting point is to conceptualise games as configurational technologies that require further interventions post production to make them work. Through multiple intersecting ethnographies of Singstar, a game for the PlayStation console which references Karaoke, we attend to processes of domestication. In particular, we pay attention to role of the genre of 'the technology' as complicit in its domestication. In this case, the particular genre of the game references back to Karaoke and the things associated with this activity. An implication of this is that even though the developers have disembedded particular technologies associated with Karaoke, such as the consumption of alcohol, the connotation of such relationships is so strong that these are reembedded by users as they domesticate the game. Furthermore, we consider how one particular group of technologies (alcohol and recreational drugs) further shapes the possibilities of domestication activity because of their complicit nature. Thus, although we know that existing technologies might continue to be important in domesticating configurational technologies and that such technologies display variety in malleability - through the concept of technological complicity we are able to identify why this might be the case.

3.1.8: Visions meet Expectations: Differences, Similarities and Relevance for STS, I

Collectively Scrutinizing Expectations in 'Sustainable Technologies' - Participatory Scenario Exercises as an Instrument for RTD-Policy Towards Sustainability

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The concept of 'green bio-refineries' functions as a guiding vision orienting R&D efforts in Austria, Europe and the US. Expectations and promises regarding positive ecological and societal effects of this mode of production (security of supply, landscape conservation, rural income) led to governmental agencies increasingly funding RTD activities in this field. Due to the 'dilemma of control' (Collingridge) governmental agencies are confronted with an extremely high level of uncertainties as long as they potentially have (e.g. by selective funding) a decisive effect on technological change. RTD-policy thus usually has to cope with problems that are still weakly structured and promises and fears not yet substantiated.

Some scholars of technology foresight suggest a collective analysis of 'guiding visions' in stakeholder workshops as a partly solution to this dilemma. On the practical side, some RTD programmes (like the Austrian 'nachhaltigwirtschaften.at') try to actively use such 'guiding visions' to coordinate the actions of many actors in technology development and implementation (in energy systems besides 'bio-refineries' also 'virtual power stations', 'poly-generation' etc.)

In an experiment accompanying an Austrian programme, a methodology has been developed to elaborate such visions together with RTD actors in participatory scenario processes: To test the expectations with regard to jointly developed scenarios of future framework conditions, governance structures and policies, to develop possible ways of embedding the new technology into socio-technical systems etc. Expert interviews and workshops have been carried out to document the genesis of thematic networks in favour of certain 'socio-technical transitions'. The aim of the government agencies was to facilitate a coherence of funded RTD activities and hence to increase their effect with regard to more radical system innovation. The methodological innovation tested promised to actively support a critical assessment of expectations and the joint elaboration of 'coherent, context-related and robust technological visions'.

The developed methodology actually seems very suitable to facilitate expectation dynamics in the given context of selecting and supporting early technological experiments which aim to add up pressure on current socio-technological regimes in terms of sustainability transitions: They seem suitable to make the development of visions more integrative and coherent, e.g. by emphasising the embedding of national strategies in supranational developments and to shortcut unproductive dynamics like funding RTD-efforts based one-sided expectations, crises of disappointment etc.

This paper discusses a combination of the two perspectives a) vision/Leitbild assessment and b) dynamics of expectations in one methodological framework, which aims to innovate the way in which selective decisions on the level of R&D programmes (with reference to 'sustainable technologies') are derived at. An experimental institutionalisation of a specially designed participatory scenario process is described and critically assessed, especially with regard to shortcomings of the experiment and principle limitations of such a rationalist, discourse-oriented institutional design.

Between Norm-Driven Visions and Expectation-Driven Practices. Energy Supply in 2030 as a Case Study.

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The Rathenau Institute is performing a first reality check upon visions of sustainable energy supply. Our experiences indicate that neither the 'vision' nor the 'expectation' body of literature offers a suitable framework for analyzing this norm-induced process of change. A theoretical framework is needed that puts the very confrontation between norm-driven visions and expectation-driven practices central-stage, we argue.

Our contribution is based on our report "Visions at sight. A critical analysis of medium-term visions of the future Dutch energy supply." (expected springtime/summer 2008). This report takes the Dutch energy policy as a point of departure. The government is ambitious in its strive for a sustainable energy supply. High targets are set for reducing levels of CO_2 emission. Not only the Dutch industry sector is to meet these targets, but agreements have also been signed with the agricultural, transportation and housing sector. At the same time, security of energy supply and continuation of economic growth are just as important.

This political setting invites various actors to produce visions of how the future energy system should look like. In these sketches of the future, many new and old technological possibilities are embraced, ranging from solar panels and virtual power plants to coal fired plants and nuclear energy. However, it is unclear to what extent these visions are conflicting or overlapping. Furthermore, it is indistinct how all these visions that circulate on a rhetorical level are rooted in actor coalitions that are needed to act. Our first findings indicate that the technological expectations on a practical level do not match the circulating visions on a rhetoric level.

In the session at the 4S/EASST conference, we want to take our analysis one step further. We will explore what kind of theoretical framework is helpful for understanding and analyzing the confrontation between desirable visions and expected practice in processes of societal change.

Dynamics of Expectations and Dynamics of Needs: a Critical Exploration

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According to the old wisdom, need is the mother of invention. And, indeed, one of the building blocks of our understanding of innovation processes and systems is the concept of 'need'. When an innovation is successful, the argument goes, there must have been a need for this, albeit 'latent'. On the other hand, it is also a well-known that technological change can incite new needs. For instance, in his seminal book on Diffusion of Innovations Everett M. Rogers (2003) notes that "A need is a state of dissatisfaction or frustration that occurs

when one's desires outweighs one's actualities (...) An individual may develop a need when he or she learns that an innovation exists. Therefore, innovations can lead to needs, as well as vice versa.." (p.164)

In the sociology of expectations another, contrasting account of technological change is given (Van Lente 1993, Borup e.a. 2006). On the basis of circulating and shared expectations researchers, technologists and firms decide what options to take and routes to follow. It is not a matter of pre-defined problems or articulated needs, but a matter of ongoing technical change driven by promises in which actors cannot afford to miss the next generation of technologies. In other words: a technological promise is the mother of invention.

In this paper I will explore the relationship between the dynamics of expectations and the dynamics of needs by following two lines. First, the various uses of the concept of 'need' in technical change are studied and categorized. Here we explore various strands of innovation literature as well as technology and cultural critics, such as Ivan Illich, Pierre Dumouchel, and Jacques Ellul. Second, a reconstruction is made, based on the sociology of expectations, how needs are part of the co-evolutionary process of technical change. The mechanism in which promises are converted into requirements appears to be accompanied by a mechanism in which needs as outcome are converted into needs as cause. In this second line I can draw from case studies in the Netherlands on hydrogen research, on renewable energies and on energy transitions

I conclude that the distinction between 'real' or 'genuine' needs on the one hand, and artificial needs on the other is misleading. Therefore, the question whether needs are real or artificial is not very helpful. The relevant and sensible question is which needs can we afford.

Envisioning or Expecting? Creating a Framework for Future Oriented Research.

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Scientific studies concerning future research have a rich vocabulary including concepts such as promises, expectations, visions, scenario planning, scenario research, or pathways. However, when looking at scientific future research the vocabulary is not mutually exclusive, which eliminates possible benefits of a rich vocabulary. Each of the concepts can be interpreted broadly, overlapping with other concepts. A disadvantage of such a rich, though ambiguous, language is the increasing difficulty of establishing and stabilizing the position of future research within the field of STS. To deal with this ambiguous language, many scholars choose one of the concepts as an umbrella term. This is visible in the work of Van Lente (1993) in which the concept 'expectation' is used in the broadest sense whereas De Wilde often uses the concept 'prophecy' (de Wilde, 2000). However, the interpretation of the concepts strongly depends on the definition of the individual scholar. This leads to interpretive flexibility of the concepts in the sociology of expectations. A framework which positions the different concepts can help the establishment of this field.

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This paper presents such a framework by addressing three aspects to which differences in interpretation can be attributed; scope; degree of uncertainty and concept application. The first two aspects scope and degree of uncertainty are interrelated. The scope refers to the comprehensiveness of the articulated ideas; a promise is often less extensive than a vision or a prophecy. The second aspect is the degree of uncertainty. When an idea is wide-ranging in scope the uncertainty will be large. Additionally, when an idea is limited in scope, less effort is needed to reach the prescribed situation, which reduces the uncertainty. Concepts will be divided based on these two aspects which can be used to select the most suitable concept for the research focus.

The third aspect concept application refers to a different dimension. Whereas the first two aspects refer to the content of the concepts, this aspect considers the context in which future research is actually performed. It therefore includes the use of research methods such as scenario studies, roadmaps and pathways. The paper outlines the framework and applies it to the conceptualization of a future hydrogen economy.

Developing Theory for Researching Future Expectations in Information Systems Innovations: the Case of the United Kingdom National Biometric Identity Scheme

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Since proposing a national biometric identity scheme in 2005, the United Kingdom (UK) government has made a concerted effort to steer public perceptions and expectations of the scheme. These efforts include an ongoing public relations battle with opposition parties and activist groups as well as the politicization of expertise about the scheme and its technological components (Martin & Whitley 2007). Such government efforts aim to allay concerns about the privacy and civil liberty implications surrounding the proposed technologies and practices within the scheme, the security of government data systems and the projected financial costs of implementing the scheme as originally envisioned. Quite often these public relation activities are concerned with what will happen.

Within the information systems literature, the notion of an 'organizing vision' (Swanson & Ramiller 1997) provides a useful concept to explain the development of innovative technologies such as a national biometric identity scheme. According to this research, such visions originate discursively and help guide innovation activities within organizations. Likewise, the field of science and technology studies (STS) offers a growing literature which examines the role of future expectations in scientific and technological endeavors (Borup et al 2006). This literature has shown that a lot of the work involved in new science and technology is prospective, imaginative and very much future-oriented. Importantly, these expectations can also be seen as a constitutive or performative force; enabling some scientific and technological possibilities and disabling others.

In this paper I attempt to marry concepts from research on organizing visions in information systems innovations and from STS research on the role of future expectations in new science and technology. I argue that although these two approaches have typically been applied in different contexts (the business organization and the laboratory, respectively) for

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research purposes, they are strikingly similar. Thus they offer an interesting opportunity to develop a joint visions/expectations framework to analyze the development of emerging technological systems. I intend for this conceptual marriage to illuminate the role of future-oriented discourse and activities surrounding ongoing developments in the UK national biometric identity scheme.

In particular, media representations about the scheme are analyzed, including the visual imagery that accompanies media reportage. I review and analyze public and semi-public expectation statements (Van Lente & Rip 1998) made by government about ongoing developments and practices surrounding the delivery of the scheme, including those that comprise the policy repertoire. I also review current focus group based empirical research into public understandings and expectations of biometrics, exploring the extent to which these mirror media and government discourses.

3.1.9: Cities

Creative Workers and the City: the Nature of Embeddedness

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A national Canadian research network, ISRN, is engaged in a study of the social context of innovation in cities. The project examines most Canadian census Metropolitan areas. In addition to the organization of work supporting innovative behaviour (Lorenz and Valeyre, 2006), a key consideration is the attraction and retention of creative professionals (Florida, 2004). The project methodology involves three streams of interviewing among which are interviews with individual creative professionals. In our work in Calgary, Alberta, we commonly identify candidates for these interviews by asking senior executives of firms and civic organizations to identify individuals who "would be hardest to replace". We regard this as an operational indicator of creative contribution, and it avoids bias toward defining creative as "artistic" that is the reflexive reaction of many interviewees.

A grounded theory type of approach applied in early stages of interviewing led to development of five hypotheses concerning the factors "embedding" creative professionals in the Calgary community. These are the following. H1: A socio-cultural environment rich in diversity attracts 'creative' people. H2: Economic opportunity is a key attractor and growth is auto-catalytic. H3: Specific urban/regional environmental attractions are critical. H4: Professional networks (w. strong links) are critical H5: Personal networks (w. strong links) are critical. Each of these hypotheses is formulated on the basis of factors identified in one or more interviews as critical to the relationship of the interview subject to the Calgary community and to the rationale for locating in the city as well as to intentions with respect to future mobility. The accumulation of interview results is permitting us to assess the relative importance of each of these factors. For the Calgary case, the interpretation of the qualitative results can be related to statistical data on creative worker populations in the Canadian CMAs and on mobility of creative individuals in Canada (Shearmur, 2007).

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Reengineering the Postindustrial City: Philadelphia and the Marketing of an Emerging Nanotechological Sector

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Philadelphia, a postindustrial and depopulating city, is geographically sandwiched equidistantly between two powerful, American metropolises, New York City and Washington

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DC. Metaphorically, and perhaps more significantly, the city is squeezed by an economic powerhouse to the north of its borders, and a political one, to the south. Since the 1980s, Philadelphia has steadily lost jobs and its population as its textile and other manufacturing jobs migrated first to America's southern states, and then overseas, in pursuit of cheaper and nonunionized labor (Adams, Barlet, et. al. 1991). Left in this postindustrial wake Philadelphia has experienced an increasing rise in poverty rates, violent crime and joblessness, year upon year since the 1980s. To address these problems, the city has embarked on several revitalization programs including a gentrification of its waterfront with casinos and up-market real estate developments, the creation of community development corporations, and an intensification in political support of entrepreneurial relationships between university-based science and engineering and the commercial sector within the city. In this paper, I explore some of the university-commercial networks emerging to develop a nanotechnological sector within Philadelphia and how actors within these networks are marketing nanotechnologies as a new technological-industrial base for the city.

Within the paper, I critically examine some of the arguments made in defense of globalizing industrial economies, namely as a manufacturing-industrial base is exported to foreign countries the industrial vacuum left will be filled with a knowledge or information economy. Certainly, this narrative is much more complicated than how those who support globalization tell the story, if not a fallacy in the case of Philadelphia (Sassen 1998, 2006; Rajan 2006). Interest throughout the paper is in how actors within academic science and engineering are aligning themselves with this globalization argument to commercialize their research in nanotechnologies, and to rebrand and market nanotechnologies to fit into the larger political efforts to revitalize Philadelphia as a globally and technologically competitive city (Giroux 2007). I make a strong link between Philadelphia's university-based nanoscience and engineering's relationship to political and commercial partnerships to build a nanotech sector within the city, and Slaughter and Rhoades's (2004) 'theory of academic capitalism,' where academic science's response to the 'new economy' is not to become 'corporatized' but rather to develop and take advantage of innovation networks that move between the public and private sectors in order to manage the new realities of corporate and venture capital research investments.

Assessing and Redesigning CO_2 and Health Effects in Long Term City Development of Rotterdam

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The greenhouse effect is challenging engineers to redesign cities to adapt and to mitigate for climate change. Organizing city development itself is already a complex design and engineering task. However, reorganizing a complex system as a city of several hundred thousand inhabitants, calls for new design and engineering techniques, as well as new organizing methods. Traditional methods do not solve the problems, since the use of these methods produced them.

During a six month period starting in December 2007, a changing group of engineers have collaborated in a sequence of several design and engineering conferences, to develop plans for a city of Rotterdam that would stand the challenge of CO_2 neutral city and a healthy city.

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The main task was to allocate the potential for effective changes in the city and to assess the spatial effects of design and engineering solutions. During the period of six month a new design method was developed. Parallel to that the organization of the team members was optimized by introducing elements for self-steering and self-learning management in action research. The combination of design and engineering with project management through a sequence of working conferences, was successful because of the consent decision making. With this tool smaller design steps could be assessed and decided upon. Parallel to that every team member had a means to evaluate the process of collaboration against the results of the design and engineering.

The method of action research combines the mining of data needed for the design and engineering task, as well as the design and engineering process itself. Action research means that an unsatisfying situation, an unhealthy and CO_2 producing city, is transformed into a more satisfying situation, a CO_2 neutral and healthy city. Parallel to that scientific research is performed. In this case the contents of the process as well as the process itself were monitored en if possible and if necessary improved. Therefore also data about the collaboration in the design and engineering process are collected and are used to improve the process.

In STS literature, little is known about designing social constructions, by stimulating processes of engineering and design with action research. This paper tries to contribute to the STS discussion whether paradigm shifts in social constructions of designers and engineers can be constructed to speed up the design and engineering process and to boost the problem solving capacity.

The paper will describe the components of the design and engineering process and will also elaborate the relation of those components with the process management and decision making tools. It will be shown that in the case of a CO_2 neutral and healthy redefined city of Rotterdam an interactive and constructive approach of appropriate technology could form a niche-paradigm in STS.

3.1.10: About Methods

A Critique of the Multi-Level Perspective of Technological Transitions

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Two ongoing challenges for researchers and practitioners alike concern:

a. how to improve our understanding of long-term technological change; and
b. the generation and refinement of perspectives and tools for the analysis of technological change, and for informing interventions related to the governance and management of technological change in practice.

Researching technological transitions offers the potential to provide a better understanding of technological change, for example to analyse factors enabling or inhibiting adoption of environmentally sustainable or energy-efficient technologies. In recent years numerous articles have been published which advocate a multi-level perspective (MLP) for the analysis of long term technological transitions. Two branches of research on transitions may be identified:

i.   systems in transition; and
ii. transition management.

This paper critically reviews current transitions research and considers the limitations of the MLP which need to be addressed to enhance understanding of processes of innovation affecting the transformation of technology and society. There are questions connected with the exposition and employment of the MLP which need to be addressed in order to appreciate better the merits of the perspective for the conduct of research and for informing practice. A key question concerns whether MLP research been conducted in a sufficiently systematic manner to enable fully developed accounts of the nature and dynamics of transitions and their effective governance. Other aspects concern the operationalisation of the MLP in relation to the organisation of data collection and analysis in studies of technological change in society, and the definition of alternative transition pathways by which such change may occur. With these matters in mind it is intended to subject the MLP to a critique, which will shed light on the applicability of the approach to analyse technological transitions effectively.

The paper thus highlights certain conceptual and methodological limitations of the MLP. Further, it considers how MLP research addresses the steering of technology by the State and others in society, and the relation of this to 'bottom-up' activities in niches of technology development, and relationships between niches with incumbent socio-technical regimes. Moreover, the paper considers the incrementality or radicalness of transitions and how so-called 'transitional' technologies break through into the mainstream. In its conclusion, the paper suggests ways in which the MLP may be effectively rethought, based on more thoroughgoing application of a co-evolutionary concept of technological transitions.

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STS Ethnography and the Freecycle Network:
Tensions in Practice and the Sustainability of Messy Methods

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This paper examines a grassroots sustainability initiative, the Freecycle network. The first part of the paper contains an ethnographic description of one local Freecycle group, describing tensions that arise between top-level descriptions of the group as an exercise in sustainability and the varied interpretations that participants make on a day-to-day basis. The second part of the paper explores the role of such an account of diverse and contradictory practices, in order to question the place of an STS perspective within the web of relations in which Freecycle participate.

The Freecycle network (http://www.freecycle.org) is a movement which claims over 4 million members worldwide, divided into small local groups focused around online mailing lists. Each local mailing lists consists of messages offering items which members no longer have a use for, and which they are offering for free to other members who want them. Items sometimes have considerable commercial value, but more often have little absolute worth and may have some damage. The person offering the item selects a recipient by email, and arranges a convenient time for the item to be collected. A successful Freecycle transaction sees the recipient arrive at the home of the original owner and take away the item, thus saving it from landfill. Original owner and recipient are usually meeting one another for the first time at the point of handover.

The Freecyle network is often described in terms of its contrast with conventional consumption. As "socially conscious consumers" (Shah, McLeod, Friedland, & Nelson, 2007) Freecycle members engage in alternative consumption practices (Nelson, Rademacher, & Paek, 2007), and participate in a "social economy" (Seyfang, 2006) linked to, but often in conscious opposition to, the mainstream economy. Freecycle networks form a "technologically generated community" (Chayko, 2007), focused around, although not confined to, online interactions. In the spirit of Law's calls for a responsible social science methodology that attends to mess and complexity (Law, 2004) and in homage to recent STS accounts that celebrate multiplicity (de Laet & Mol, 2000), this paper describes an ethnographic study of a Freecycle group which aims to do justice to diverse strands of meaning-making rather than reducing the group to such straightforward descriptions. Viewed from this perspective, the group's connection with sustainability seems to be achieved only as a result of considerable policing and soul-searching from a small number of members.

The production of such a description, however, creates considerable tensions, first in the relations it creates with image that the Freecycle network strives to create. By apparently describing what members are "really" doing, it risks being seen as placing itself in opposition to the group's own public portrayal. The messy description also places itself in a difficult position in relation to the various policy and funding audiences for studies of the Freecycle network, for whom more straightforward messages might be more palatable. By exploring these tensions the paper contributes to the ongoing STS concern with appropriate methodologies for complex situations and diverse audiences.

3.1.10: About Methods

Apes as Anthropological Identity Operators? : The Concept of Version Applied to the Study of Ape Cognition Research.

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Because of their phylogenetic proximity to humans, great apes (gorillas, chimpanzees, bonobos and orang-utans) have played a major role in cognitive studies. These researches have always been carried out under the representational tradition in cognitive sciences. Its main features are very well known: (a) behaviours are caused by domain-specific cognitions; as well as (b) cognitions are caused by specific organisms. All of this independently of the interactions between observer and observed.

However, the role of ape cognition has always been that of an "anthropological identity operator" (Despret, 2006), meaning that it has served as the touchstone for the configuration of human specific identity (a role also played by the "savage" or the "mad"). Following Despret's epistemological analysis of ethology, we would like to propose a model of science based on the notion of version that might allow us to think differently.

"Version" is conceived as a way of describing the multiple co-existence of different forms of knowledge. It opposes to the model of understanding science as "vision". Vision is concerned with different perspectives of "things-in-themselves", different interpretations of the same referent.

Using version in studying ape cognition research allows us to trace the possibilities of different approaches to these animals cognition from a non human-centred or specieist departure. In sum, "versions" allow us to trace how bodies and cognitions emerge out of the concerted research activities as results of the particular mutual affectation of apes and human researchers. This means, knowing would be a way of crafting mutual ecologies of bodies in becoming.

Exploring Anthropological Notions of Culture for STS

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The paper focuses on the concept of culture in anthropology and seeks to gain fruitful insights for the study of scientific cultures. As STS tends to concentrate on established sciences, the concept of culture is usually applied to scientific cultures as distinguishable entities. These obtain their analytic force as a result of their distinctness. Knorr Cetinas 'Epistemic cultures', for instance, focuses on the specific differences between two scien-tific cultures (particle physics and molecular biology) and what sets them apart along three dimensions (the empirical, object relations , social arrangements). On the other hand, studies in cultural anthropology are interested in aspects of change initialized through transcultural contacts, therefore investigations and theoretical approaches rather focus on contact zones between cultures. They aim to analyse transfer processes and the effects of transculturally

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linked actors.

The paper wants to explore what STS studies of scientific culture can adopt from anthro-pological theories on hybrid cultures and cultural transfer processes. As a first step, the theoretical approaches of Hannerz, Appadurai, Marcus, Clifford, Bhabha and others will be examined for their possible applicability for an analysis of scientific cultures. Subse-quently, the findings will be related with empirical data gained from an ethnographic study on 'nano culture' in Switzerland. Nanoscale research takes place within a myriad of disciplines. Thus anthropological approaches towards the blurred borders between cul-tures seem to be promising for the conceptual framing of the study.

Considering the concept of glocalization, 'nano culture' might be understood as analogue to globally spread cultural phenomena which are conducted in individual ways within the local settings, i.e. in our case institutes or (sub)disciplines. The study casts light on which common aspects this multicultural field shares, what cultural transfer processes take place, whether we can find the emergence of a new scientific culture as well as what sets it apart from other scientific fields. On a more abstract level the paper wants to point out possible criteria for distinguishing scientific cultures from one another. Thereupon it in-vestigates whether indicators for hybrid scientific cultures exist, based on the nanoscale research example.

3.1.11: Electronic Patient Records: Some Critical Perspectives

When IT Projects 'go Large' : Some Preliminary Thoughts on Analysing the Summary Care Record Programme in England

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Stories of failed large-scale IT projects in healthcare abound, though few have been written up as theory-driven academic analyses. The international spotlight has recently fallen on a project by the English Department of Health to introduce an online Summary Care Record (SCR) with the option for people to access their own record from any internet connection via a separate product called HealthSpace. Forty million records are being uploaded; a million staff in ten thousand organisations will have access to them. The SCR was a prominent election promise; a vocal 'opt-out' campaign is raising questions (some legitimate, some misguided) about security and civil liberties; technical suppliers are struggling with immature products and a tight implementation schedule; information governance arrangements are bemoaned as bureaucratic and unworkable; and clinical work - even for 'simple' conditions - is proving difficult to nail down.

If the project succeeds, it will make history. If it fails, it will be a major political embarrassment. The likely scenario is 'partial success', from which we (as the official evaluators using largely ethnographic methods) must draw lessons. We are considering three possible (and to some extent mutually compatible) approaches for our theoretical analysis:

1. Orlikowski's theory of technology structuration, which addresses how technology mediates the duality between social structure and individual agency. In his widely-cited theory of structuration, Giddens proposed three dimensions of this duality: interpretive schemas (which mediate the relationship between interpersonal communication and the 'structure' of social signification), the facility to allocate resources (which mediates the relationship between interpersonal power and the 'structure' of domination), and moral codes or social norms (which mediate the relationship between interpersonal sanction and the 'structure' of legitimation). The SCR structures the actions and interactions of healthcare staff through each of these pillars of structuration, and also through its material properties and affordances, which make some actions possible and others impossible or unworkable. Social (and organisational) structures, in turn, shape, enable and constrain how the SCR is used. All this develops over time.
2. Berg's model of technology-in-practice. The successful embedding of the SCR in the business-as-usual of healthcare will depend largely on the 'articulations' associated with bridging the gap between the complex, unpredictable reality of clinical work and the simpler, more algorithmic model of work that was in the technical designers' heads.
3. Callon's notion of 'the sociology of translation', derived from actor network theory (ANT), which views social phenomena as emerging from a dynamic network of both technologies and human actors. Key players interact to build heterogeneous networks of human and non-human actors, forming alliances and mobilising resources as they strive to convert an idea into reality.

In our presentation, we will apply these candidate theories to empirical data from the SCR evaluation and offer preliminary findings for discussion.

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Theorizing the ICT Artifact. The Case of Electronic Patient Records.

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This presentation will outline the evolution of an Electronic Patient Record system over a period from 1995 to 2007 at Rikshospitalet in Oslo, Norway. In 1995, the hospital embarked on a large project together with the 4 other regional hospitals in Norway and a global software and medical technology vendor. The aim of the project was to develop one integrated system offering these hospitals an electronic version of the patient record containing all information and satisfying all user needs so that the paper record would be totally removed.

When the project stared, a survey across the hospital identified 5 different systems with some kind of patient record functionality covering needs for smaller user groups within limited domains like for instance the children's hart and the thoracic surgery sections. A review of the situation in 2003, after 8 years of development, showed that the system developed so far covered about 30% of the amount of information and number of forms included in the paper record. At the same time, the number of local systems with patient record functionality had grown to 135. Based on these facts, the hospital decided to change their strategy. They gave up the aim of developing one singe system covering all information and user needs and instead focused on establishing a portal as an umbrella over the existing and dynamic portfolio of systems. This new strategy has so far been more successful, but not free of hard challenges or risks.

Based on empirical material from this case, the presentation will discuss various ways of theorizing the ICT artifact, including ANT, SCOT, Thomas P. Hughes' theory of large technological systems and more recent developments within the information systems research field conceptualizing the ICT artifact as information infrastructure. Emphasis will be put on the ontological status the theories attach to the technological artifact.

The Electronic Patient Record as Discourse in Primary Care

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The EPR is an integral feature of the primary care consultation in the UK. Far from being a passive container for information, or representative of "how things are", it is an active constitutive agent in the consultation. Berg has highlighted the role of the EPR in structuring, shaping and transforming the consultation, enabling and constraining communication.

Compared to the paper record, the EPR has been described by Iedema as having a wider organisational reach, supporting discourse which is generalising rather than particular to the clinical encounter. The EPR occupies ambiguous territory, serving purposes which are simultaneously specific to consultation and to the wider organisation. It highlights inevitable tensions: the formal and the informal; the differentiation and de-differentiation which arises

from categorization; the complex patient narrative and the minimum data-set. Users of the EPR must manage these tensions and this requires work. As such, the EPR plays a significant role in reconstituting practices, although it is not prescriptive of practices. Rather, there is a co-construction of the EPR and practice.

Discourse analysis (DA) is the study of "language in use" and recognises that language is fundamentally social; language does work and produces meaning. Iedema refers to the EPR as an "organising discourse". Little attention has been paid to the EPR as a discourse in its own right and this study will make an important contribution to this area. For example, the EPR may support some discourses and exclude others. It may be a site of struggle between the wider socio-political discourses prevailing in primary care and the individual experience of clinician and patient. The discourses within the EPR may provide insights into the nature of primary care both at the level of the individual consultation and more widely.

A GP-ethnographer is making detailed field notes of observations and "naturally occurring" talk within clinical and non-clinical areas of GP practices. Documents and memos relating to EPR use are being collected. To date, video-recordings of 25 consultations have been made, alongside parallel screen capture recordings of the dynamic EPR-in-use. Merging these two streams of video data creates a unique permanent record of how the EPR and the consultation are "co-constructed". We are currently exploring different traditions of DA to help us develop our methodology for detailed analysis of this rich and complex data set. We will present our progress and describe the challenges that a novel multimodal data set presents to the discourse analyst.

A Systematic Review of
Electronic Patient Records using the Meta-Narrative Approach:
Empirical Findings and Methodological Challenges

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Systematic reviews are central to the enterprise of evidence-based medicine (EBM). However, traditional 'Cochrane' reviews have major limitations, especially when dealing with heterogeneous methodologies or an applied setting. The meta-narrative review (see Soc Sci Med 2005; 61: 417-30) is one of several new methods that seek to address pragmatic policy-level questions via broad-based literature reviews.

Inspired by Kuhn, meta-narrative review takes a historical and paradigmatic approach to considering different areas of research activity. As an interpretive tool, the approach seeks distinct research traditions, each with its own meta-narrative. We then use these 'stories of how research unfolded' as a way of making sense of a diverse literature. Incommensurability between different traditions is seen not as a problem to be lamented or resolved but as a window to higher-order explanations about the nuances of empirical data and what these nuances mean for different applied situations.

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Having originally developed the meta-narrative method for a study of the diffusion of innovations in healthcare, we are now applying it in a review of the electronic patient record (EPR) in an organizational context. We have collated some 600 papers and books across multiple research traditions including health informatics, information systems research, computer-supported cooperative work (CSCW) and sociology. This very contemporary topic area is raising interesting methodological questions. For example, the EPR literature does not comprise as cleanly delineable traditions for four main reasons:

1. Information and communications technology research is a particularly fast-moving field, so paradigm shifts are relatively common (e.g. the rise of CSCW out of human-computer interaction research).
2. In the electronic age, it is easy for researchers to explore beyond their own discipline and 'borrow' theories, ideas and methods from elsewhere. Journal editors may commission overviews from experts in another tradition; authors may explicitly address an audience in another tradition. Research traditions can begin to converge (e.g. papers bringing together CSCW, information systems research and STS).
3. Some researchers are adept 'boundary spanners', writing for a number of different academic audiences and adapting their theoretical pedigree to fit (e.g. Marc Berg).
4. Some traditions are characterized not by a single unified paradigm but by active dialogue between competing paradigms (e.g. 'hard' versus 'soft' perspectives on knowledge management).

This work contributes to the STS literature by critically questioning the nature of rigour in secondary research. The EBM movement values 'Cochrane' reviews because they meet positivist criteria (e.g. they are rational, objective, replicable, data-led, and transferable across contexts). In contrast, the meta-narrative review is interpretive, reflexive, problem-oriented and work-led, and makes no claim to either replicability or transferability. Rigour is redefined in terms of plausibility, authenticity and usefulness - raising the radical suggestion that the evidence base for key policy decisions can never be set in stone.

A Social Network Perspective for Studying the Impact of Information and Communication Technology on Hospital Staff Interactions

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Introduction: Information and communication technology (ICT) is being introduced into clinical settings worldwide. These systems are designed to support information flow amongst health care professionals and decision-making by them, with the ultimate aim to improve patient care. Yet evidence is emerging that such systems may significantly disrupt existing communication patterns, contributing to new types of errors.

We still lack good data about the extent to which communication within and between health professionals occurs, or the networks through which information is conveyed. We do know that good communication and teamwork are core to high quality patient care and that breakdowns in communication processes have been consistently identified as major causes of errors.

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Drawing on a social network perspective we are provided with a method that allows examination of the complex exchanges of information that occur between clinicians in their day-to-day work. Using this perspective we have studied interactions between individuals, up to the level of interactions occurring amongst the entire staff of a hospital ward or department.

Method: Communication patterns between staff in three units of a teaching hospital (n=211) were measured using social network analysis. Questionnaires which listed all staff in a unit, sought information from respondents regarding with whom and how often they interacted in order to ask for help to solve work-related problems, to seek advice regarding medication decisions and tasks, and to socialise. Very high response rates were achieved in the three units (96%, 94%, 85%). Data were analysed using social network software, UCINET. Network density, geodesic distance, strength of ties and reciprocation of relations were measured to study the cohesiveness of the networks, and centrality of individuals was measured to identify the "hubs" of connections in the units. Netdraw was used to produce social network diagrams, which allow a visual examination of the patterns of interactions in the network structures. After the introduction of an electronic medication management system, the network structures will be re-examined.

Findings: Across all three hospital units studied, staff were found to mainly rely on colleagues from within their own professional group for help to solve work-related problems, for advice regarding medication decisions and tasks, and for opportunities to socialise. That is, nurses interacted mainly with nurses, and doctors interacted mainly with doctors. However, in each of the units there were individuals who provided help and medication advice to many staff from a range of professional backgrounds. Overall, the number of individuals with whom people interacted, and the average frequency of interaction was quite low across all networks in all hospital units studied.

Discussion/Conclusions: Given the demonstrated link between communication and errors, the overall infrequency of interactions amongst staff on average, and amongst members from different professional groups in particular, has implications for quality of care and patient safety. With the extensive introduction of ICT planned and underway in the health sector, which may further disrupt the communication, it is exceptionally important to understand the information networks that connect hospital staff, and to study the impact of ICT on these networks.

Complexity of Orderings:
Examining Ontological Politics of Coordinating
Large-Scale Electronic Service System in Care Settings

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During the last decade, there has been an unprecedented amount of ideas introducing electronic service systems within health and social care settings in England. Accompanied by a range of different narratives about, for instance reducing cost, increasing efficiency, empowering people, such systems are conceptualised to facilitate care practices, particularly those related to patient-level data, audit, population health management, planning and

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commissioning. This heterogeneous diversity, evident in Electronic Health Records (EHR), however, may create unpredictable tension when different elements are attempted to be bundled together: during building a system. While there are limits to the capacity to model and control (cf. Law 2004), this paper presupposes that the focus of an empirical investigation on EHR (for instance) should be on processes related to achieving and maintaining stability of objects prominent in care settings that would enact such a record. This, consequently is not about framing spatial belongings across boundaries, or illuminating different perspectives, but instead coping with different objects that are produced in different ways (cf. Mol 2002). Moreover, the implied multitude of different object realities, suggests a primary focus on the way in which these different but overlapping practices (fail to) reconcile and adjust within complex settings. Highlighting the incredible amount of work required to mutually adjust, for instance different existing record systems, this paper contrasts the notion "Knowing in Practice" (Orlikowski 2002), particularly in relation to the way components in a network or system may influence another. By juxtaposing various forms of "coupling" (Perrow 1999), forms coordinating the building of common assorted objects, such as EHR, is aimed to be shown. In specific, this conceptual discussion will be illustrated by two praxis-oriented ethnographic form of enquiries, conducted in sites in the North of England related to the organisation of care practices. It, thereby, will contribute to an understanding of objects, and issues surrounding their orderings, encountered in practices related to health and social care.

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ALARA or Precaution on Chemical Issues:
How Policy Affects our Perception of Science

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Certain chemicals have increasingly come under attack over their potential environmental health risks. Where the science is insufficiently conclusive, or activist pressure too strong, EU regulators invoke the precautionary principle - effectively regulating out a substance in favour of less-tested alternatives. This 'either-or' approach ignores the complexity of the chemistry. Precaution works in black or white issues but not with hazardous chemicals, where the choice of alternatives may not be clear, but its benefits widely accepted. Activist campaigns target chemicals, but provide scant argument on how enjoyment of the benefits arising from these chemicals can be maintained. The precautionary principle does not restore trust, but rather stokes further fear of chemicals.

The precautionary principle is ultimately destructive to the public image of science. The David Gee application of precaution puts the burden of proof on scientists to prove that their work is safe. This is extremely difficult. Biomonitoring testing confirms our exposure to synthetic chemicals in our blood, tissue and urine, offering an uncomfortable choice: give up the benefits these chemicals are bringing or better manage exposures. In other words, take precaution or apply ALARA (As Low As Reasonably Achievable). ALARA is used widely in the nuclear and vaccine industries, where benefits are clear and risks need to be managed. The public accepts the risks where industry is committed to working to ensure that any exposure is kept to as low as reasonably achievable.

Chemical issue managers should articulate ALARA as a risk management tool. Indeed, the chemical industry has ALARA unintentionally built into its product stewardship and Responsible Care® philosophies, with its commitment to continuous improvement throughout the value chain. The paper examines several voluntary commitments to lower emissions (PVC and flame retardants). ALARA is about managing the risks, precaution is about evading them. Chemical management fits the ALARA mould more that the precautionary one (which fosters mistrust in science and stifles innovation).

This paper defines precaution and ALARA and shows how the two policy tools affect our perception of the risk issues and, accordingly, our perception of the role of science.

Scientific Uncertainty and the Selection of Evidence in the
Assessment of Agri-Chemical Mixtures

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Research in Science and Technology Studies has explored the role of science and the outcomes of chemical risk assessments in the construction and justification of policy decision-making. These studies on risk assessment and regulatory practices highlight the

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significance of often tacit assumptions and expert judgements in the shaping of advisory recommendations. This study hopes to build upon existing research in the field of regulatory science to explore how UK advisory group members working in the area of pesticides manage scientific uncertainty when producing risk advice.

Exposure to agri-chemical mixtures present in foodstuffs has been highlighted within the scientific literature as an area of uncertainty where many conclusions are based on expert judgement. Despite this acknowledgement, recent policy documents issued by the UK Food Standards Agency (FSA) suggest that the risk to human health from exposure to mixtures of pesticide residues in food is likely to be small, a finding that has been challenged by both members of the scientific community and by several pressure groups. This study uses both documentary and interview data to critically evaluate how scientific uncertainty is understood and managed in the creation of advice and policy regarding exposure to pesticide residues in food. The analysis draws upon the concepts of boundary work and interpretative repertoires to understand how advisory groups map out the boundaries of what they believe to be scientific and in turn explores how this may influence the selection and use of evidence in the production of risk advice and regulation.

Preliminary findings suggest that whilst UK advisory group members working within this field accept the inherent uncertainty in their own scientific practice this contingency is stripped away from their regulatory advice; thus, scientific facts are presented as more certain than the scientists themselves believe them to be. The implications of these findings will be discussed with respect to both the current process of regulatory decision-making and the potential consequences for consumers exposed through their diet to mixtures of agri-chemicals.

Contaminated Places, Environmental and Health Impacts: Complexity, Uncertainties and Vulnerabilities in Portugal and Brazil

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Science and technology involved in chemical production and use produce risks and uncertainties that can generate environmental and health problems. Population and institutional vulnerabilities in some countries and places aggravate these impacts. S&T advance produce short term economic and social benefits in this area. Risk analysis techniques and the production and consumption paradigm guide most of the public policy development, promoting a "toxic culture" and neglecting the quality of life of local communities and the uncertainties in long term predictions of health and environmental damages.

We claim that these policies should be anchored in the precautionary principle and the righ to know principles. The question currently guiding most chemical policies is: 'How little damage is possible?' whilst we defend that the question should be: 'How much damage is safe?'. Normal science is a decision-making mechanism, that isn't able to address the problem, most of the times. It doesn't take into account the complexity, uncertainties and vulnerabilities of the chemical contamination case. On the other hand, local knowledge produces and expresses social, political and cultural values and claims neglected by

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scientists and technicians in the contaminated environment decision process, who consider theirs as the only kind of acceptable knowledge.

The contaminated environments of Estarreja (Portugal) and Cidade dos Meninos (Brazil) are the selected case studies of this research, both considered here as a "toxic culture" product, complex systems, with technical, political, social, cultural and economic interfaces and population and institutional vulnerabilities presence. The work's main objective is to understand the ways of (non) interaction between local and technical-scientific knowledge involved in the decision-making process realted to contaminated places. The study methodology is anchored in participant observation, interviews and focus group with the actors involved and analysis of related documents (news, scientific reports, data produced by NGOs and local groups). This paper discusses the main results of the work up to now.

Strategic Idealizations of Science to Oppose Local Environmental Regulation: a Case Study of Six TMDLs

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This paper is based on a study, funded by SKAPP (Scientific Knowledge and Public Policy), of six TMDL (Total Maximum Daily Load, or an identified pollutant) controversies in eastern Pennsylvania. TMDLs for each "water" in the US (e.g., lakes, streams, rivers) are generally prepared by state regulators, approved by the federal EPA (Environmental Protection Agency), and then issued to point source dischargers (such as a municipal wastewater facility or a factory) to set the maximum discharge of a particular pollutant (e.g., nutrients causing exessive algal growth). Environmentalist literature in law has suggested that stakeholders use idealzations of science (e.g., high standards for science reflected in the "sound science" movement, or high demands for certainty) to delay, weaken, or avoid environmental regulation, and we wanted to test that hypothesis by analyzing a data-base of scientific arguments in opposition to TMDLs (the arguments were identified in comments made upon issuance of a draft TMDL, in legal documents during an administrative appeal, and in technical reports by scientists hired by stakeholders to oppose the scientific analyses of the government agency. We did not find explicit idealizations (e.g., demands for error-free science or certainty), but we did find implicit idealizations in arguments that offer no threshold for uncertainty, that fail to consider the effect or magnitude of errors, or that fail to offer alternative analyses. We concluded that such arguments were not very effective as strategies to dealy, weaken, or avoid regulation, but that they were employed as "placeholders" to allow time for an administative appeal, for negotiation with relevant governmental agencies, or for more rigorous scientifc arguments. The study also resulted in some insights as to the effectiveness of TMDL regulation, the ethics of lawyering, the problem of burdens of proof in regulatory challenges, and the role of uncertainty analyses in environmental law.

Dealing with Emission Allowances: How Companies Learn the Fundamentals of the EU Emissions Trading Scheme

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The EU ETS defines very basic rules for controlling greenhouse gas emissions in some industries. It has also created a new tradable object (the "emission allowance") that companies have to deal with if their industrial operations fall under the jurisdiction of the scheme. Companies have been provided with a material infrastructure for allowance trading and have been allocated a known number of allowances at the beginning of the trading period in 2005. However, they often face substantial uncertainties regarding the development of their own demand for emission allowances over time, regarding the price development for the allowances and the regulatory future of the trading scheme.

This paper analyses how the emission allowances move through a company and become an object of classification and interpretation. The allowances become meaningful for a company while they pass critical junctures of material infrastructures, technological fixes, organizational routines and professional logics. This contribution builds on qualitative company case studies that have been conducted this year, aiming at a reconstruction of the decision-making processes within the company and the emergence of a company specific carbon-strategy in which the tradable allowances are included. The paper will demonstrate that an emission allowance can become very different sorts of objects, depending on the organisational unit within the company that mainly deals with it. Allowances that are dealt with by a professional trading floor are different objects than allowances that fall under the responsibility of the production unit or of environmental management. Data from the case studies will be used to elaborate on these differences.

The data stem from a project on company behaviour in the EU ETS in the UK, Germany, Denmark and the Netherlands. The project combines quantitative surveys with qualitative case studies. By this, a deeper understanding of the materiality of this "virtual" market becomes possible. This analysis contributes to the STS literature in at least two respects: First, the EU ETS aims at facilitating the switch to less carbon intensive innovation trajectories, and it is important to understand how companies try to make sense of carbon trading in order to assess the Scheme's potential to achieve this objective. Second, the paper contributes to STS debates on practices of technology development, policymaking, legal decision-making and corporate governance.

Making Things the Same: Gases, Emission Rights and the Politics of Carbon Markets

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This paper seeks to contribute to a material sociology of markets by analysing the development of carbon markets: markets in permits to emit greenhouse gases or in credits

earned by not emitting them. It will describe briefly the route that has led to their emergence. It will then delve a little deeper into the conditions of possibility of these markets, by examining two examples of what it takes to make the entities traded in these markets 'the same'. The examples are how the destruction of one gas in one place is made commensurate with emissions of a different gas in a different place, and how accountants have sought (so far with only limited success) to make 'emission rights' equivalent. The paper concludes by discussing the attitude that should be taken to carbon markets (for example by environmentalists, especially those who conceive of themselves as opponents of 'capitalism') and the possibility of developing a 'politics of market design' oriented to making such markets more effective tools of abatement. Methodologically, the paper is based upon 24 interviews with participants in carbon markets (as market designers, traders, brokers, etc.) and an analysis of documentary evidence concerning the commensuration of gases and the accounting treatment of emission rights. Although the paper will draw upon a 'finitist' perspective, the main underlying theoretical framework is actor-network approaches to the understanding of markets, and the paper suggests that the case of carbon markets is a rich instance for developing and fleshing out an analysis of this kind.

A Market of EPIC Proportions:
Finance (Re)Configured in the London Stock Exchange

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The recent history of British finance has often been presented in terms of a dualistic cultural transformation, transitioning from a state of gentlemanly affairs to one of globalized casino capitalism. The standard narrative has thus focused on human actors and the (legal) structures that surround them. The purpose of this paper is to give a different account, namely, one that highlights the role of material entities as central factors in formatting the London stock market and the relations that exist within it. For this, I present and analyze two inter-related stories. The main one concerns the technological career of the London Stock Exchange from 1960 to 1990, the period during which automated computer systems were introduced to the marketplace as part of a broad drive towards the 'modernization' of finance in Britain. This is related to a second account, namely, that of the re-definition of information as an ontologically independent entity within several fields, finance included. It is shown that the emergence of the modern variety of screen-based finance can be located at the intersection of these two stories, where 'information' became meaningful in terms of flows mediated by digital computers.

Using 14 interviews with the main programmers, developers, coders, and project managers of the Stock Exchange's technical services division, I explore the manner in which the re-defined concept of information was materialized through the numerous automated systems that populated the City of London, making these distributed networks the new locale of financial activity. This argument is exemplified through the case of the Exchange Price Information Computer (EPIC), which stood at the core of the Stock Exchange's market information systems.

3.1.13: Towards a Material Sociology of Markets

Weather Matters: Thermometers, Equations and Models in Weather Derivatives Trading

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Managing the weather (and weather effects) has been a long-held dream of many individuals, businesses and governments. The creation of weather derivatives markets around 1997 developed the financial terrains within which weather could be managed and valued. No longer was weather something that could only be proximally hedged, it could now be directly hedged by trading on weather indexes. This paper will examine the financial, technological and meteorological networks bound up within the creation and practices of weather derivatives trading. Drawing upon in-depth interviews with weather traders and a variety of secondary sources, the paper will outline and analyze the ways in which weather derivatives have become financially established and legitimated. Finances, companies, meteorological instruments and pricing mechanisms (a difficult factor in weather trading) highlight the extended networks within which weather trading operates and which weather trading also transform and re-negotiate. The paper will focus specifically on the role of this extended network of (predominantly 'non-human') actors in making and re-making these markets in weather. This attempts to integrate a social studies of finance with a social studies of meteorology (science) and explore the ways in which these interrelate within the example of weather derivatives.

The Awkward Materiality of Housing Markets

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The tradable objects of housing markets are highly heterogeneous, locationally fixed, hard to price and slow to turnover. They are a strange hybrid of money and materials; an awkward mix of consumption goods and financial instruments. Economics, nevertheless, tends to focus on what these objects share: on the properties of 'sameness' which help analysts tease out the (increasingly important) implications of housing markets for the macro-economy. There is, moreover, an effort within financial markets to make certain attributes of housing 'the same' so they can be traded in derivative form, just like most other major financial assets. This paper draws from original data to ask whether and to what extent the drive to sameness is compatible with the material sociology - the technologies, accounting procedures, bodily practices, emotional energies, and physical fabrics - of housing markets. The answer engages with some current conceptual and methodological debates; more critically it has enormous economic implications.

3.1.14: Acting with (e-)Governance

E-Governance for Artisans: Intellectual Property, Networked Culture, & the Promiscuity of Freedom in Peru

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In mid-2006, the Peruvian government awarded an intellectual property (IP) title - in the form of a geographic indicator known as a Denomination of Origin - to a traditional ceramics made by the artisans of the northern coastal town of Chulucanas. The acquisition of the Denomination of Origin for Chulucanas Ceramics was celebrated by the state as the launching of a larger plan to promote the use of IP rights among rural populations as a "culturally-sensitive" strategy for regional development. Implemented as part of Peru's electronic governance policy and highlighting its reliance on the resources of new information technologies, the initiative promised to simultaneously preserve the cultural practices of rural and indigenous populations, while at once preparing those populations for the modern, globalized, information-based economy. This paper thus undertakes an ethnography of Peru's IP-for-development project, approaching the initiative as representative of a key turn in developing states where culture is increasingly being summoned as the strategic resource for regional and economic development. I find that key to the success of such projects is the state's work in cultivating partnerships and relationships of "promiscuity" between actors with diverse and often oppositional interests. In Chulucanas, these include transnational exporters, Lima-based government planners, cosmopolitan designers and consultants, and rural artisans themselves. Such projects further rely on tactics that seek to remake traditional artisans into modern, individual authors and IP-rights holders - reskilling ceramicists to be less like provincial artisans and more like sophisticated, market-savvy entrepreneurs who can respect and navigate the logics of the global market. These strategies of the state reveal that despite its claims to undertake the work of cultural preservation through its promotion of Chulucanas as a productive site of culture as intellectual property, its interventions there have in fact produced precisely the opposite effect - compromising the longevity of traditional cultural production and the forms of associativity in Chulucanas that sustained such practices. This study suggests that, counter-intuitively, rural communities may have to be as concerned with successes of e-government initiatives as they are with its failures.

Computerization Movements, Business Strategy and Society

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The aim of this paper is to show empirically how the situated practices of a software corporation, when entangling with the choice of a Free/Libre and Open Source Software (FLOSS) business strategy, bring to a re-definition of future society, as well as the re-definition of the same practices of the software company.

The issue of the interaction between FLOSS as a way of producing software with a sharing-attitude in the copyright regime, and the profit - driven companies in the software industry arena has been understudied in the Science, Technology, and Society field. This paper draw

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on a 20 months cyberethnography on the OpenSolaris project, backed by one of the big players in the software industry, Sun Microsystems, in order to describe the interaction between the two different social worlds involved as mediated by the different visualization of cyberspace that the different collectives have developed and enacted.

In the first part of the paper, I will describe these visualizations, the Sun Participation Age, and the FLOSS political program, in relation to the practices that sustain and shape their ways of constructing problematizations: if the Sun point of view is rooted in the necessity of being accountable in front of shareholders, and the necessity to make strong a problematization of FLOSS, it is shaped as a societal move to the Participation Age; the FLOSS political program is backed in the history of software programming practices, and put sharing at the center of a civic spirit that needs to spread.

The empirical data show how this interaction is actualized in the construction of a technological infrastructure supporting the life of the OpenSolaris development project, and it is the infrastructure, in the shape of a communication one, done of mailing lists, blogs, and chats, that opens spaces to re-define in multiple and competing ways what Sun is, what FLOSS is, and what kind of society is visualized. That is a more participated and free one, enacting a re-distribution of power between producer and user of technology and creating spaces for open criticism to the role of powerful entities.

The Influence of Institutions in the Selection of Programmes of Action

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One interesting insight from the STS field is the idea of understanding the power relations behind the development of technologies, and how the outcome of conflicts of interests are translated into programmes of action and inscribed into technology (Bijker, Hughes and Pinch, 1987). The way people appropriate technology, nonetheless, is deeply related to their institutional environment, which has the power, in some circumstances, to configure or manipulate these programmes of action (Orlikowski, 2000). Ultimately, some organizations and social collectives simply may not appropriate technologies which are not coherent with their rules, values and cognitive schemas, even in circumstances in which the referred technologies are pervasive and distributed for free, such is the case for many Internet tools and communication channels. In an interpretive study (Habermas, 1981 [1968]) focused on virtual communities (qualitative method based on 58 in-depth interviews), members revealed how community leaders created two main strategies to protect their governance structures from the undesirable influence of Internet tools which could potentially foster more decentralized decision-making processes in their online interactions. The first strategy was the customization of the adopted Internet communication channels in ways which fostered centralized governance structures. A second strategy was the rejection of tools which could be disruptive to their institutionalised social structures, based on the argument that members did not have enough knowledge to appropriate such technologies.

Drawing on empirical data, the investigation suggests that social collectives may appropriate Internet tools that are coherent with their social institutions. This is especially valid for

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contemporary societies. In the face of the large variety of Internet tools (and forms of customisation) which is available, often for free, each collective appropriates programmes of action which are interpreted as adequate in relation to their institutions. The study thus contributes to the STS literature by analysing the relevance of specific programmes of actions in relation to institutional practices, particularly in an environment such as the Internet in which a great variety of inscriptions is available.

3.1.15: Investigating Relations between Technology, Expertise, and Skills

Global Knowledge Production and Local Community Relations: the Subaru Telescope and its Social Relations

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This paper examines how interactions between science and society affect scientific practices in the case of the Subaru Telescope. In particular, it studies how local issues become important in globalized practices of knowledge making.

The Subaru Telescope of NAOJ (National Astronomical Observatory of Japan) is the largest single-mirror optical telescope in the world with some technological most advanced features. Being the first of the major scientific facilities in a foreign land, the Subaru Telescope signifies one aspect of globalization of knowledge making in science. Japanese scientists envisioned this project within an international competition in astronomy, and had to overcome various bureaucratic barriers in order to have such a facility overseas.

In order for the observatory to operate, scientists have to pay attention to local issues, in particular community relations. The history and culture of Hawaii raise sensitive issues for all the observatories located on the summit of Mauna Kea. Being foreigners in a US territory, which, however, contains a large population of Japanese immigrants, Subaru scientists were put in an unusual situation in their scientific practices. Unlike many astronomical observatories, located in a remote place with little social interactions, Subaru scientists are confronted with direct contact with very different cultures. Recognizing the importance of community relations, Subaru scientists make various efforts to make their observatory acceptable to the locals.

Thus, the case of the Subaru Telescope provides an interesting case how scientists deal with interactions between scientific facilities and its local community. The focus of this paper is more on the perspectives and practices of Subaru scientists. It studies how issues between scientific institutes and local communities affect scientific practices of Subaru scientists.

This study is based on an on-going oral history project on the Subaru Telescope, "The Sokendai / The Kohala Center Oral History Project." Sokendai (or the Graduate University for Advanced Studies) is a unique university in Japan, which consists of inter-university research institutes (IURIs), Japan national research institutes that provide facilities for inter-university uses, including NAOJ. As a leading graduate university in Japan, Sokendai recognizes importance of STS education in order to produce a new generation of scientific leaders with knowledge and sensitivities about social relations of science. In 2004, it started a research project to study relations between its IURIs and society. In 2008, As a part of this research project, Sokendai launched a collaborative research project with the Kohala Center, "The Sokendai / The Kohala Center Oral History Project," which aims to collect oral histories interviews on the Subaru Telescope, focusing on the controversies over the use of the summit area of Mauna Kea.

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Shifting Skills in Laboratory Action:
Implications of the Mechanisation of the Mini-prep

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Though many contemporary biotechnologies occupy controversial positions within society, for example GMO's and human embryonic stem cells, innumerable basic biotechnologies are in routine use in laboratories throughout the world. Within STS many such tools and techniques have been characterised in terms of practices, protocols and embodied actions (eg. Rabinow, 1996; Jordan and Lynch, 1992, 1998), and while these maybe becoming standardised, they continue to incorporate the skills and local knowledge of human practitioners.

The paper extends this model, and offers a systematic analysis of three, increasingly automated forms of the plasmid mini-prep. Drawing on Collins and Kuschs' (1998) theory of action morphicity, which provides a framework for analysing the same action carried out in different ways, the paper compares the "home brew", kit-based, and fully automated versions of this procedure. It suggests that each version involves the same series of steps, though ones which are progressively delegated to machines. While this could be seen as part of the 'deskilling' of laboratory scientists, the paper suggests that the shift towards the fully automated form of the mini-prep does not involve a reduction in the skill required by laboratory researchers, rather it implies a shift from one skill set to another.

The paper draws on empirical data collected by participant observation in two UK laboratories in 2003 and 2005. The laboratories differed in a number of theoretically relevant ways, including the number of researchers present, their physical size, location, and balance of academic and commercial research focus (one being primarily academic and the other housing researchers from both academia and industry). Both observations were carried out over continuous three month periods, during which large, diverse and multi-modal datasets were generated. Data was anaylsed using a number of tools as appropriate to their medium: audio-visual data was analysed using Transcriber, in order to examine in detail the work of 'discovery' (Lynch, 1985) conducted around inscriptions generated in and through embodied/mechanised actions; while fieldnotes were analysed using NVivo (N7), in order to identify similarities and differences in multiple examples of 'the same' action.

The paper stands as one of few attempts to apply the theory of action morphicity (Collins and Kusch, 1998) to examples of practical action in the biosciences. As such it confronts a number of the problems involved in identifying the shape of actions by observation, and further, in attempting to uncover the nature of the skills and expertise that make such action possible and meaningful. While the study adopts a naturalistic and explanatory orientation drawn from SSK (Bloor, 1991), 'observable indicators' of action morphicity have been drawn from a variety of perspectives in STS, including ethnomethodology, conversation analysis and and actor-network theory. Insofar as these theoretical positions in STS are frequently represented as being in conflict with each other (as in Pickering, 1992, for example), this paper suggests how they can be used together in order to explore the nature and basis of scientific actions in practice.

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Performing Aging Cells through Imaging: Microscopes, Flow Cytometers and the Regulation of Blood Products

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Imaging practices are an important aspect of scientific activity and that is particularly evident in biological and biomedical research. This paper deals with the visualization of erythrocytes (or red blood cells) and their damage.

And let us proceed by briefly presenting the scenario. It is now well established that (in health and under normal condition) human erythrocytes have a life span of 120 days ending with the removal of the old effete cells from circulation. It is also well known that during storage in blood banks erythrocytes undergo a series of changes - including shape transformation (as it occurs during the normal in vivo aging of these cells) -, collectively referred to as the storage lesion, and that transfused erythrocytes are rapidly removed from the patient's bloodstream; the proportion of viable cells at the time of transfusion - as determined by their post-transfusion survival - is a current standard for the use of red blood cell concentrates. In the domain comprising research aiming at a better understanding of the mechanism(s) of the storage lesion of red blood cells, research on the conditions of storage for transfusion as well as on the assessment of red blood cell viability in stored units, the visual culture - as present in the published specialized literature - is significant and the ways of performing aging (or injured) cells through imaging seem worth to explore.

In this paper we will examine the place of imaging practices and the role played by the images produced - mainly transmission and scanning electron micrographs and flow cytometric imagery - in the dynamics of knowledge production and the related regulatory procedures.

The Robust Science and Technology

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After the social turbulence and awareness of the negative effect caused by modern science and technology in the 1960's, Japan made various efforts to promote science and technology that can meet social expectations and demands. The Delphi analysis, for example, has been carried out to integrate experts' opinion on timing of realization and social application of emerging technologies. Recently, however, an increasing number of technologies complete their maturation only after they are applied in the society. The society becomes an open laboratory for emerging technologies. Because of complex interrelation among scientific, technological and social factors, fates and impacts of technologies are becoming more and more unpredictable with existing foresight procedures.

Since the 1970's, the Japanese government, academics and industries have been promoting the Comprehensive Science and Technology (ST), an integration (fusion, convergence) of

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different disciplines. Brain science, including projects such as 'Understanding', 'Protecting' and 'Creating' the Brain, is still developing as one of the largest parts of the Comprehensive Science. In Cognitive Robotics, for example, robots are used as a platform to integrate diverse disciplines in order to understand human cognition and behaviours [1]. As early as in the 1980's, the ministry of health and welfare decided to promote the development of robots, which would serve for humans in the predicted aging society. Researchers have been trying to develop robots that can leave the controlled laboratory or factory and environment and interact with the general public in society. It is declared in 2007 that knowledge and technologies obtained from such studies should be managed to contribute for human learning/teaching, health/welfare and labor/security.

The Japanese now realize both useful and insufficient aspects of the Comprehensive ST. Most procedures have been multi- or inter-disciplinary ones. Thanks to Japanese propensity of 'closed-integral' activities (su-ri-a-wa-se), however, trans-disciplinary integrations have also taken place time to time. Now that emerging technologies can have greater social impacts that may propagate ever quicker than before, it is required to explicitly manage the Comprehensive ST and to develop new strategy to extract desirable effects from unexpected combinations of knowledge and/or technologies.

I propose herewith the Robust Science and Technology, in which sciences and technologies in different layers of phenomena (in size, time, complexity, place, community, meaning, value, etc.) are interconnected as redundant and flexible networks. The networks as a whole are designed to be robust as regulatory processes sustaining homeostasis of biological systems. The Robust ST is expected to facilitate not only the integration of unexpected combination of knowledge or technologies in diverse disciplines but also precaution procedures related to emerging technologies, and help preparing preventive measures against devastating influences of an emerging technology in case that it runs wild.

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Imaginatively Inside

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The operations internal to computational devices remain invisible to users because they never step imaginatively inside them unless their profession is one in which members go about their work by reading and writing in code. Instrumental rationality as a particular logical anatomy is irrelevant to us. We can manipulate these technologies without having to know how or why they can do what they do at the computational level. In praxis, what facilitates the emerging fit of new technologies into co-ordinated worksite activities is rather the availability of representational controls, processing outputs, flexible user-level configurations and relatively seamless access to the objects of work. This is a condition by which the technology is transparent and the workings of particular devices are non-reducible agents as Berg points out (1998: 475-476), "whose logic and ontology is not predetermined but emergent, always remaining an empirical matter."

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This paper is about the open-ended constitution of a worksite which takes this depiction to a test. It is based on a longitudinal study in which the electronic component of ongoing organisational interaction was auto-recorded. I agree with Berg that the logic of technology-in-use remains an empirical matter. However, I will argue that instrumental rationality is an important characteristic of that logic when it is negotiated between social actors with and through the very same technology whose logic is emerging, and through which the "irreducible agent" is reducible to them. Those who work in data / document management, for instance, are trained to adapt imaginatively to the insides of structured systems of sorting objects, converting them, transmitting, intercepting and so on. Those who do not read or write the code that facilitates these manoeuvres nevertheless share to some extent, with those who do, a practical approach to instrumental rationality with which they envision to get on with this work. As this study demonstrates, a break-down in the articulation work which goes into successfully accomplishing everyday tasks, is not inevitably a collision of somehow principally different rationalities. Rather, the intelligibility of and access to internals of worksite facilities varies both in scope and degree amongst members across the organisation and the activities associated with it. As I see it, there are practical and procedural relationships at work as co-operative work arrangements evolve, the rationale built into worksite facilities are tested, articulation work is reiterated, learning enforced, and new designs and engineering proceed.

The studies which have profoundly informed the development of this paper are ethnomethodological studies of work and technology in action. I draw considerably from Button and Sharrock (1995, 2000), Hindmarsh et al. (1998), Heath and Luff (2000), Heath et al. (2001), Luff et al. (2000) and Suchman (1995, 1998, 2000, 2007). Other scholars I draw from are well known in the STS literature, such as Agre (2003), Berg (1998) and Woolgar (1987) on the performative character of human-device interaction and related issues.

3.1.16: Rethinking Relationships between Public Engagement, Participation, and
Policy/Non-Policy Contexts as Sites of Action

Deliberadicalism: Difference and the Failures of Input/Output Models of Public Engagement

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Practical models of engagement found in the literature on public engagement with science and technology pull strongly, if not solely, from the concept of deliberative democracy. Literatures on deliberative democracy, however, contain a wide variety of approaches that often disagree on central issues concerning the structures, outcomes, and practicalities of deliberation. One crucial 'turn' in the recent literature on deliberative democracy is the move away from the liberal constitutionalist values that predefine set preferences of actors found in the deliberative setting. This 'turn' is, very consciously, a response to the literatures on radical democracy. Some of the central tenets of radical democracy (e.g., the focus on pluralism and difference) have become widely accepted by many who fall under the 'deliberative' heading, prompting my own term, 'deliberadicalism'.

Given that appeals to 'deliberative democracy' are so predominant and that this theory of democracy structures, defines, and limits modes of engagement according to various dictates of the 'deliberative' approach, understanding the effects of this turn to radicalism is crucial for the STS literature that focuses on practical models for public engagement. How do the ways in which we have traditionally defined 'engagement' depend on the particularisms of a specific deliberative democratic approach? Has the recent turn away from predefined liberal values as guiding principles for communicative action in the deliberative democracy literatures affect the models for public engagement currently available? How do these changes affect how we understand evaluative criteria for engagement?

This paper will suggest that many of the conceptual problems and shortcomings of current models of public engagement are a result of the failure to properly situate models of engagement in a particular deliberative literature. Problems of consensus, reifying preexisting inequalities, expert/non-expert boundaries, communicative interaction, etc. are all handled in radically different ways among the democracy literatures that identify as 'deliberative'.

By appeal to a specific theory of deliberative democracy, deliberadicalism, this paper will re-analyze evaluative criteria for public engagement events. Focusing on a disagreement-sensitive theory of deliberative democracy that takes the notion of 'difference' as central to deliberation, this paper will argue for a broadening of what counts as a 'deliberative' model for public engagement and in turn what sorts of metrics of success ought to be employed.

Taking the non-policy oriented Choices and Challenges Forum at Virginia Tech (which positions itself as a public engagement project), as well as the recent Theatre Workshop in Science, Technology & Society (TWISTS) initiative at Virginia Tech (which positions itself as a model for engagement through theatre), I will argue that any deliberative model for public engagement with science and technology that takes seriously the recent trends in the deliberative democracy literatures will have to discard old input/output models for successful deliberation in terms of policy or consensus and take deliberation across intractable differences as a catalyst for fostering a more general democratic attitude as a real measure for success.

Engaging Theater: from Science-Theater to STS-Performance as a Mode for Public Engagement

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Recent literature and practice on public deliberation of science and technology has begun to open non-policy-oriented spaces for consideration. While public participation in policy assessment of S&T is a crucial goal, it cannot stand as the only goal of public deliberation and engagement. Mutual learning, individual and community empowerment and political mobilization, expression and mobilization of antagonisms, awakening alternative perspectives, self-discovery and self-expression, and knowledge formation are all important goals for such work and may require different sorts of approaches.

A recently initiated project at Virginia Tech, the Theatre Workshop in Science, Technology, and Society (TWISTS), attempts to create alternative spaces for and modes of public engagement and dialogue with controversial S&T issues. Avoiding an explicit "policy" orientation, this project uses an innovative performance-workshop model that borrows liberally from both community theater-practice and STS theory to create unique forums for various publics to engage with multiple perspectives and contending forms of expertise. Central to this model is the activation of "expertise" from both traditional and non-traditional sources in a setting that mixes dialogue, performance, and movement. Moving from existing models of science theater, with their traditional sensibilities about science, expertise, and knowledge, this project instead builds a science and technology studies performance model that fosters critical engagement with notions of expertise, sources of knowledge, and expectations of authority. In crossing disciplinary boundaries, in recasting and decentering expertise, in challenging participant's comfort and allowing free expression of both "logical" and "non-logical" positions and ideas, this approach to community dialog promises outcomes that are difficult to achieve in other, information and talk-oriented approaches.

In this talk I briefly outline the TWISTS project, situating it in the larger domains of both science-theater and public engagement with science and technology (PEST). Once so situated, I explore the strengths and weaknesses of this approach with respect to various goals of public dialog/deliberation/engagement events. Success for this project relies little on the measurement of policy changes.

Reconstructing Models of Scientific Literacy via Science, Technology & Society Theatre

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Jasanoff (2005) has suggested that efforts to increase the public understanding of science provide a lens through which to understand the tacit democratic theory of both science and the state. This paper builds upon this argument to examine underlying assumptions about ideal and possible relationships between science(s) and public(s) embodied in the ways in

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which we measure 'scientific literacy' and 'public attitudes towards science'.

The empirical material for this exploration is drawn from evaluation data collected at the 2007 premiere of THE NUCLEAR POWER PLAY, an original performance developed by a new organization, the Theatre Workshop in Science, Technology & Society, which brings together experts on the social and technical dimensions of science and technology with theatre arts practitioners to develop original performance pieces with the goal of facilitating dialogue about contemporary scientific and technical controversies amongst student, public, and professional communities.

TWISTS, founded and co-directed by two STS scholars, is a public engagement project that does not seek to facilitate direct public impact on policymaking. This paper thus also contributes to discussions of what counts as 'action' or 'impact' as STS scholars undertake reconstructive projects in non-policy contexts.

The National Science Foundation defines scientific literacy as "knowing basic facts and concepts about science and having an understanding of how science works" (2005, 7-15). Scientific literacy is important, according to the NSF, because "[t]hose who possess such knowledge are better able to follow science news reports and participate in public discourse on science-related issues. An appreciation of the scientific process may be even more important. ... in evaluating and assessing the validity of any type of information and participating meaningfully in the political process" (2005, 7-15).

The NSF explicitly links measurements of scientific literacy to what they term 'public attitudes towards science', in that increased 'scientific literacy' is thought to engender more positive attitudes towards science and scientists. The NSF measures 'public attitudes towards science' via four Likert-scale survey questions:

1. Science and technology are making our lives healthier, easier, and more comfortable;
2. With the application of science and technology, work will become more interesting;
3. Thanks to science and technology, there will be greater opportunities for future generations; and,
4. The benefits of scientific research outweigh any harmful results (2005, 7-23).

For this study, THE NUCLEAR POWER PLAY attendees were asked in pre- and post-performance surveys to respond to the NSF's 'public attitudes towards science' questions. The paper employs this data to challenge the relationship between science(s) and public(s) embodied in the NSF's interpretation of the 'public attitudes towards science' survey results by asking whether the goal of non-policy-informing public engagement projects should be to increase trust between scientific and technical experts, policymakers, and public(s) or, instead, to create more critical and oppositional perspectives? In other words, this paper asks, is a 'bad' attitude towards science necessarily a 'bad thing'? The author concludes by suggesting that science, technology and society theatre can be a useful site to foster the creation of more critical models of scientific literacy.

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Engaging STS, Energy Alternatives, and a Local Community: an (Inter)Active Approach

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In conjunction with the theme of this conference, this presentation explores the issue of alternative energy from within a public, community outreach event meant to highlight the various ways energy can become a matter of concern. In particular, how can insights from science and technology studies be used to disaggregate valuable components of the alternative energy issue from its dominant conceptual frame of a technical problem guided by technocratic expertise? The event examined is an "Energy Alternatives" symposium and fair held in central New York state, U.S. The format of this symposium, organized by the presenter, offers tours of facilities representing alternative modes of power production (methane digesters, wind farms), along with a panel discussion of the ethical, historical, and social/political (at the community and state levels) aspects of the energy question. Also, community activist groups and local alternative energy companies will be present at information tables to interact with attendees. In addition to these more traditional modes of expertise, an art exhibit and essay contest runs concurrently, filled with submissions from symposium attendees and other local community members, which highlight the energy question as they see it. Using a modified photo/voice technique to encourage multiple levels of participation and ownership of an issue, this exhibit helps to complement and challenge the "expert" framing of the problem. This presentation, then, examines the means by which one can put STS insights to use - the complexity of technological systems, the expansion of the concept and political utility of expertise, and the manner through which different stagings of technoscientific problems and expertise can empower and/or constrain audiences in terms of their perceived competencies and roles. Relying on attendee interaction and exit survey data, I will explicate the promise and pitfalls of this mode of putting STS into action and engaging/transforming a public.

Situated Knowledges and Praxis: Performance as Analysis of Women and Minorities in Engineering Contexts

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This paper will report on a devised original performance that arose out of a concern about the attrition rates of women and minorities in engineering and the role of pedagogy in addressing these issues. The performance took place in the context of a day long teaching and interactive theatre workshop at Virginia Tech entitled "'The Quiet Crisis Intervention: Inventing the Future by Engaging Today's Students." The performance was produced by Professor Leslie Pendleton, and written and directed by Professor Ann Kilkelly and MFA Theatre graduate student Megan Carney. The specific goals of the performance were to increase awareness of gender equity issues in engineering education, establish the need for attitude changes, and to consider specific action steps that could be implemented at Virginia Tech. Our analysis of the project, however, will focus on the ways in which using devised and

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interactive theatrical techniques offers new and important avenues for the praxis of situated knowledges as well as constituting a site for STS scholars to analyze knowledge in the context of multiple, and sometimes conflicting, sites of production.

We argue that this performance put Donna Haraway's notion of situated knowledges into practice. We argue that the work of devised theatre has specific applications for grappling with situated knowledges because it gives voice to members of the relevant communities (in this case the research of engineering educators concerning women and minorities in engineering) as well as the participants in building the performance at various levels (including collaborators as well as performers, scholars, and students from theatre disciplines). In this specific case, the performance manifested a variety of feminist positions within academic research on gender and engineering. In ways that are often difficult for a single textual document to handle, particularly forms dominant in academic writing, the performance in the context of this workshop made possible multiple frameworks of analysis to be active simultaneously, disrupting ideas about "one correct way to frame the problem." We will argue that this method of combining devised theatre methods with an area of research (specifically one that embodies conflict or desire(s) for change) offers crucial opportunities for research. Further, the embodied character of this practice resists the construction of universal narratives and is more reflective of both feminist and STS frameworks.

Finally, the paper will argue that the project employed a specific set of theatrical techniques that constitute new methods of analysis and as such should be regarded as research that is of particular importance to STS scholars. We draw on materials collected in the process of building the performance such as the academic research that was reviewed, meeting minutes, interviews and feedback from actors and workshop attendees. Most importantly, we argue that the process of building and enacting the performance itself is research. We contend, such work has particular applications for STS research, especially in terms of having impact in other communities, both scientific and otherwise.

3.1.17: Dealing with Unanticipated Consequences and Unintended Side Effects

From the Ethics of Technology towards an Ethics of Knowledge Policy & Knowledge Assessment

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In my contribution I will reflect upon the difficulties of developing ethical frameworks for (new) technologies in the context of an ethics of responsibility. The principle shortcomings of contemporary ethical theory with regard to the challenges of scientific and technological development. A key -deficit of classical ethical theories are, that they addres the issue of ethical responsibility in terms how intentional actions of individuals can be justified. Scientific and technological developments, however, have produced unintentional consequences and side-consequences. These consequences are very often the results of collective decisions on the way we wish to organise our economies and society, rather than from individual actions A case is made for the need of an ethics of collective co-responsibility. Such an ethics should focus on the ethics of knowledge assessment and knowledge policy in the framework of deliberative procedures, rather than on the ethics of technologies as such. Furthermore, I will outline some deliberative procedures and processes in the science-society interface in which ethical issues concerning new technologies should be addressed.

TA as Side Effect - Side Effects as Primary Concern of TA

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Originally, the technology assessment (TA) concept was aimed at developing a scientifically based and research-oriented consultancy, analysing current and potential societal impacts of technological innovations. In the opinion of the authors, this basic concept, based on the principles of research, assessment and advice, has still not become outdated. However, the further differentiation of scientific and technological "progress" results in problems that change the relation of the intended goals of technology and the unintended consequences. This change cannot only be assessed as cognitive phenomenon but increasingly manifests itself as a societal problem.

We will support a TA concept with a stronger focus on (re-)considering and reflecting on the unintended side-effects from a factual, social and temporal point of view.

Even on the first view it is easy to recognise that almost everything about the TA concept has been criticised and put up for disposal - except for the idea of impact orientation. The classical definition still seems to be sufficient to lend satisfactory theoretical conviction to the concept. The fact that decisions can often be justified as a result of their effects and by their effects sounds trivial and is practiced millions of times every day, but how this can be done scientifically and rationally remains largely unclear. The "classical concept" only contains the advice that the impact analysis must be comprehensive and should include all possible relevant social, legal, political, economic, and technical consequences and effects. However,

3.1.17: Dealing with Unanticipated Consequences and Unintended Side Effects

this does not say anything about the specifics of an impact analysis, namely the reflection of consequences in a complex world.

EU Policy on Biofuel Crops: Predicting and Limiting Harm?

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Biofuel crops have been increasingly promoted as a means to mitigate problems of climate change and energy insecurity in the common good. EU policy on biofuel crops has set a target for nearly 6% of liquid fuels by 2010 and 10% by 2020. To achieve the target would depend upon significant imports from the global South, where production of similar crops has already caused harm - e.g. higher land and food prices, greater agrichemical usage and community dispossession. For those reasons, many critics have raised doubts whether or how the EU targets should be fulfilled.

There are proposals to regulate imports through sustainability criteria, in order to avoid or minimise additional damage. As currently proposed, those criteria emphasise aspects which are most readily measurable, e.g. savings in carbon emissions and protection of special 'biodiversity' areas. Controversy continues over how to predict and limit any harm, especially in the global South.

Although biofuels are not widely seen as a technology, the EU controversy can be analysed in ways analogous to contentious technological developments. Recent expansion of biofuels has been driven by the 'bio-refinery', an industrial reorganisation which integrates feed, fuel and other industrial uses of the same crop. GM crops are being designed to extend those agri-industrial systems for global commodity flows. Even where biofuels were initially intended to meet national needs, with some regulatory scope to protect local populations and environments, these protections are being undermined by global competitive pressures).

Those tendencies can be analysed through co-production perspectives: how technology is co-produced along with specific forms of nature and society. In this case, the agri-industrial integration both stimulates and depends upon wider changes in social relations of power over human and natural resources. Views of EU sustainability criteria make assumptions about those relations. Amidst disagreements over likely global effects of EU biofuel imports, there are divergent assumptions - about cause-effect dynamics, productive efficiency, sustainability and relevant comparators, e.g. counter-factual contexts. These assumptions can be analysed by using a discursive-frame analysis.

3.1.18: Science and Globalization

The Center and the Periphery

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For over a hundred years, physiologists studying human performance have debated the causes of fatigue. Nineteenth-century scientists applied recently discovered laws of thermodynamics to the human body. Early 20th-century industrial physiologists, following contemporary medical advances, searched for a "fatigue toxin." Some physiologists today argue that fatigue starts in the brain. Based on seven months of participant-observation and interviewing in human performance laboratories, I argue that this rather technical debate over causes of fatigue in fact locates the science of human performance within the world system.

The paper opens with a "thick description" of two human performance laboratories, one in Austin, Texas in the U.S. and one in Cape Town, South Africa. Separated by a vast stretch of ocean and several months, my first days in each laboratory were strikingly similar. Scientists eagerly piloted a novel instrument they hoped would measure "cardiac output," a pivotal step toward solving the riddle of fatigue. In many other ways, the daily practice of both groups was similar. However, participant-observation in the Cape Town lab illuminates a dimension of this science that would otherwise remain invisible: the tremendous amount of electricity it demands. Scientists who study human performance aim to recreate whole worlds inside environmental chambers, simulating wind, sun, humidity, altitude, etc. In addition, they connect human subjects to a shocking number of instruments (and accompanying computers), from sensors detecting brain oxygenation to rectal thermometers determining core temperature. In Cape Town, generators were necessary to offset the regular threat of a metropolitan power outage. Extension cords and electrical outlets were limiting factors. In light of Latour's work on the cost of the production of scientific knowledge and laboratories, that the ability to engage in the debate over causes of fatigue demands resources is predictable.

In this case, however, I emphasize that the ability to measure human power fundamentally relies upon the ability to secure material power. That ability is ultimately political and economic, and the world system is invoked as issues of access to and consumption of energy appear as crucial in the laboratory as they are in the world.

I then highlight the perspective of one South African scientist, who is currently taking on what he considers the entrenched and incorrect view that fatigue starts in the muscles, where lactic acid builds up due to a lack of oxygen in the blood. This form of fatigue is known as "peripheral fatigue." Rather, he maintains, fatigue starts in the brain, "the central governor." This scientist's passion does not derive just from the fact that he thinks he is right. He is also fiercely loyal to Africa and argues that new ideas are more likely to come from the outside and that he and his colleagues are more likely to think outside the box and less likely to be bought out by big business than their peers in the North. The world system is once again implicated as the debate over physiological center and periphery becomes simultaneously a way to debate geopolitical center and periphery.

3.1.18: Science and Globalization

From New Deal Institutions to Capital Markets: Commercial Consumer Risk Scores and the Making of the US Subprime Mortgage Market

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At the tail end of 2006, the 'subprime' hit the news with a bang when default rates shot up in a segment of the mortgage market that had previously received little attention in mainstream reporting. Against rising central bank interest rates, and following the collapse of the housing bubble, borrowers bearing certain high-risk classes of loans ceased to maintain their repayment schedules. By the turn of 2007, the unanticipated inability of lenders to raise enough capital from borrowers impeded their own instalment payments to international residential mortgage backed securities (RMBS) holders. Major subprime lenders declared bankruptcy and several high profile hedge funds imploded. As regularized transnational circuits of capital flow broke down in the space of only a few months, the problem amplified into a financial crunch that soon took on global proportions. A critical observation that has emerged from these events is the displacement of the New Deal institutions called government sponsored agencies (GSEs) which have traditionally sustained the U.S. mortgage market. The recent subprime mortgage crisis has drawn attention to the fact that these agencies, which once dominated the market, have largely been replaced by risk tolerant channels of lending, securitization and investment fueled by international investment banks and private capital players. How has U.S. mortgage finance been rendered open to the practices of high-risk investment that appeal to big capital players? Surely, something might be said about the genesis and development of subprime finance as a novel space of lending in and of itself.

This research traces the movement of a scientific tool - commercial consumer credit analytics - into mortgage underwriting as a means of demonstrating that what might look like the spontaneous rise (and fall) of an ostensibly 'free' market divested of direct government intervention, has been thoroughly embedded in the concerted movement of calculative technological devices.

The paper tracks how a particular GSE interpretation of commercially available consumer risk scores adapted to automated mortgage underwriting gave rise to a bipartite market: composed on end of by the conventional risk-adverse 'prime', and on the other by the infrastructurally independent, high-risk 'subprime'. Instead of appealing to the 'irrational psychology of investors', 'the naivety of borrowers', or the 'dishonesty of lenders' to explain the global subprime credit crisis, the contribution of STS is to show the technical constitution of an internationally invested subprime market - at once a class of U.S. consumers, a set of alternative mortgage products, and a tranche (risk class) of a mortgage backed security available for capital investment- as a viable and coordinated space of high stakes financial action.

3.1.18: Science and Globalization

The Case of Measuring Tools for 'Social Quality' in Global Supply Chains

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This paper is part of my PhD research on Corporate Social Responsibility and the sweatshop issue. In my PhD, I examine the way in which various Western actors contribute to foster the concern for the labour conditions in developing countries by constructing "social quality" as a relevant element to be taken into account in market exchanges. Facing protests, most multinational firms adopted codes of conduct in the 90s. But activists refused to take the declarations of firms for granted. Then "social auditing" appeared, defined as a formal examination of the working conditions in a factory (according to a standard and a protocol). In most cases, the Western firm chooses the standard and then requires its suppliers to be audited on the basis of this standard. The purpose of these firms is clearly to prove that they are concerned with the sweatshop issue and that they are trying to check if all their suppliers are compliant with the core labor rights. In this way, social auditing tends to connect the workers in factories (whose working conditions are assessed) with the final consumers (who are supposed to be one of the recipients of the results). The purpose of this paper is to focus on the tools of measurement of "social quality" so as to:

▷ analyse what exactly is measured through this tool,
▷ examine what happens when the measure circulates.

The empirical data are two-fold. First, I have conducted interviews with social auditors, I have attended training sessions on social auditing, and I have collected guidelines referring to various standards. Second, I have focused on the case study of a Belgian firm whose suppliers are audited according to a standard used by around 70 European brands and retailers. I have collected all materials used for the assessment of the factories (which are confidential documents), I have gone to Bangladesh to see social auditors in action in certain factories, and then I have observed how the Belgian firm used the "grades" of its suppliers.

In sum, through the case of the standardized assessment of "social quality" in factories, my paper will question the link between "scientific" practices and market practices. Moreover, since I examine the tools of measurement of "social quality", I will undoubtedly have to question how my own research contributes to the construction of this emerging field of activity.

Designing Epidemics:
AIDS, Policymaking and Global Norms in India

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This paper is about how an epidemic becomes visible, is experienced and understood. I use national-level policymaking around the Indian AIDS epidemic as a case study, and examine

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the models and technologies the government deploys to measure and map the epidemic, and plan public health interventions. The national policymaking, and its models, are dominated by global actors, global categories and a globalized discourse about AIDS. The global actors bring with them a foreknowledge about the epidemic. This foreknowledge provides an already existing template of an AIDS epidemic which helps mold the national government's strategies and tools. The prior models, categories and information that the generic foreknowledge bring in leave little room for surprises - and arguably come in the way of learning new lessons. Thus, while this talk is about national policymaking around AIDS, it is also about the workings of globalization and how globalized epistemic models and categories 'touch down' in the South. The paper contributes to the growing literature at the intersection of STS and globalization by exploring how public health policy, and the concept of public health itself, are being reconstituted in an age of globalization.

3.1.19: Engaging with Converging Technologies, I: The Politics of Convergence

Converging Technologies:
Engaging with The Ghosts in - What Machine?

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The rise of 'convergence' as a discourse in technology and innovaton has been a remarkable element of contemporary science and society developments. Conventional regulatory philosophies have assumed that prediction of impacts (usually risks rather than benefits) was the central issue - and that it was feasible in a credible manner. Latterly instead it has been attempts at prediction, or 'foresight', of what technologies will be developed to have such impacts, which have been to the fore. Thus 'horizon-scanning' and 'foresight' seems to have been institutionalised everywhere in science policy and related areas. If it is no longer meaningful - if indeed it ever was - to found social regulation of technologies on claims to credible prediction of impacts, and when the political economy of science intensifies innovation and commercialisation such that claims to prediction and real-time regulation of technology commitments themselves looks increasingly incredible too, what is left for regulation and such fevered activities as 'public engagement' to engage with, other than ghosts? This paper will argue: first that social benefits claims, promises, purposes and conditions have been insufficiently included in regulatory appraisal processes, regardless of the degree of ambition and 'convergence' of the technologies in question; and second that the imaginations of social uses, ends, and purposes of the programmes underpinning convergent technology innovation and the scientific research deriving from it, also need to be critically and publicly scrutinised and challenged as forms of normative social commitment being materialised through the construction of science-embedded promises which are negotiated into credibility for particular audiences such as venture-capitalists and other big investors. If these shifts were to be made, then the complexity and impenetrability of convergence technologies would not in itself matter as an ostensibly distinct problem. I will use the example of synthetic biology - a form of NBIC convergence - to illustrate these points.

The Converging Technologies Agenda:
the Stakes and the Prospects

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This paper is based on the first report submitted by the EU Framework 6 'Knowledge Project' on the social and intellectual impacts of the 'converging technologies' (CT) agenda, i.e. the bringing together of nano- , bio-, info-, and cogno- sciences and technologies for 'improving human performance', to recall the title of the influential 2002 US National Science Foundation report. My own report consists of an examination of historical and policy literature relating to the CT agenda, also reflecting upon interviews, many conducted by partners in other European countries.

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There is an ongoing struggle between the US and EU to define the direction given to CT agenda. The US appears to be winning this struggle both in terms of influencing science and policy discourse and the scholarly literature worldwide, though it is unclear whether they will result in long-term substantive changes in science and technology itself. But what exactly is at stake in the difference between the US and EU perspectives?

The US strategy aims to leverage short-term practical breakthroughs in nanotechnology into a long-term basic research agenda that would enable revolutions across all of science and technology. In contrast, the EU strategy discusses CT in more modest terms, allowing for multiple convergences amongst different disciplines. Indeed, it is ultimately less concerned with the future direction of science than on what Joseph Schumpeter meant by 'innovation', that is, the conversion of an invention to a successful market product. Under the rubric of CT, the EU proposes incentives to break down cross-disciplinary barriers to enable new ideas to be brought to market more effectively. At the same time, the EU sees itself in a more regulatory role. Where the US initiative calls on both the state and business to reinforce already existing trends in nanotechnology, the EU initiative is much more explicitly about the reorientation of scientists' behaviour from their default patterns to what the 2004 EU report edited by philosopher Alfred Nordmann called 'shaping the future of human societies'.

Lurking beneath differences in formulation, the alternative US and EU readings of CT tap into radically different sensibilities that are somewhat occluded by euphemisms. In the US case, the phrase 'improving human performance' can be sharpened up to refer more explicitly to a project of enhancing individuals by making them - and their offspring - smarter, stronger, etc. This project presumes a sense of biological evolution that might be expedited to the overall benefit of the species by interventions at the level of individual species members. In the EU case, the phrase 'shaping future societies' suggests a more holistic and less invasive approach that focuses on enabling people to live more sustainable lives, where the state or some inter-state authority like the EU is seen as the protector of social equilibrium. In terms of contemporary ecological politics discussed at the start of this report, the US approach is 'proactionary' and the EU approach 'precautionary'.

Providing a Space for Critical Reflections

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Over the past three years I conducted a research program on Bionanoethics. We did frequent visits in French laboratories working in nanotechnology and biotechnology in Paris, Toulouse Strasbourg and Grenoble. Observing what scientists are doing and listening to what they think about their research we have learnt that:

1. Most scientists interviewed are taking advantage of the nanoinitiatives for pursuing cognitive aims, without any concern with applications. Their research is instrument-driven but in their view it is not application-driven. Technological applications are just an excuse for raising funds.
2. They want to keep their disciplinary agendas and radically distrust the hype and promises surrounding nanotechnology. This nanocynicism is expressed through repeated

3.1.19: Engaging with Converging Technologies, I: The Politics of Convergence

complaints about the national science policy which fosters targeted research programs and consequently threatens the autonomy of research.

3. A number of scientists are strongly opposed to the paradigm of converging technologies. In particular they reject the goal of "enhancing human performances". They consider the convergence program as a typical American fantasy, the product of a competitive society encouraging individualism. In brief, they quickly identify the cultural roots of current technology research.

Consequently I will not support the view of nano as a "predecessor technology". Rather I will argue that we should not take the notion of convergence for granted. I will suggest that as social scientists we should create spaces for critical reflections about the social and cultural values embedded in current research programs. Furthermore we may have to engage with those scientists who are trying to resist and help them in shaping an alternative agenda.

Converging on Error:
Some Methodological Lessons for Technology Forecasting

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The history of assessments of the social impact of technologies, and the history of problem of predicting technological progress itself, provides some lessons of a "methodological" kind. In this paper I will identify some of these lessons and discuss their relevance to the category of converging technologies. The larger problem that these methodological lessons pose is whether there is any meaningful sort of expertise about these issues- whether there is a kind of expertise about technological expertise- that warrants deference or a serious role in policy-making. These lessons are familiar, even banal, but have not been specified in any detail, perhaps for that very reason.

The first lesson involves the problem of alternatives: if other available technologies are pushed to their limits, would they have similar results? For historians, this is a complex problem of contrafactual reasoning, depending on plausible assumptions, which often produces surprising results. When Fogel and Engerman considered the impact of rail roads on the development of the South, for example, they concluded that it was limited- steam boats, more intensively used, would have provided the same economic boost.

The second lesson involves unintended consequences. A technology may prove useful for unanticipated reasons. The US Geological map project of the 19th century was controversial because of its one mile to the inch scale, which was not precise enough for rail engineering. But it was excellent for the roads needed for cars- a technology not in existence when the project was planned.

The third lesson involves errors resulting from baseline projection, which plays a role in all forecasting. Examples are endless, but an obvious one relating to convergence of technologies is this. The comfort station movement in the US called for the construction of a huge network of vast mile-square areas to serve the toilet needs of air travelers, before the creation of in flight facilities.

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The fourth lesson involves path dependence and resulting errors of retrospection. Decisions to invest in given technologies appear to be vindicated by success. But the technologies or choices that were not invested in might also have succeeded, or worked better, had they been invested in. But without the record of investing down a particular path, one cannot know what would have occurred, and therefore whether the choice that was made was a comparative success.

3.1.20: Tensions in Standardization, I: Stability and Change / Local and Global

Strategies for Using
International Domain Standards within a National Context:
the Case of the Dutch Temporary Staffing Industry

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This paper will elaborate on strategies for using international domain standards within a national context. The first strategy is mainly aimed at achieving international interoperability, while a second strategy is more or less aimed at efficiently setting up a new (national) standard while making re-use of the international standard. Other strategies combine the re-use aspect with goals of international interoperability. Often the concept of "localisation" is being used as an extension for adding national specific aspects as part of the international standard. Often localisations are being misused for adding more than only national specific aspects, which makes it an easy way to adapt the standard to the specific needs. However, this has often a negative impact on interoperability and the quality of the standard.

These strategies are explained by using a case study of the temporary staffing industry. The international domain standard hr-XML is being used worldwide and uses the concept of localisation for adding specific "local" (means national) needs. Within The Netherlands, the local SETU (Foundation for Electronic Transactions within the Temporary Staffing Industry) standard has being developed based on this international standard and is being released in the first quarter of 2008. The national SETU uses guidelines on how to deal with the tension of using an international standard within a national context. This case study shows that almost all "local" needs are merely normal maintenance requests to the international base standards. Instead of adding them as localisation to the standard, they could have been added to the international base version. Reasons like "we need to use them right away" (instead of waiting till the new international release), or "it's too time-consuming to add the need as maintenance request to the international standard" are being used for adding general needs into localisations.

The paper will elaborate on these lessons learned and will conclude with a model containing contextual variables as indicators for selecting an appropriate strategy for dealing with international domain standards within a national context.

Negotiating Changes in Water Flows: Global Policies and
Local Standards in Regional Water Management 1970-2000

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How do knowledge infrastructures, as carriers of standards, catalyze or obstruct processes of change towards more sustainable practices at a local level? The proposed paper aims to analyze this issue by presenting a case study on Dutch regional water management.

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According to Bowker & Star (1999), infrastructures are the result of processes of standardization. These infrastructures are, amongst others, characterized by their embeddedness in a certain institutional constellation, and their strong links with conventions of practice. This accounts for the resilient nature of infrastructures, and consequently, a considerable resistance to change. One other characteristic Star attributes to infrastructures, is that changes within them, and hence the standards developed and used, always have to be negotiated at a local level.

Standards play an important role in water management. Parallel to the changes in Dutch water management in the period of 1970 until 2000, the standards developed and used in water management at a local level changed as well. The new standards developed were mostly aimed at establishing a new 'master narrative' (Star, 1999) of Integrated Water management. These local processes of change have been highly political processes. One explanation for this might be the largely generic, or 'global' character of the national policy made up in this period. On the one side, a wave of centralization increased the pressure on regional water managers to implement national policy. On the other side, national policy makers seemed to be hesitant to constrain the autonomy of regional water managers, i.e. Water Boards, too much. The global character of the newly made policies resulted in an important role for local negotiation processes in deciding how these policies actually were to be implemented within the current practices. This led to a situation in which these policies were implemented in some regions a bit more, and in other regions a bit less progressively. Also content wise, the policies were implemented in very diverse ways. An analysis of the local negotiations on the standards to be used thus reveals the tension between, on the one side, globally defined policies; and on the other, the existing knowledge infrastructures supporting governmental organizations, which are increasingly bound to implement these policies.

For analyzing this issue I will present a case study on the changes that occurred in the knowledge infrastructure supporting a Dutch Water Board in the period 1970-2000. The case study is based on historical research, in which primary sources as interviewing, reports and publications of actors involved have been used, as well as secondary sources such as previous historical research. The proposed paper contributes to the literature on the role of networks, knowledge and standards in policy implementation processes, which is an issue that both relevant to STS as well as to the field of interpretive policy analysis.

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Rebuilding the Tower of Babel:
the Standardization of Clinical Terminology

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Standardization has for several decades played an important role in the integration of health care services. With the introduction of ICT enabled integration, this issue was brought to the

3.1.20: Tensions in Standardization, I: Stability and Change / Local and Global

next level. Conventional thinking about ICT technology requires a base of formal structures upon which the systems can be built, assuming that the technology is unable to deal with the embedded flexibility of human interaction.

The domain of health care services has proven to represent an overwhelming collection of complexities, and these complexities have proven to be severe obstacles on the paths towards standardization. Dealing with integration in complex domains requires flexibility, and flexibility comes with a built in tension towards standardization. This tension is inherent in a sense that places complexity it self in a paradoxical relationship to standardization.

Attempts to create an exhausting standard for clinical terminology provides a very apt illustration of this problem. The precision and granularity of clinical terminology makes the process behind the ICD10 look like a walk in the park. To develop such a standard has been on the agenda for several actors since the introduction if ICT in health care services. In 1999 Rector summarized these efforts by claiming that no evidence existed to indicate that the project is at all conceivable (Rector, 1999). Even though the advocates of Snomed CT today claim to see light at the end of the tunnel, even this effort lacks proof of actual usefulness when entering the domains of medical practice.

By following a local initiative made by two major Norwegian hospitals to negotiate a common set of parameters for the implementation of an electronic curve system, this paper studies the issues of standardizing medical terminology in the making. The fact that both regional and national health authorities has shown interest in the project, indicating ambitions of exploiting it as a base for regional and national standards, makes the case particularly interesting.

Applying Engeström's interpretation of Bateson's terminology (Engeström, 2001), this paper claims that practice in the domain of standardizing clinical terminology is dominated by learning I; how can we use our means more efficiently to reach our goals? Similarly, theorizing within the domain seems to be dominated by learning II; what other means can we engage to reach our goals? The paper concludes with a warrant for learning III; what are our goals? How and why did this become our goals? Is it necessary to revise our goals? Viewing standards as boundary objects, we can draw on existing knowledge of such objects (Star & Griesemer, 1999). Thus I claim that in order to maintain the plasticity of the object, standardization of clinical terminology should be constrained to a minimum set of common denominators, leaving the rest for local variations and interpretations.

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Addressing Standards' Dynamics:
Tension between the Need for Stability and Pressure for Change

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"By definition, a standard is reasonably unchanging; therefore, the only time that an architecture should be standardized is when it is no longer subject to change - and when an

architecture is no longer subject to change, it is dead." (Cargill, 1989, p. 70)

The value of standards is closely tied to their stability and diffusion. Change thus undermines their value. While stable standards create transparency and reduce transaction costs, changing standards has the opposite effect. In the case of compatibility standards, due to changes the interoperability between the new product and the installed base is no longer self-evident.

Standards' change is systematic occurrence. If international formal standards are anything to go by, and there is no principled reason to think otherwise, change is a normal occurrence. At least forty percent of these standards are revised once or more times, are withdrawn, or are replaced. This means that the work which takes place under the auspices of standards bodies and which an onlooker will primarily associate with developing standards focuses to a large degree on standards maintenance.

Cargill's (1989, p. 70) quote - although it specifically focuses on architectures -identifies the tension between the need for stability and the seeming inevitability of change in situations where standards are used. This tension harbours difficult dilemmas. Standard developers must decide whether it is better to keep the standard stable or to respond to new, evolving market demands; whether technical continuity should take precedence over improved functionality; and whether compatibility between standard versions and successors should be maintained. Standard users must face the decision whether or not to adopt the new standard version and taking in stride the switching costs, or risk becoming an 'angry orphan'.

This paper highlights and builds forth on theoretical insights that stem from an edited volume on 'The Dynamics of Standards' (Egyedi & Blind, 2008). It discusses and integrates the findings of the contributions into a framework that helps answer the three research questions:

▷ What causes standards' change?
▷ Is it avoidable?
▷ If not, can its impact be reduced?

Standardisation of Knowledge Conceptualisation: the Formal and the Informal

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With the proliferation of digital resources, structured data about data ('metadata' hereafter) have been created by resource holders to better manage information and help support a wide range of operations (Day, 2001). However, different ways of describing and conceptualising metadata have resulted in different formats and vocabularies (controlled natural languages) which are processable by different tools and understandable by people in different fields. Such balkanisation of knowledge conceptualisation becomes a problem in an infrastructure where every piece of information is networked and integrated immediately. Without standards for storing, curating and accessing data, data(sets) cannot be exchanged and/or integrated.

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For the past years, many have tried to resolve this problem by standardising ways of conceptualising knowledge. For example, a variety of tools and methods have been generated for this end. The Resource Description Framework (RDF) is designed on top of the Extensible Markup Language (XML) for describing and interchanging metadata. The OWL Web Ontology Language is extended from RDF in order to formally describe the meaning of terminology used to annotate Web documents. From XML schemas, RDF schemas, to ontologies, the formats and meanings of the metadata terms are structured and defined in ways ranging from the most flexible ones to the most formalised. Standardisation of knowledge conceptualisation is not only a process of developing technical artefacts, but also a social process where the knowledge is conceptualised through negotiating between the informal and the formal, and between flexibility and controllability.

This paper draws on our ethnographic observation in two projects, DebTags, an open source software project, and NeuroPsyGrid, a UK-based MRC-funded project. The former aims to provide a set of categories (both controlled vocabularies and user-generated tags) to manage more than 15,000 Debian GNU/Linux software packages. And the latter is to merge two large databases by developing a shared metadata model and an ontology of terms for psychosis relevant clinical and biological data. While both projects aim to create standardised knowledge conceptualisation, the former takes a more flexible and less formal approach than the latter. This paper will explore different ways of standardising domain knowledge, and see how standardisation of knowledge conceptualisation is situated in and negotiated through their decision making processes.

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3.1.21: Acting with Social Sciences and Humanities, I: Impacts, Uses and Politics

Acting with the Web. How to Handle Multiplicity in the Context of Online Health Information.

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Recent contributions in actor-network theory have argued that methods do not simply report on a given reality, but rather enact social reality (Law 2004, Mol 2002). While this argument applies to (social) scientific research in general, it becomes particularly striking when thinking of the broad variety of social scientific web research, which shape quite different objects of study. Web-based projects for example visualize and investigate how the web space is structured, while user-centred studies analyse how the web is individually practiced and perceived. Methods - whether classical, virtual or digital - used to analyse "the web" have thus become a central issue in debates beyond STS scholars (Beaulieu 2004, Hine 2005, Rogers 2007).

In this paper, I discuss how different methods differently enact the web. Drawing on hyperlink network maps, search experiments and qualitative interviews with website providers and users, I show that health-related web information should not be seen as having a stable shape, but rather as differently performed, assembled and perceived in different social practices and narratives. In my analysis, I understand the web as a socio-technical network enacted by heterogeneous actors, both human and others. This network however takes different shapes depending on the standpoint taken up, which is defined by the method chosen, as I argue. Focussing on the provider side and linking strategies enacts the web as a network of clear-cut websites, while focussing on the user side and search behaviour performs the web as an information space predominantly organized by Google, to put it briefly.

Hence, the question is what these multiple enactments of the web imply and how to handle this multiplicity as a researcher. One implication discussed in ANT is what has become labelled as ontological politics (Mol 2002). If methods are performative, they are no neutral tools, but rather carry an assemblage of hidden assumptions and agendas. In this sense, they may also be judged politically as giving presence to certain accounts of reality, whilst eroding others (Law 2004). I thus discuss which politics is pushed forward by different method assemblages, as for example by either giving presence to link networks or enacting Google as a central search tool, and which interests may be served this way. I finally argue that wider power constellations and effects such as the "Google hegemony" may be understood better by thinking about the relating and co-ordinating mechanisms between the different versions of reality by focussing on interferences and obligatory passage points.

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3.1.21: Acting with Social Sciences and Humanities, I: Impacts, Uses and Politics

Enacting Informed Consent Through Social Science Research

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During the last years qualitative social science research has gained increasing relevance in studying informed consent procedures in the medical system. As opposed to ethical research, most of those studies suggest a critical questioning of the bioethical principles underlying informed consent on the grounds of their empirical findings (e.g. Corrigan 2003, Hoeyer 2003, Dixon-Woods et al. 2006).

In my presentation I will draw on experience gained through collaborating in the project "Informed consent - space of negotiation between biomedicine and society" conducted from 2005 until 2007 at the Department of Social Studies of Science at the University of Vienna, Austria, in cooperation with the Clinical Department of Pathology and the Department of Reconstructive and Plastic Surgery, Medical University and General Hospital of Vienna. In the project my colleagues and I observed informed consent procedures to medical research on surgically removed skin tissue through participant observation, conducted qualitative interviews with the patients afterwards and performed interviews and group discussions with diverse experts in the field, including members of the hospital's ethics committee.

The aim of this paper is to encourage a debate about how social science research methods in this context actually co-shape and create the realm of bioethics while "merely" exploring it. Using examples of the projects' methodological setting I will argue that through investigating informed consent both normative bioethical values lying behind informed consent and the actual practice of informed consent might get re-enforced. By doing so I do not wish to tie our, the social scientists' hands but rather to advocate reflection on the constitutiveness of our work.

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Making Sense of Social Research in Forestry

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The Australian forest industry has increasingly commissioned social research over the last decade, drawing on social science expertise. While this research is known to have been useful for policy and forest management, little is known about how it becomes useful.

Preliminary research suggested that among the stakeholders which comprise 'forestry' there are diverse ways that social research might contribute to forest management, and therefore considerable challenges for connection between the research 'audience' and researchers. A case study aims to better understand how participants produce meaning from a social research project in forestry. The methods include participant-observation as a researcher in the case study as it happens, and interviews at different points in time during the process. The role of the researcher is particularly complex with this methodology. In particular, there are complex relationships to be managed with both funders and other researchers, who are the participants in this study. Despite being complex, this approach brings to the fore the social role of the researcher as inside and not outside of the research context. Reflexivity is particularly important in this context as I seek to understand and act with a) my own role in the research process (reflecting on my own knowledge practices and social positionality), b) how others make meaning from the research process (reflecting on others' knowledge practices), and c) whether it is possible and/or an enhancement of the research process to support others to reflect on their own knowledge production practices.

Studying Sideways - Reflexivity in Research Interviews with Sociologists and Journalists

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This paper addresses some of the intricacies of doing research interviews with journalists and fellow sociologists. I call this 'studying sideways', with references to Latour's critique of sociologists for always 'studying down', and seeing their research subjects as less rational, less objective, less reflexive and less scientific (Latour, 2005: 101). Latour argues that this arrogant approach towards the subjects of sociology has been challenged most vehemently and visibly within Science and Technology Studies, because natural scientists did not accept having their explanations reduced to irrational, contingent knowledge claims by sociologists of science. But what happens with our interpretations and interactions when we 'study sideways'? When, throughout our interviews, boundaries between different areas of expertise are broken down, and a production of intimacy takes place? Drawing on Giddens, Mesny (1998) has proposed that the reflexivity of the social sciences - the circular relationship between common sense and sociological ideas and concepts - produces a 'lay sociological imagination'; i.e. a habitual use of social science by lay people. I will show that the concept of lay sociological imagination can be used as a heuristic tool in relation to my interviews with journalists and to some extent in relation to my interviews with fellow sociologists. These interviews are marked by the fact that interviewer and interviewee are competent lay audiences for one another. I think that this calls for an approach to reflexivity much in line with that of Latour (2005) and Lynch (2000). They argue that reflexivity should be given back to actors, rather than being drawn upon as a routine methodological duty to enhance the validity of the interviewer's research practices. Much interview literature has been concerned with the normative or otherwise problematic implications of studying down or studying up (i.e. interviewing 'disadvantaged' or marginalized people or elites). I will argue that studying sideways and giving reflexivity back to actors has consequences on a very practical level, namely for the choice of interview method. 'The active interview' (Holstein and Gubrium, 1995) embodies a set of assumptions which match the above considerations. From this perspective, the interview is a 'meaning-making occasion', where the interviewer

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interjects herself in the interview in various ways. This type of interview is oriented towards exploring how different resources are assembled into accounts, and are analysed both with regards to content and form. In my paper, I offer empirical examples from my interviews with journalists and social scientists, and reflect upon the implications of lay sociological imagination and actors' reflexivity, and discuss the utility of the concepts for the analyses of my doctoral thesis.

Communicating Social Scientific Knowledge Dialogically: an Integrative Approach

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Relations between science/society relations have become interactive or "dialogic", as researchers are called upon to create socially relevant and robust knowledge in collaboration with different social actors and their perspectives. In science and technology studies, there is widespread recognition of this "dialogic turn" in science/society relations and of its centrality to a new form of scientific governance involving a re-configuration, and apparent democratisation of, relations between researchers, publics and experts. However, most of the research that has been carried out on this development has been on the production and communication of knowledge emanating from the natural sciences and technology, neglecting the social sciences and humanities. This paper focuses on the dialogic turn in the production and communication of social scientific knowledge, discussing the issue theoretically and then exploring it empirically in a case-study. Theoretically and methodologically, the paper combines STS which analyses knowledge production processes, dialogic approaches to communication studies which analyse dialogic communication processes and social scientific action research which aims to further the democratisation of research/field relations.

The object of the case-study is the dialogic production and communication of knowledge in a Danish research and development consultancy in which researchers cooperate as researcher-consultants with participants in a field of practice with a view to furthering change in practices. The researcher-consultants operate with a dialogic view of knowledge production and communication in the sense that they view the processes as forms of knowledge-sharing, interaction, dialogue or negotiation rather than the one-way, unilinear transmission of expert knowledge to a less knowledgeable target-group. Their consultancy project centres around a course of workshops for managers in a public organisation on how to run meetings that create more value for external stakeholders and more personal meaning for participants. The methods of data production used are participant observation and audio-recordings of the workshops, semi-structured interviews and informal conversations with the researcher-consultants and workshop participants and document analysis of workshop scripts and powerpoint presentations. The data are analysed through a combination of STS, dialogic communication approaches including discourse analysis and reflexive approaches to social scientific action research.

The following, open empirical questions are addressed: What happens to social scientific knowledge when it is communicated dialogically? How are different knowledges produced, negotiated, challenged and transformed in the meeting between social scientific knowledges

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and other knowledge forms and between the researcher, co-researchers and other participants? In addressing these questions in the case-study, the aim is to take into account the particular ways in which conditions of knowledge production (including particular ontologies and epistemologies) in the social sciences - as opposed to the natural sciences and technology - impinge on the interactive communication of social scientific research. The overall aim is, through the interplay between theory and empirical case-study data, to develop an integrative analytical approach for the study and practice of the dialogic production and communication of social scientific knowledge. By working across STS, communication studies and action research, the goal is to cross-fertilize the three fields.

3.2.2: Genetics: Legal Aspects

Children of Someone, Children of No One

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This paper explores the organization of the inquiries and investigations of paternity claims in Portugal and, in particular, the role of forensic expertise.

In countries like Portugal, initiatives by the judiciary to enact the (constitutionally defined) right of any child to know his/her biological father are recognized as part of the duty of the State to protect the child's rights. When the father is not identified in a child's birth certificate, the judiciary is compelled to initiate a procedure for defining and to proceed with a paternity investigation. Both the number of unsuccessful cases and how they fail to identify the father are of particular interest, especially the central role played by forensic expertise and the uses and evaluation of different types of evidence.

In Portugal the question that this research arises, following Sheila Jasanoff, is that we are constructing a new civic epistemology between science and law and the scientific expertise assume a central role, nevertheless the credibility of the traditional proofs are not being overstepped.

The role played by public attorneys in the judicial system is of particular interest too: the timing of the procedures, the display of information between different institutions, the relevant objects for different actors about the same reality are themes that we can not lay aside of the study. Science and law are nowadays used in a rotinized way as elements of governance and legitimation of governments, but forgetting that their actions involve different citizens with different stories.

Children of someone, children of no one, reflects precisely the cases in which the State itself cannot find the biological truth.

Regulating Biomedical Research in Post Genomic Era:
a Shifting Focus from Autonomy to Accountability

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Autonomy has been a leading principle in Western bioethics in the past 50 years and generated ever-expanding informed consent requirements. Both international instruments and domestic regulations stress on informed consent as the major mechanism to protect human subjects. The doctrine did not come to Taiwan until very lately when several young legal and ethical scholars trained in the western countries brought back the concept and advocate it aggressively in the therapeutic setting of doctor-patient relationship. Consent requirements were subsequently extended from clinical treatment to clinical trial, and more recently to biomedical research. While the laws of informed consent become more and more rigorous, the practice of informed consent reveals problematic: critical information for

decisionmaking is often lost in lengthy pages of consent forms; research subjects often consent without reading or understanding informed consent disclosures. The gap between theory and practice is so huge that even the most enthusiastic believers of informed consent have to seriously reflect upon the normative value of autonomy and contemplate for feasible solutions so as to bridge the law-in-books and law-in-action.:

Understanding the various attacks, challenges, and limitations of informed consent, the author seeks in this paper to establish a new form of informed consent which would appropriately address the distinctive features of biomedical research in the post genomic ear and hence bear practical feasibility. The paper starts from a descriptive summary of the common features of post-genome biomedical research, and then checks critically the role of individual autonomy in regulating such research. Instead of exalting the value of individual autonomy, the investigator tries to weave autonomy with other competing and equally important values such as trust, integrity, justice and progress. To be more specific, the author plans to demonstrate that the conventional format and practice of informed consent provide insufficient protection for human subjects on the one hand, and put excessive restrictions for the researchers on the other, and hence do more harm than good to research ethics.

I argue that overly relying on individual autonomy in regulating post-genomic biomedical research may have three major problems: (1) emphasis of individual consent weaken the role and responsibility of IRB members in reviewing a protocol; (2) consent requirements generates unnecessary costs for researchers; and (3) re-consent requirements brings privacy risks for participants. It is time to rethink informed consent and to reconstruct the concept of autonomy in post-genome research ethics.

The Co-Production of Technology, Society, and Law: Current Transformations in the Governance of Patent Law

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Law is often considered as one of the cornerstones of social coherence and stability ('the rule of law', legal certainty). Patent law is deemed a mechanism for fostering technical innovation. Hence, patent law must both be stable and universal ('one size fits all'), and dynamic in terms of its flexibility and adaptability to all kinds of inventions. Patent offices are situated at the forefront of innovation. The patent system's self-depiction relates to its supposed technology-unleashing effects by 'adding the fuel of interest to the fire of genius' (A. Lincoln), and by securing the 'return on investment' via the grant of a temporary legal monopoly.

Patent law has traditionally evolved in a self-regulatory mode between the applicants, the patent offices, and courts. However, recent expansions of patentable subject matter towards biotechnology, software, and business-methods have encountered critical public reception.

First, economists (David/Foray 1995, Hall 2004, Guellec/van Pottelsberghe 2007) have questioned the efficiency of patent law in 'adding value' to macro-economic innovation. Dysfunctional and anti-competitive effects, high transaction and litigation costs, the restriction of other inventors' freedom to operate (FTO), particularly in sequential and cumulative

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innovation processes, have been emphasized. Concerns about effects detrimental to innovation are often summarized as 'tragedy of the anti-commons' (Heller/Eisenberg 1998).

Second, civil society organizations and parliaments have challenged the legitimacy of the patent system, by accusing it of not taking sufficiently the interests of the public at large ('public interest') into account (STOA 2008; Drahos 2002). Hence, the representation of a plurality of interests (e.g. sources and consumers) within the patent system has been demanded. Moreover, the patent system was called upon to be responsive and accountable to normative values, such as ethical limits to biomedical research, public health, environmental concerns, and to consider the importance of open science and the public domain.

Due to the crisis both concerning its efficiency and legitimacy (Borrás 2006), the patent system is recently undergoing a reorientation towards reflexive and network-based governance.

In my presentation, I will consider two processes which are analytically distinct but interrelated:

1. The co-production of technology and the patent rule(s) in which a technology-specific patent law is becoming salient.
2. Approaches of qualifying technological and societal innovation in terms of sustainability and social appropriateness, thus challenging positivist and scienticist models of technological progress.

Policy analysis of the EU biopatent directive (98/44/EC) forms my empirical case study for demonstrating the inscription of both efficiency and social regulatory dimensions in the body of the European patent law.

The paper is based upon theories of governance (Mayntz 1998), democracy in the EU (Majone 2006, Scharpf 2003), STS and technology assessment (Rip 2000, Renn 2006), and studies on the relationship between law and innovation (Hoffmann-Riem/Eifler 2008). It explores regulatory and deliberative concepts of patent governance which would enable greater responsiveness via social and economic impact assessment pre-grant.

Truth with Repercussions
- How do Forensics Create Truth Out of Uncertainty?

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How does forensic work produce reliable evidence? Public debate of forensics, at least in Sweden, seems to focus on laboratory analysis, trusting it to produce "the truth," evidence that is regarded as objectively correct and thus of utmost reliability. This reliability, however, is not a given. Within genetic research for example, where DNA analysis originates, biological material such as blood or other bodily fluids is considered as inherently unpredictable and consequently as harboring uncertainty. Still, in order to produce scientific knowledge, results have to be certain and reliable, and thus much effort goes into battling

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this uncertainty. Traces collected from crime scenes often contain similar biological material, which means that forensics must, possibly to an even larger extent, manage and minimize uncertainty so as not to jeopardize legal security.

Forensic work in Sweden is organized in a so-called "legal chain," with laboratory analysis in a central position: Police specialists collect traces from the crime scene, these samples are analyzed by the National Laboratory of Forensic Science and the results, in the form of expert opinions, are used as evidence in trial. In order for this legal chain to work and for the evidence it produces to be regarded as reliable, as "the truth," every link in the chain has to both manage any uncertainties and convince others of their reliability.

How, then, do the different links or arenas in this legal chain - the police, the laboratory and the court - contribute to making reliable evidence? How do practitioners create meaning in and around their work, and do these meanings vary between the different arenas? How is the evidence-to-be moved or, to use Latour's term, translated between them? How do the practitioners make these translations possible, and how do the meanings that are created with and around the evidence-to-be change or persist? In a larger context - what happens when scientific methods are moved from the laboratory into a sphere where their results are received in a new context, causing repercussions for both individuals and the state?

This is a very new project, started in January 2008. By August, ethnographic fieldwork should be well under way, and I would like to discuss this project as a whole, along with its first tentative results.

3.2.3: Controversies in Health Care

Settling Hybrid: Selection of Cell Source in Tissue Engineering

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This paper investigates how scientists make the decision of which cell sources to be used for tissue engineering, a particular area of therapeutic biotechnology. This technology grows cells using scaffolds and biomaterials, and aims to produce a piece of biological matter, which can be used to substitute with failed tissues or organs. One of the major disputes about this technology is about which cell source to be used. Griffith and Naughton (2002) explain that there are several potential cell sources; autologous cells from the patient, allogeneic cells from a human donor, and xenogeneic cells from a different species. Among these options, how do scientists decide which cell source to be used?

Xenogeneic cells are suitable for mass-production, but immunological rejection is inevitable. Although immunosuppressant can control this rejection and allow an individual to integrate a foreign matter into the body, this increases the risk of 'contagion' (Rosengarten 2001; Welsh and Evans 1999).

Using allogeneic cells, like human stem cells, also results in immunological rejection, unless their genetic information is modified in advance. However, to do so it is necessary to employ a technique used for cloning (Waldby 2002). Therefore, this procedure can be considered as human cloning, and provokes ethical issues.

Autologous cells, unlike the other two, do not cause immunological rejection, and may appear to be the obvious choice. However, to produce this custom-made matter, cells have to be cultured several weeks. This would not be practical for acutely-ill patients. Furthermore, adult cells have already differentiated and their functions are pre-determined. Therefore, different therapies need different adult cells. Now, the latest technique can un-differentiate adult cells, and can induce 'pluripotency', but this further increases the time required.

These scientific explanations demonstrate advantages and disadvantages of each cell source. However, from an STS perspective, these advantages and disadvantages are not 'the facts' but socially constructed ideas. I argue that these ideas demonstrate perceived risks and benefits of the cell sources. Such perceptions will be materialized and then normalized if the selected cell source becomes standardized for tissue engineering technology. I will interview with scientists in the field and explore how they justify their choices and in what way 'scientific evidences' from our past experiences like organ transplantation and xenotransplantation are drawn into their arguments about new technologies and thereby influencing their development.

3.2.3: Controversies in Health Care

Material(izing) Networks:
Disposable and Reusable Surgical Textiles

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For over sixty years, surgical textiles (i.e., gowns and drapes) have been framed in terms of a dramatic binary opposition: disposable (nonwoven) versus reusable (woven). Relevant scientific and political debates can be traced to the interests of groups revolving around materials ranging from petrochemicals to cotton. Developed alongside the petrochemical industry and U.S. military research, "nonwoven" disposable materials were introduced and marketed as fusible, overlapping webs (in opposition to weaves) comprised largely of synthetic materials. A whole infrastructure (e.g., industries, trade and lobbying associations, medical and material research) developed around these new nonwoven/disposable materials. In reaction, "reusable textiles" became the terminology for an older, oppositional, and yet newly formalized, woven medical textiles network encompassing processes of manufacturing and laundering. In our research, which is part of a larger interdisciplinary project funded by the U.S. National Science Foundation, we find that competing woven/reusable and nonwoven/disposable networks become interdependent, blurry, and multiple. Similarly, controversies associated with these and related (complicating) material networks are cross-cutting.

Latour (2005) recommends tracing "connections between the controversies themselves rather than try[ing] to decide how to settle any given controversy" (p. 23). Using Actor-Network-Theory (ANT), this paper traces how perceptions, meanings, and "truths" are mediated through intersecting controversies such as infection control in hospitals, economics of healthcare, and resource/environmental issues.

This paper begins with an extensive discourse analysis of relevant articles in the popular press, medical journals, trade publications, industry websites, and standards or recommended practices disseminated by regulatory agencies. This analysis is then combined with interviews we have conducted with scientists, industry representatives and healthcare workers. We describe connections across diverse controversies, and discuss how these are framed through what Latour (2005) describes as a "sociology of association" among human and "non-human" actors.

Next, we describe how and why we too have become, and become perceived as, actors in various networks through interactions with our informants. We have been provided with multiple "truths" and "histories" and aim to map these in relation to the materials and social actors involved. For example, as one industry interviewee noted, "We kind of have our own vested interest... We really do want to help however we can... [to] make sure whatever facts we can help provide maybe help prevent other slants-other points of view that are not necessarily factual-from being written into the final report as kind of the gospel." Using ANT, we unfold how and why a binary (disposable versus reusable) framework is insufficient when exploring the controversies and networks involving surgical textiles. We aim to "reassemble the social" (Latour, 2005) associated with surgical textiles by tracing the convoluted circuits implicating multiple human and material actors.

Latour, Bruno. 2005. Reassembling the Social: An Introduction to Actor-Network-Theory. Oxford: Oxford University Press.

3.2.3: Controversies in Health Care

Ethics and Ontology:
Relationally Reworking HIV Biomedical Prevention

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This paper examines the challenges posed by the development of an HIV pre-exposure (chemo) prophylaxis (PrEP), a once a day pill consisting of anti-HIV drugs presently used in the treatment of HIV infection. Many of the challenges came into public view as a result of community protest action against initial efforts to establish clinical trials in Cambodia, Cameroon and Thailand on the efficacy of PrEP. Although the controversy has receded from public view, it is apparent from a literature review and a series of in-depth interviews with a selection of PrEP scientists and advocates that the development of PrEP is important but fraught.

At present, bioethics serves as the recourse for dealing with what is seen as a tension between the need to involve high numbers of HIV vulnerable participants in trials for the development of a much needed HIV prevention technology and the potential for such trials to cause iatrogenic disease and/or involve intercurrent HIV infection requiring a commitment to treat. Yet despite apparent agreement on a relation of moral obligation on the part of the researchers to protect the researched, the translation of this relation into specific practices and commitments is generally regarded as unsatisfactory by many stakeholders, albeit for different reasons. Moreover, the relation of obligation offers little to the perceived medical and social challenges of ongoing implementation of PrEP, especially those arising from its anticipated 'partial' effectiveness. While PrEP may offer those unable to use condoms (women and some men who have sex with men) some form of protection, it could result in new infections occurring under conditions of sub-optimal therapy and with risk of drug resistance. It could also have a widespread 'disinhibiting' effect on the epidemiologically more effective yet, for some, increasingly unfashionable prevention method of condom use.

Our review reveals the preventative potential of PrEP to be the effect of a performative and relational process, resulting in an ontologically multiple entity. Indeed PrEP's multiplicity is shown as the relational effect of the use of experimental populations constituted according to a series of pre-identified biological, physiological and cultural differences, then materialised in relation to HIV and antiretroviral drug use. This recasting of PrEP turns attention to a broader set of relations than those of researcher and researched, namely those enacted by the work of the virus, antiretroviral drugs and bodies brought together through the technology of clinical trialling. It also turns attention to a more heterogeneous and relational mode of prevention through which the prevention/treatment divide of HIV management is becoming reconfigured.

The paper goes on to explore some of the practical and policy implications of this relational, multiple ontological perspective, such as the way PrEP can reconfigure the enactments of 'condom use' and 'efficacy'.

3.2.4: Pleasure and Control in Emerging Technologies

Control and Power in Nanotechnologies

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This paper aims to scrutinize the current debate on the ethical challenges posed by nanotechnologies through the category of control; and then to understand its consequences in terms of power. This represents a novelty in the STS-analysis devoted to nanotechnologies. The paper is based on the of an analysis of the current ethical literature on nanotechnologies done during the EU project DEEPEN.

Nanotechnologies are attached with promises of modifying nature and reshaping the world in each one of its dimensions, i.e. of (totally) controlling it (cf. NSCT 1999). In many visions, nano aims at manipulating the atomic level and offers not only the possibility of reshaping the environment and things, but also living beings, including the human being. Control through nano presents some new and interesting aspects: it should not be easily identified with mastery, but rather with a multifaceted concept, connected with both domestication of the physical world and surprise, since scientists are fascinated by the "wildness" - the unexpected happenings - of their work. Nanoscientists accept in many cases the possibility of creating tools and devices, which they do not control in every step of the process but which can rather act autonomously (bottom-up approach), on the condition that these tools could accomplish established goals. This aspect is clearly connected with the technoscientific character of nanotechnologies.

This orientation toward control influences power relationships between scientists, policy and the public in our society in various ways. First, if nano is really offering mastery of things, it opens at the same time questions connected with ownership of devices and knowledge (who has access to these tools? Who is creating them?), as well as with rights of individuals (for which purpose are these tools created?). Second, if scientists can create tools that work autonomously, they are accepting some unpredictability and loss of control and this has some implications for questions of risks and communication with the public. Third, there is a more subtle way in which nanovisions insinuate the idea of control and then exercises a form of power: if these visions are so broad attached with the promise of a new world, then every question asked on the legitimacy of a particular application looses its force, becoming a matter of acceptance (or refusal) of changes offered by technologies.

Even the strong opponents to human enhancements, for example, refuse these technologies on the basis of particular ethical/religious values, but they permanently engage with the questions offered by the proponents, not deeply challenging the idea of control presupposed by these nanovisions, but rather accepting their power. If the solution to our main problems such as pollution and diseases seems to be offered by nanotechnologies, who would refuse the control offered/imposed by them?. The power of nanovisions consists precisely not only in offering images of the future, but also in imposing the relevant questions of the debate.

3.2.4: Pleasure and Control in Emerging Technologies

Unpredictability. On Pleasure and Control in Autonomous Robotics.

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In the last decades a profound change took place in the theoretical framework of Artificial Intelligence (AI) and robotics. While the main focus in plan-based AI was on symbol processing, representation and internal calculation, new AI tries to avoid representations of the world and stresses the importance of (real-world) experience, embodiment, situatedness, autonomy and the tight coupling of system and environment. At the end of the 1980s prominent roboticists, such as Rodney Brooks, Rolf Pfeifer, and Luc Steels turned away from the symbol-oriented to a more behaviour-oriented approach inspired by cybernetics and the theory of dynamic systems. In this new approach, intelligence is regarded as the emergent product of the interaction of the system with the environment. The idea is to model simple behaviours 'bottom-up'. In order to do so, action is broken down into simple 'behaviours' and reflexes based on the principle of stimulus and response. This concept underlies a new ontological understanding of organisms which are interpreted as flexible, dynamic and permanently changing entities equipped with a large number of parallel, only loosely-coupled processes.

The notion of unpredictability, spontaneity and emergent behaviour are the centre of attention. This comes along with a new ontological grounding of the body which is no longer considered to be a hierarchically organised rigid framework which consists of organs, sensors and muscles. Instead it is interpreted as a dynamic system, endowed with the ability to produce something new and with evolving characteristics and possibilities. It is a system which possesses 'emergent functionality' (Steels 1991). Complex feedback loops evoke new combinations and variations with which researchers hope to 'find' new solutions on more complex levels. Researchers wish to 'siphon off' the creativity of emergent processes and the reservoirs of creative development, which are historically deposited in nature in order to render them useful for technoscientific procedures. This is the ontological grounding for the idea to develop complex systems with the ability to permanently reinvent and recreate themselves and to act spontaneously. Remaining in a functional systems paradigm, it aims at constructing 'living machines' and self-evolving artefacts.

In my contribution, I will analyze the function of unpredictability in autonomous robotics oscillating between the pleasure to grasp at the 'liveliness of the world' (Pickering) and to use these mechanisms for a better control of humans and machines (Wiener).

Unlimited Potential in a Limited World:
Shared Pleasures in Eco- and Nanotechnologies?

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Many critiques of nanotechnology assume that it requires special work to reconcile the optimism of its advocates with the cautionary tales of environmentalism. In particular, nanotech-

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nology is viewed as an engine of innovation that blatantly disregards the distribution and limitation of matter and other resources such as space or energy. The widespread slogans "there's plenty of room at the bottom" and "shaping the world atom by atom" testify to this rhetorical and structural ignorance. On the other hand governments and industry argue that nanotech-nology will provide our societies with smokeless industry and wasteless products.

Here, we uncover a common thread in nano- and ecotechnologies. Both acknowledge limits of growth-arguments and both recommend strategies of control to disclose, perhaps new resources beyond these limits, especially the precision control of flux of matter, of inputs and outputs, and thus greater efficiency. Both share the idea that, in order to preserve nature, we need to improve nature. And in both cases we also detect a tension that comes with the very idea of an "unlimited potential" - the limitless opportunities for innovation ("global abundance"), harnessing of new energies ("hydrogen economies"), recreation of nature ("restoration ecology"), enhancement of efficiency ("synthetic biology") foster excess rather than restraint. However, while eco- and nanotechnologies both peer at an unlimited potential, appeal-ing in same time to a limited world, the stories they tell are radically different: nanotechnolo-gies invite us to join a pleasureful world where it is difficult to resist to the open space of op-portunities offered. In contrast ecotechnologies tell stories of similar seductive power by say-ing no. These seemingly fundamentally different types of narrative, the role of pleasure and seduction, the power of building, defending and dissolving limits will be scrutinized.

Seduction, Concern and Control: Debating Nanotechnologies

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The development of emerging sciences and technologies, such as nanosciences and nanotechnologies, has implied a proliferation of promisory notes and scenarios for the future raging from utopias of pleasure to dystopias of total control and manipulation. Although some of the innovations are being incorporated into new technologies and materials, for instance in consumer products, exploratory dimensions of nanosciences/nanotechnologies are still dominant. Further, there are some explicit concerns of actors involved with the domain of nanosciences/nanotechnologies - the "nanoenactors" - around their implications in the domains of ethics, society and regulation of these new knowledges and technologies, which could be traced back to the biotechnology debate and usually follow the creation of new products.

The novelty of this discussion lies at the present effort of launching the public debate into the process of research and innovation, in such way nanotechnology can be discussed and related risks or benefits can be evaluated, together with its consequences for social organization. As in the case of biotechnology, this debate call for the creation of spaces that can incorporate citizens, their concerns and diverse ethical conceptions, experiences and knowledges. Conversely, the organization of such spaces must take into account new challenges and issues raised by the specificities of nanosciences and nanotechnologies.

As part of the European project DEEPEN (Deepening Ethical Engagement and Participation in Emerging Nanotechnologies), some exploratory methodologies of citizen involvement in

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the debate and reflection on possible trajectories were rehearsed. The challenges posed by the incorporation of experiences and concerns of different publics into scenario-building exercises led to the development of procedures combining well-known methods of social research, such as focus groups, with innovative approaches inspired by the work of Paulo Freire and Augusto Boal.

Intra-Regional and International Research Collaboration of Central African Countries

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Central Africa is one of the poorest regions in the world, with a history of conflict. The S&T emphasis in Central Africa, as articulated by the New Partnership for Africa's Development (NEPAD), is on assisting science and scientists to recover from conflict by establishing an appropriate S&T infrastructure. Despite these challenges, the region managed to produce 3 246 publications in the Thomson Scientific Web of Science (ISI) database between 2000 and 2006. The first focus of the paper is a bibliometric analysis of these publications in order to determine national and regional research strengths and capacity, and patterns of intra-regional and international co-authorship. The output will inform various audiences, such as the Economic Community of Central African States (ECCAS), which is the regional economic integration organisation for Central Africa. ECCAS is tasked with the alignment of the S&T policies and R&D programmes of 11 member countries - Angola, Burundi, Cameroon, Central African Republic, Chad, Congo Republic, Democratic Republic of the Congo, Equatorial Guinea, Gabon, Rwanda and Sao Tomé & Principe.

The second focus of the paper directly contributes to the field of S&T by investigating (1) the nature and characteristics of research collaborations that result in co-authorship between developing and industrialized countries and (2) the role that colonial versus non-colonial linkages, field differences and/or other arrangements play in determining the pattern of collaboration and co-authorship. The methodology involves an electronic survey of the reprint authors (RP) of 210 ISI publications. The ISI publications selected represent four clusters: 'Cameroon(RP)-France'; 'France(RP)-Cameroon'; 'Cameroon(RP)-USA or UK' and 'USA(RP) or UK(RP)-Cameroon'. Cameroon was selected as case study because of its dominance in terms of ISI output and its research linkages with both France (colonial) and the USA and UK (non-colonial).

The outline of the paper is broadly as follows: (1) the state of S&T in Central Africa , (2) theoretical entry points to studies of S&T in developing countries (e.g. dependency and institutional theory), (3) methodology and presentation of findings of the bibliometric analysis and survey, and (4) a discussion of insights generated.

A Comparative Analysis of Kenya & Zambias 'Theoretical' Priorities vs. their 'Actual' Priorities

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African countries look to the developed world for guidance where Science and Technology policy and priority setting are concerned. Now that S&T has gained greater prominence on the African continent and in most African countries, the matter of resource allocation is of even greater importance due to limited resources. Research priority setting is a complex

process that needs to involve all relevant stakeholders, so that the process may be an effective one. The gap between the needs and resources available is large in most African countries. It is therefore imperative that priority setting is not taken lightly. All the stakeholders need to ensure firstly that priorities are set as close to the actual needs of the country, and secondly, that the resources and necessary capacity be available. African governments need to move away from S&T policies, with broad and ambitious S&T priorities, which are inappropriate and cannot be implemented within their own countries. In a well-articulated S&T system priorities are identified on the basis of research, analysis, advice and consultative processes.

In this paper two countries, Kenya and Zambia's S&T policies are analysed in terms of their S&T priorities. The alignment between their theoretical S&T priorities and actual S&T priorities will be determined. One manner to observe S&T priorities of a country is to observe the actual research programmes and projects the S&T community of that country is involved in. In this regard a bibliometric analysis of the fields of research output will present an entry point into this landscape. By observing and interpreting what scientists actually do, one is able to get a sense of what they prioritize; these are actual (or factual) priorities. In order to allow for some comparison, a between-country comparison of the subject categories of journals in which scientists publish (in the ISI-output) will also be performed. The research institutions who dominate in the subject categories will be assessed to determine their own research priorities. Whether these institutions are government funded or internationally funded will also be looked, which in turn shows who directs the research within each country.

S&T and Higher Education Policies in the 'Catch-Up' Economies of Eastern Europe

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The EU's attempts to create an integrated knowledge economy and the wish of Eastern European countries to 'catch up' with the more advanced Western economies has meant for the new EU member states setting new goals and adopting new policies and practices to accelerate science and technology (S&T) development. For S&T development and technological innovation reforms in the broader institutional context are generally seen as vital (Cozzens et al 2008).

On the one hand social innovations are required along with the technological ones to realize the so-called knowledge economy (Scott, 2007), but on the other the European social model and its implied values are seen as critically dependent on the promotion of the knowledge economy and social reform. It is therefore relevant to inquire into the relation between the broader institutional reform proposals and S&T advancement, the relations between social and technological innovation.

Higher education is widely seen (e.g. by the new growth theory) as one of the key areas for enhancing technological innovations through building learning capacities. The Latvian government, sharing this internationally promoted discourse, has announced the higher education reform to be the priority for transforming from industrial to knowledge economy. It has prided itself that "the pace of the educational reform after the restoration of the

independence has been very fast if compared with similar reforms in the countries of developed democracy" (Zids, 2001: 23). External observers have not been so optimistic, though. An extensive analysis of HE reform in Eastern Europe suggested that "despite a constant flow of government declarations, the reform process, which began with high hopes for a quick turnaround, has proven to be slow and difficult." (Jones, 2000: 37). Parallel to this, the pace of S&T development and innovations has been intensively criticized (Watkins & Agapitova, 2003).

Based on the ethnographic work done on Latvian higher education reform, I will explore relations between the higher education reform as playing out on the ground and the policy narratives on the emerging knowledge economy, social reforms and the need for Eastern European countries to 'catch-up'. The reforms in Latvian higher education center on aspects like quality, benchmarking, accountability, and views about new public management adopted from Western EU countries. The paper explores what such higher education policies 'promise' for S&T development in relation to social and economic policies. What arguments are being used by designers of such education policies and their opponents, how are their respective views tied to arguments about economic and S&T policy? What narratives of change and continuity are being brought into play to argue for and against reform agenda's and how do these arguments relate to the conditions to develop S&T in 'catch-up' economies?

Regional Innovation System for Technological Convergence in Low-Developed Regions

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Particular Polish regions and whole economy are during the large modernisation of its institutional structure. The institutional setting is obsolete and doesn't influence on innovation capabilities and technology transfer. That is an inheritance after central-planned economy, where innovativeness system wasn't a priority factor of economic development mainly in initiation possibility and institutional aspects. Meanwhile, innovativeness is a most important sphere to make the most opportunities that appear as a result of Polish international integration. These weaknesses are most visible in regions where innovation capabilities depend on institutional support within regional innovation systems. Especially in peripheral regions like North-east Poland.

Development of innovation capabilities both in financial and creation aspects and improvement of institutional structure are main problems in Polish regions. Enterprises couldn't create innovations without more institutional and policies support. Its important for enterprises because allows to adjust to learning economy circumstances.

A gain of more innovation capabilities in learning economy frames create new chances for innovation and technology development based on region's traditional circumstances and factors. North-east Poland couldn't create capabilities for knowledge-based economy because there aren't high-tech sector and level of R&D expenditures is very low. This region is competitive in rather traditional sector (i.e. manufacturing, forestry), so enterprises

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functioning within need more institutional support.

The main aim of the paper is to describe and interpret two processes of change in the North-east Poland: 1) the impact of the institutional changes and market environment on the changes in the regional innovation system, and 2) the role of innovation and technology transfer in the formation of the new economic activity of region's firms.

The paper consists of four parts where the following problems are analysed:

1. A role of institutions in a process of RIS transition and their impact on innovation and technology transfer
2. A main problems of RIS building
3. RIS activity for technological support in North-east Poland
4. The impact of institutional changes on innovation capability

3.2.6: Participation in Health Care, II: Patients as Experts

Patient-Researcher Relation;
the Difficulty of Inclusion of the Patient's Perspective in the Decision Making Process of Health Research

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In order to increase the relevance and quality of health-related knowledge production, patients are increasingly involved in decision-making processes on health research. Different methods are being used for this. In order to have real influence on this process, it is argued that patients should be included as partners, whereby the process is getting highly dialogical in its orientation. However, examples of partnership between researchers and patient show that the relationship between those two groups is usually asymmetric in knowledge and power. Consequently there is a risk that patients, being in vulnerable positions, will be dominated by the more established group, the researchers, and that their knowledge input gets 'lost' during the interactive process. Although there is insight into the subtle mechanisms of exclusion of vulnerable groups in conversations, more knowledge should be developed to prevent a asymmetric relationship and stimulate inclusion of the patients in order to involve them into the decision making process of the research system effectively.

This paper describes a project conducted in collaboration with the Dutch Heart Foundation, whereby people with a congenital heart disorder and researchers jointly developed a research agenda for a new Youth Fund. Different actions were undertaken to decrease the asymmetry and to ensure the inclusion of patients' perspectives in the decision making process, such as consultation of the patients and inviting a higher number of patients than researchers to the dialogue meeting.

In this study, we will analyse the behaviour of the participants based on our observations and video material of the dialogue meeting and discuss how they interacted and learned from each other. In interactive decision-making some level of influencing is needed in order to realize mutual understanding. However, it was observed that the patients were influenced by the researchers in such a way that the priorities for funding they expressed at the end of the dialogue meeting were highly based on the visions of the researchers.

We conclude that, despite of the different actions undertaken in order to avoid exclusion of the patients' perspectives, the dialogue was not 'equal'. The actions taken were insufficient to prevent domination by the researchers. Additional attention needs to be paid to enhance a more equal relationship. We have identified additional actions we would like to explore further.

First, the empowerment of patients through better preparation can play a role in diminishing the asymmetric relation. Secondly, a selection of researchers on the basis of their open mindedness towards patient participation could prevent exclusion of patients' visions during the dialogue. Thirdly, a better visibility of the effectiveness and benefits of former initiatives could reduce prejudicial ideas on the side of the researchers.

Unequal Citizens

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Definitions of psychiatric disorders are hard to make and have often changed over time. At the moment an essentialist take on psychiatry seems to prevail, looking for remedies to psychiatric problems in the field of neuroscience. The present study will use the methodological toolbox of Myriam Winance to try to come to a different description of the difficulties encountered by clients of mental health care. Winance has studied disability and shows it to be produced as a category by singling out specific differences between people. Thus the disabled are set apart as a group by making reference to an abstract standard of a normal person. In her research Winance opens up the fixed fact of disability and shows it to be a category produced in the interaction between people and things. She argues the casting of disability as a deviation from 'the norm' to be a contingent ordering of socio-materiality: it is just one possible way of ordering among others.

In this paper I shall put this proposition to the test. I will attempt to take her argument, developed within the context of muscular dystrophy, one step further by applying it to people with severe psychiatric handicaps. In this different context I shall evaluate whether her approach to analysing disability still works. In this manner I will tentatively explore the nature of the problems psychiatric patients encounter in their daily lives. Following the line of thought of Winance, I will consider whether a psychiatric disorder can be perceived other than as an attribute of a specific person. Can it be analysed as a consequence of a specific ordering of socio-materiality, to which alternative orderings exist? And what would be the implications of this different view on the problems that clients of mental health care run into? These matters will be scrutinized, drawing on observations and interviews in a mental health care facility in the Netherlands.

"Information Gathering and Information Giving": Re-Framing Expertise and Decision-Making in Scottish Abortion Practice?

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In recent years, UK abortion law has attracted considerable media and (increasingly) parliamentary attention. One of the aspects of the current law which has generated discussion is the legal requirement for two doctors to agree that a woman has grounds for an abortion. This requirement has long been the subject of feminist critiques (e.g. Boyle, 1997; Sheldon, 1997) because it frames the decision about whether an abortion should take place as a matter for the expertise of healthcare professionals (HCPs), rather than for women who want to end their pregnancies. However, it has also been argued that guidelines surrounding abortion care, in combination with changes in practice, have re-defined abortion as a decision that belongs to pregnant women, bringing practice into conflict with the law (Lee, 2003). This paper illustrates how analytical tools from Science and Technology Studies

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(STS) can be used to explore this apparent 're-framing' in a more nuanced manner.

Using forty semi-structured interviews with HCPs involved in abortion provision in central Scotland, this paper critically examines their representations of abortion as 'patient choice'. The analysis draws on critical Public Understanding of Science (cPUS), and shows how a theoretical framework which has been used to examine science-public relationships can be fruitfully employed as a means of analysing HCPs' discourses about themselves and their patients. Research within the cPUS tradition (e.g. Wynne, 1996) has clearly demonstrated that the process of defining how decisions should be made (e.g. in terms of particular 'risks') can itself be a means of framing issues in terms of particular expert-lay identities. Building on this body of work, I argue that discussing abortion as 'patient choice' does not automatically undermine the law's labelling of HCPs as 'expert'. Rather, it can be used by HCPs to reproduce this discursive identity, for example when abortion is constructed as a woman's choice after a process of "information gathering and information giving" has first taken place. I conclude by considering the implications that this kind of analysis might have for abortion practice.

Translation of Expert Information to Patients' Relatives

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This paper reports on ongoing fieldwork studying information projects directed to patients' relatives and friends. One studied information project is geared to parents of obese children, another to young adults with friends who have mental health problems. The projects are part of healthcare research interventions deploying a mix of methods such as information meetings, group sessions, interactive webpages, etc., in order to assess their respective clinical effectiveness. The present study is based on interviews, document study, and observations of healthcare professionals and, as much as possible, members of the targeted groups of patients' friends and relatives. It investigates the chain of translations involved - how professionals attempt to express scientifically encoded knowledge and expert experience in popular presentations, and how this is perceived, digested, and possibly put to use by the non-experts meant to be informed. The study explores the approaches of both groups, the difficulties encountered, and the strategies used to overcome them. The intentions of professionals are contrasted with the experiences of the target groups.

The information projects should be considered in the context of increasing policy ambitions in contemporary healthcare to construct informed patients who make deliberate choices, take responsibility for their health, and participate actively in treatments. These ambitions seem to reflect a variety of motives, such as aspirations to create markets with informed consumers, encourage preventive care, and avoid paternalistic relations between professionals and patients. A common, underlying ideal appears to be the patient as an autonomous individual. The patient groups involved in the information projects studied here, however, can hardly live up to this ideal, since they are either too young, such as the obese children, or too mentally impaired, such as the youngsters with mental health problems. In both cases, friends and relatives are expected to compensate for this lack of autonomy, and to substitute both for the patient as an autonomous individual and for the professional as a provider of expert care.

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This study evokes several themes concerning science and technology in contemporary healthcare: how health professionals configure lay users of information systems, how healthcare expert information can, or cannot, be made accessible to non-experts, how patients and their significant others are constructed as autonomous individuals, and how they perceive and respond to attempts of information and responsibilisation. The author is open to suggestions and discussions of which of these themes, in the context of the present study, is most fruitful and likely to contribute to the STS literature.

Preventing Malaria: Discourse-Disaccord-Dialogue

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This paper presents a case study of the roles of various social actors (including government regulators, medical 'experts', members of advocacy groups and citizens) in creating, transforming, and recreating knowledge related to the prevention of malaria for Canadian travellers. The case study is grounded in medical sociological theory which suggests that medicine is moving from a 'governmental' state (in which individuals are encouraged to govern themselves according to 'truths' about what constitutes the good of society) to a 'reflexive' state (characterised in part by greater inclusion of lay perspectives and subjective experience in the creation and reproduction of medical knowledge). This paper investigates whether the practice of travel medicine in Canada is indeed becoming more reflexive, by attempting to answer the following research question:

With respect to the treatment and prevention of malaria among Canadian travellers, how, if at all, do subjective epistemologies (e.g., those based on personal experience) influence the regulation of anti-malarial drugs and the (re)creation of travel health knowledge.

Multiple research methods have been used to answer the research question, including in-depth interviews with subject matter experts, a survey of TMPs, and analysis of various forms of secondary data (e.g., weblogs, government documents, adverse reactions reports to Health Canada).

The case study shows that subjective experience can at once be marginalised from the practice of medicine, while simultaneously being recuperated for the (re)production of medical knowledge. Preliminary analysis of the qualitative data shows that Canadian Travel Medicine Providers (TMPs) tend to perpetuate dominant medical discourse and to denigrate the role of personal experience in consultations with their clients. Meanwhile, citizens evaluate various forms of knowledge to devise their own malaria-prevention regimens. Denigration of clients' subjective knowledge has led to a failure in the field of travel health: a considerable proportion of travellers do not comply with any prescribed prophylactic regiments and, as a consequence, rates of 'imported malaria' (malaria that is contracted by Canadians while travelling to malaria-endemic parts of the world, but which is usually diagnosed and treated in Canada) are increasing. The paper concludes by examining the work of advocacy groups and their role in the (re)production of medical knowledge - capturing and synthesising the subjective health experiences of individuals, analysing these experiences against international evidence, and engaging in political activities to shift or transform medical knowledge when appropriate. It is argued that advocacy groups must be

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given a more privileged position in the (re)creation of medical knowledge, and strategies must be put in place to ensure open and transparent communication between citizens, members of advocacy groups, health care professionals, and health regulators, in order to move towards a more reflexive practice of medicine.

Keywords: malaria, subjective knowledge, governmentality, mefloquine, advocacy, health, risk controversy

3.2.7: Information Technologies, Imaging & Simulation

Surveillance and Control In a Life Science Laboratory: Making a Space 'Scientific'

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The coherence of laboratory life is partly ensured by various restrictions on its modes of work and to the access of 'outsiders' to its spaces. This high coherence marks its distinctness from the environment within which it is embedded. The laboratory is a site that is the opposite to what scientists see as messy in the everyday world 'out there.' Scientific work is done in an insulated context, with restrictions against 'outside' noise, ambiguity and contestability. These safeguards are related to the cognitive and physical demands of work performance in the laboratory. Taking the ethnographic instance of a life science laboratory in India, the paper identifies some epistemically productive restrictions in the laboratory. It discusses spatial regulation and the deployment of information technologies in the restricted life of the laboratory. The purpose is to understand the intensive surveillance and regulation that help make knowledge deemed credible in a disciplinary matrix. The critical point is that such restriction is a key tool in maintaining and policing the boundaries and the contents of scientific operations. The strength and longevity of a laboratory are tied to the maintenance of boundary arrangements that render it a distinct and viable working unit within a particular specialty area. These restrictions are intimately connected to the making of a specialty area, that is, possessing definition and integrity of procedure and interests.

The data for these arguments is from field research for my doctoral dissertation ('Power, Authority and Capital in the Laboratory') submitted in June 2007 to the Jawaharlal Nehru University at New Delhi. The research was conducted between January-June 2004, in a bioscience laboratory. It is part of a well-regarded life science research centre (hereafter called the Institute) in the Southwest of India. The mission of the laboratory is the study of 'the molecular pathogenesis of cervical tumours.' (Hereafter, I shall refer to the laboratory as CCL, or Cervical Cancer Laboratory). The population of the laboratory included the laboratory director (Principal Investigator, PI hereafter), two PhD candidates, 4 postdoctoral fellows (postdocs hereafter), and 3 Junior Research Fellows (JRFs), working as technical assistants. There were also 2 MSc student trainees and 2 undergraduate summer interns from other institutes, doing brief research projects with external funding. The methodology included observations of laboratory set up and daily operations and interactions at and away from the bench. There were also lengthy unstructured interviews and conversations with the laboratory members.

The Dynamics of Collaborative Comparisons: Questions of Replication, Expectation and Field Formation in Simulation-Based Research

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This paper explores the role and function of so-called model intercomparison or code comparison projects; a type of collaborative project that has become increasingly popular in

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a number of simulation-based research areas such as e.g. astrophysics and climate modeling. These projects are aimed at comparing the results of simulations of the "same" problem in order to ensure the reliability and validity of simulations.

The paper presents the steps involved in organizing these projects on the basis of ethnographic case studies of astrophysics, meteorology, and oceanography. In the two latter disciplines, much of the simulations are conducted within the framework of climate modelling, which is also discussed. The material is based on interviews and participant observation, including observation during workshops and project meetings specifically focused on code comparison projects. The analysis focuses on cross-disciplinary similarities, but considering that climate modeling is such a hot topic also discusses what difference international politics play for the organization of these projects.

In relation to previous work on replication of experiments (Collins 1985) and questions of individual career in relation to collaboration (e.g. Fujimura 1987), the paper brings out several important sociological aspects of simulation practices in general and the dynamics of scientific collaboration in particular. First, code comparison projects serve to organize, in some cases even form, research fields. Who belongs to this field and who does not? Second, the results of the simulations help to create and shape expectations of what result to achieve from particular numerical experiments in these research fields. At the same time, these code comparisons themselves underscore the difficulties in performing replications in science. This is in part because of the difficulties to agree on a common set-up of the numerical experiment, the researchers' previous experiences and the (more or less debated) aim of the project as a whole. However, scientists believe that code comparisons play a role in the credibility and reputation of the research field as a whole and therefore tend to show a united front in public (e.g. at presentations, in publications), for instance by downplaying differences in the results. Taken together, these aspects create an interesting dynamics of collaborative competition where the participants compete among themselves while they simultaneously collaborate as an entity in relation to the outside.

Teaching with the Sources: a New Interactive Database in the History of Science in Latin America and the Caribbean

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Studies of the social impact of science and technology in Latin America have been growing in number and sophistication. However, attempts to integrate analyses of Latin American science into mainstream history of science scholarship and curricula have been limited despite growing interest. There is a need to build bridges between area specialists in Latin American history of science and those trained in the history of science in other parts of the world, in particular the United States and Europe.

In this presentation I will demonstrate a web-based collection of primary sources in the history of science, medicine, and technology in Latin America and the Caribbean. This electronic database, called HOSLAC (History of Science in Latin America and the Caribbean), funded by a grant from the National Science Foundation, will ultimately provide digitized primary sources, ranging from pre-Columbian times to the modern day for teaching

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and research. Using the latest new media tools, the shell consolidates sources from all media types (images, text, audio, video) into a single, seamless interface. HOSLAC is organized into 23 Topics (e.g., Aztec agriculture; exploration and navigation; Humboldt and America; tropical medicine), and contains a total of over 150 primary sources. These sources include historic maps; photographs of pre-Columbian tools and artifacts such as the Inca quipu (knotted strings that served as writing and accounting systems); photographs of individual scientists, scientific institutions, and universities; and excerpted translations of texts such as Darwin's descriptions of Latin American flora and fauna. The sources are accompanied by texts, built on recent scholarship, that places them in historical, political, and social context. A number of interactive features, such as maps and timelines, are included as well.

When complete, HOSLAC will be of use in a variety of classes, such as the history of science, the history of technology, geography, Atlantic history, Latin American history. It can be used as a tool for lectures, to illustrate a point or argument, and/or as a learning device for students. Faculty will be able to assign primary sources and interactive maps for students to study and incorporate in their written work.

A vital step in the production of this database is review by scholars and teachers in the field. During my conference presentation I will solicit critical comments from the audience about both content and usability. In the end, it is my hope that HOSLAC will contribute not only to the classroom learning environment, but also to scholarly and public understandings of the history of science, medicine, and technology in frequently overlooked regions such as Latin America and the Caribbean.

3.2.8: Energy Systems under Stress

Promoting Paralysis or Progress? Incremental and Transformative R&D Strategies at the US Department of Energy.

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What type of energy R&D promotes long-term, transformative innovation? Which types of research do energy R&D organizations predominately practice? What are the consequences of their approaches? Drawing from literature in the anthropology of engineering, sociology, history, and science and technology studies, this paper begins by distinguishing between incremental and transformative approaches to R&D. Using the U.S. Department of Energy (DOE) as a case study, the article explores whether that organization is more dedicated to promoting incremental innovation or transformative change.

The article finds that while transformational R&D does occasionally occur within the present DOE research system, it occurs by circumstance instead of design. Complicated structure and loss of mission within some parts of the DOE continues to plague some programs and create inconsistencies in terms of a national energy policy. Various layers of stove-piping within and between the DOE and the national laboratories continue to fracture collaboration and engender only slow, incremental progress on energy problems. Energy R&D continues to remain grossly under-funded by the federal government, compromising the country's ability to address energy concerns.

In addition, scientists and engineers continue to view themselves as problem solvers instead of critical and reflexive thinkers, and channels of communication and coordination between other federal institutions and within the DOE remain confusing. The national laboratories are sponsor driven rather than mission driven, R&D programs are poorly funded compared to other federal activities, and inconsistencies make it virtually impossible to sustain a coherent, long-term national energy vision. These trends contribute directly to the country's energy insecurity, risking inflated energy prices, environmental degradation, and recurring energy crises.

Innovation and Energy Systems: Learning Pathways for Emerging Technologies

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The increased urgency of climate change mitigation has focused attention on the need for energy system transformation to achieve radical reductions in carbon emissions. One of the key dynamics - and uncertainties - of energy system change relate to technological innovation: the emergence and deployment of new, low carbon energy supply technologies. After a long period of decline associated with liberalisation, there has been an upswing in effort on energy innovation in recent years, and a vast number of 'low carbon technologies' are now promulgated - each supported by dedicated research communities, policy initiatives and institutional supports. Making sense of this activity - in terms of ordering, condensing and

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judging - has become a major research challenge in its own right.

A range of tools are commonly drawn on to help policymakers and others understand and evaluate technology activity in the energy sector, including roadmaps, models and scenarios. Each has particular strengths and weaknesses, but from an STS perspective, all tend to be limited in their ability to capture and represent innovation processes. For example, modelling exercises often represent learning by a single aggregate parameter: the 'learning rate'. Alongside these tools, there is an accumulating wealth of case study research from more STS-informed accounts of technological innovation in energy systems. These predominantly qualitative accounts deploy 'middle-range' theories such as innovation systems and the multi-level perspective. Typically, they highlight a diverse range of sociotechnical enablers and barriers shaping change, and distinctive types of learning processes involved (e.g. interacting, doing, researching).

In the wider public sphere, energy policy debates often appear to reduce down to choices between rival technology options: nuclear power versus renewables, clean coal versus windpower, etc. Given what we know from STS accounts about the specificities and complexities of innovation, any attempt to compare different technologies runs the risk of ignoring or disguising important differences of content and context. Clearly, there is a difficult balancing act here between sensitivity to specifics, and the need for abstraction and generalisation to enable comparison.

With this tension in mind, we have developed a simple analytical model to characterise and compare the 'learning pathways' of several different energy technologies. Our research draws on recent important contributions on sociotechnical transitions (e.g. Smith et al., 2005; Geels and Schot, 2007), while also seeking to make its own distinctive contribution. In particular, our model allows us to recognise that niches emerge in technologically and socially diverse settings, and that these different environments enable and constrain subsequent innovation journeys over time. Starting from original expert-authored accounts of learning processes in different energy fields, we use the model to help generate historic and prospective learning pathways for a number of emerging energy supply technologies, and to compare the pathways for different technologies.

Overall, our focus on learning pathways enables us to develop more discrete innovation storylines than is often suggested in generalised accounts of innovation and transition, while, at the same time, maintaining a level of comparability often absent in STS accounts of technological change.

The Technology that was Born Old? Assessing the Disruptiveness of the Carbon Capture and Storage Transition.

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Over approximately the last 15 years, carbon capture and storage (CCS) has emerged as a powerful potential response to the need to decarbonise our energy supply. There is, as yet, little STS literature that analyses the dynamics of this new technology, and the socio-technical transition associated with its development and deployment. Smith et al (2005) use

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CCS as an example of a transition that is deliberate and highly coordinated, and which draws on the resources more or less readily available to existing regime actors. In contrast, Shackley and Green (2007) stress the uncertainty inherent in the range of technology variants currently competing for the status of the dominant CCS solution. It is thus unclear how smooth or disruptive a transition we can expect in the coming years.

Given that the technology is so new, this should perhaps come as no surprise. There is genuine uncertainty as to the shape of a CCS transition process, and whether it might entail a radical reshaping of the socio-technical regime. The technology is, however, often promoted as a 'business-as-usual' option, which draws on already proven technology, and which will be delivered by resource-rich industry players. In this version, CCS is presented as an already mature solution, and in this sense 'born old'.

A degree of hype around a new technology is useful to attract attention, resources, etc. for its further development, and to do this, uncertainties have to be blackboxed. However, disappointments may occur if expectations are not met, either wholly or in part. In fact, a hype-disappointment cycle is a common feature in new technology development (Borup et al 2006). Therefore, whilst it may be necessary to appear optimistic, the potential disruptiveness of the technology may be underestimated. This paper sets out to explore the hype around CCS technology as it is being developed, and assess the potential disruptiveness of the CCS transition.

The approach chosen is to compare expectations, as articulated in high-profile policy documents, industry visions, etc., with what we know about transitions in other technologies. For example, we learn from STS literature (Borup et al 2006) that organisational and cultural factors are often disregarded in the articulation of technological visions. We would expect this to be an area where discontinuities may be found, and potential disruptions lurk.

In this way, we seek to identify discontinuities between the hype and the evolving developments in CCS, the possible conformance of these developments to hype-disappointment cycles, and elements of disruptiveness in the transition process.

What is the Place of Users in the Construction of Energy-Using Products?

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ISEU - which stands for 'Integration of Standards, Ecodesign and Users in energy-using products' - is a research project that aims at getting a better understanding of how household energy-using products (EuP) are designed and used. Our main hypothesis states that the necessary change of culture of energy - for environmental and depletion reasons - could be brought by objects. If the "culture of energy" goes through the uses and objects, could objects embody the seeds of a relation between energy and users?

One way to answer this question is to consider objects as embodying conflicts and trade-offs of constraints pertaining to different categories of requirements: environmental, technology, economy, supposed user's behaviour, health and safety, and so on. These constraints are

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mutually negotiated for eventually constituting an appliance. To study how the question of energy consumption modifies the construction of objects, we are following the trail of the introduction of the question of energy reduction (through the European "EuP directive") into these trade-offs as well as into the production process. We tried to see if a modification of these questions could lead to a modification of the user's representations.

The representations of users can be understood in two senses: representations (mental or scriptural) that different actors can have (e.g. designers) of users; political representation through organizations. These representations are part of the process of negotiating an EuP.

Users are given different kinds of power in the legislation surrounding EuP's. Their behavior is negotiated and then standardized in the documents that serve as basis for the measure of the EuP's consumption. In the implementing measures of the Ecodesign directive, users are reduced to "average use pattern". Users are also standardized in order to make possible power consumption tests that compare different kinds of appliances and behaviours.

The political representation of users in European standardization processes is a rather recent evolution. In the process of negotiating new standards that integrate environmental aspects, the European representative bodies of environmental NGOs (ECOS, EEB) and of consumers organization (ANEC, BEUC) are making alliances in order to speak with a single voice in the forums. It is not clear however whether these alliances are strategic or structural. Indeed, there is no a priori reason that consumers' and environment's interests converge.

The STS perspective (Science-Technology-Society) and the actor-network theory are helpful to overcome the traditional alternative of determination (things are led either by technology or by society). In this theoretical framework, objects are understood as the construction of heterogeneous elements. This framework shows its limits however when coming to users, since it mainly analyses the process of construction. How would it be possible to integrate uses and users in this picture?

The paper will be based on interviews with designers, manufacturers and different stakeholders representatives, as well as on observations made the meetings for the implementing of the "EuP directive".

3.2.9: Urban Native, Digital City - Interdisciplinary e-Research

VKS Summer School

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A core feature of the Virtual Knowledge Studio is the integration of design and analysis in a close cooperation between social scientists, humanities researchers, information technology experts and information scientists. This integrated approach provides insight in the way e-research can contribute to new research questions and methods. Each summer since its inception, the VKS invites student researchers to conduct urban research in Amsterdam with instruction on the theoretical underpinnings of e-research. The use of e-research practices requires that students pay particular attention to the way questions about society are embedded in assumptions about reality. As such, we explore the epistemological connections between data gathering methods and knowledge production. The emergence of e-research as a collaborative practice in social science and humanities makes international and interdisciplinary research all the more powerful as it removes barriers of time and space that once hindered similar collaborations. We will exploit research methods from three domains: international research, urban studies, and e-research practices. We seek to examine a variety of socio-cultural topics in the urban context of Amsterdam, with a reflective eye on the process as well as the findings. Inspired by the Virtual Knowledge Studio, this study incorporates social science and humanities interdisciplinary research with methodological exploration of digital data-gathering devices and e-research techniques. The methodological framework utilized in this study is based on the assumption that technologically mediated research influences not only the method of data collection and analysis but also the character and process of knowledge production. Our aim is to develop innovative social science methods by employing digital technologies in a reflexive research design. Data collection and analysis techniques will include still image photography, sound and voice recordings, short video clips, and the use of geo-location tagging (eg. Google Earth and Geographical Information Systems software. We seek to examine a variety of socio-cultural topics in the urban context of Amsterdam, with a reflective eye on the process as well as the findings.

The Arcade - a Conceptual Framework

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This innovative summer study abroad program based in Amsterdam, one of Europe's most progressive and oldest cities. Thematically, we will focus on the interplay of urban space and digital space.With the data gathering focused in physical space and methodology rooted technology mediated methods, we employ a conceptual framework that explores the city as a place both familiar and foreign. We will examine the city through the lens of Walter Benjamin's famous, evocative, and incomplete "ArcadesProject": in which a scholar used the architectural-historical object of the Paris Arcades as a site through which to explore theories of history and modernity. Using the English-language version of The Arcades Project (Harvard UP, 1999), we will focus on the convolutes dedicated to Prostitution, Gambling,

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Literary History, The Trace, Boredom, and the flneur. This provides us with one lens with which to approach a conceptual methodology for reading physical space, which far exceeds understanding architecture as a mere building. Amsterdams WESTERGASFABRIEK currently employs the arcade as one aspect of its space-and we will run with that, building on our experience of the famous Seattle arcade, the PIKE PLACE MARKET. We argue for the arcade as both a metaphor and embodiment of the space in which multiple hermeneutics those of the humanities and social sciences- encounter each other in a *playful* and contesting spirit of inquiry. For the students this means at once teaching them to recognize what they already know as alien-they speak Facebook, but don't know what it MEANS; they have likely not considered that Pike Place Market is an epistemology and the alien as familiar. This interdisciplinary inquiry is intended to push beyond our conventional ways of knowing place and space.

Engaging the City with Social (e-)Research

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Because of the highly mediated context of online interaction, Internet research scholars have found it necessary to revisit many of the basic questions of research. Going 'back to the basics' in this manner has refocused the attention of research design onto the research question - thus providing a valuable starting point in developing a course for teaching research. The development of Internet research methods for the study of online interaction provides a foundation for engaging students in the theory behind research. A basic understanding of research is overlooked when simply teaching research methods. Similarly, using collaborative technologies in the context of teaching research requires a strong focus on the theory in practice. Students in this program use collaborative technologies as a platform for learning and conducting research as well as a means to bridge between the two segments of the program; spring in Seattle and summer in Amsterdam.

The Virtual Knowledge Studio will play a key role in co-developing methodologies and collaborative analytical techniques that will inform the execution of student research projects. The research projects, as well as the coursework at the University of Amsterdam, will retain a contextual grounding within the unique setting of Amsterdam. Experts from UvA will provide instruction on contemporary social issues within these broad topic areas while the UW instructors will facilitate student research projects and provide instruction on broader notions of knowledge production in research. Specifically, students will maintain individual blogs and collaborative wikis throughout the full 14 weeks of the program. These e-Research practices serve to augment data gathering and will be incorporated into research designs. With approved research designs, students' arrival in Amsterdam marks the start of the field research component of the program. Findings from data gathered using a variety of urban and digital methods will be presented by the students groups as a central part of this panel.

3.2.10: Acting with Social Sciences and Humanities, II: (Performativity of) Methods and Complicity

Social Network Diagrammatics

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The methodology of Social Network Analysis (SNA) is gaining popularity due to affordable information technology and the amount of data available through social software and other digital communication. What makes it so compelling is not only its powerful toolset for the unveiling of (social) structures, but also its network imaging techniques. SNA is both a theoretical perspective and a tool for scaling, modeling, simulating and demonstrating. Images of networks are complex assemblages themselves and by far not only scientific illustrations; they are inherent to the methodology and serve as tools and laboratory, as argument and evidence. Technically such networks are depicted with vertices and edges as rhizomatic aggregations, mounted on a two dimensional plane, sometimes simulating more dimensions and dynamics. They are graph drawings, which are produced by special optimization algorithms for topological problems within the constraints of digital information visualization. Practically they perform many roles and serve multiple purposes in research practice, as this "object-oriented"(Latour/Weibel 2005) presentation intends to show.

Scientific imagery has been contested and studied since long, but the practice of image production and use of imaging technologies in social sciences are rarely objects of research. If producing and representing knowledge are analytically inseparable, then a focus onto the production and use of social network diagrams and schemata exposes not only the performativity of imaging techniques, but also the social and corporeal dimension of the co-construction of scientific validity, relevance and authenticity. My presentation aims to elaborate on these performative dimensions such as the impact of popular visual cultures or the epistemological desires to "touch" (Nancy 2002) objects of research, in regard to the production of "socially robust knowledge" (Nowotny 1999). My suppositions derive from data of participant observations in an institution specialized in network analysis and of several interviews with network and visualization experts, from software experiments and encounters in the SNA community. The ethnographic data was interpreted on the basis of selected visualization practices and metaphorical inscriptions.

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Complicity and Ambivalence.
Questioning the Boundaries of a Research Field.

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In this paper I want to reflect my research on international co-operations between gender researchers of four different national communities (USA, Austria, the Czech Republic and

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Slovakia). I used guided interviews with protagonists, discourse analysis and participant observations to grasp the construction of differences, boundaries and hierarchies between gender researchers of different national contexts in a chosen sample of co-operations. Being a researcher in the field of gender studies myself, being located in one of the contexts under study and being interested and engaged in international feminist research co-operations, made me an outsider within, or maybe rather: an insider who tried to "step back" and observe her own field of interest. Therefore I want to explore the ambivalence of proximity and distance I experienced in researching different national communities of feminist scholars. I want to reflect how my own embeddedness in these fields influenced my perceptions of the communities under study as well as the co-operations between them. Being perceived differently in each context and by different protagonists (e.g. as a "rich Westerner", "experienced gender researcher", "poor student" or "badly prepared foreigner") made me aware of certain ways "outsiders" resp. "foreigners" are seen and dealt with. Besides it brought me to re-conceptualize my own assumptions about the respective "others" in the different field sites. The relations between the researcher (me) and the researched (my colleagues) were diverse, often ambivalent and sometimes inconsistent. Power relations and boundaries became blurred and confused. Drawing on feminist debates about social research methodologies as well as on participatory research I want to call the protagonists of my study "co-researchers" (Kitzinger / Wilkinson 1996): They were not only experts in their field, but also experts in mine, i.e. in a field, that we shared - and we both were aware of this fact.

Dealing with these issues I will mainly refer to anthropological and sociological methodological literature, e.g. to George Marcus' thoughts about complicity as a promising concept to grasp the relation between "outside" and "inside" when researching a social field. Bringing the "outside in" - e.g. as a colleague from a different department or country - , activates reflections on both sides: reflection on the side of the social scientists who are researched as well as those who are researching. Making research (practices) an explicit issue of investigation, discussing them with someone who is an "outsider within" might help to elaborate on a "reflexive sociology" (Bourdieu 1993). In my perception feminist and participatory approaches offer interesting ideas for carrying out social research on resp. with social researchers that can also enrich STS approaches on natural sciences and technology.

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Embedded Observation between (Re-)Construction and (Re-) Conceptualisation of Organised Visions

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Sciences have become increasingly self-reflexive, social sciences and humanities (SS&H) too. What does that mean for doing social research on social research? In the case of the

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project I wish to describe in a first step, I study people from SS&H who carry out research and dialogue on genomics mainly at the Centre for Society and Genomics in the Netherlands. I compare this with what colleagues in UK do in terms of "society and genomics" in a more or less similar way. My project is descriptive as well as conceptual. It aims at considering the ability of a research and dialogue organisation to foster policy relevance, stakeholder participation, and collaboration between highly distinct disciplines, and to legitimise the centres' existence. Possible conceptions and "a viable future" for the centre's approach shall be 'envisioned'. It represents a rather 'internal' self-reflexive type of assessment, compared to external ones which also take place, e.g. in form of peer review procedures for research granting and semi-annual work reports to the funding agency. This self-reflexive approach could act as a counterbalance against purely external assessments with rather external criteria of evaluation. Other 'society and genomics projects' claim to "co-construct" with partners outside SS&H things like policy forums, patient information or pharmacogenetics.

Such 'embedded research' can in a second step be defined as basic research with practical institutional use, as life-world and theory oriented, as well as institutionally focused and comparative. With my paper I discuss the problem of the practicalities of balancing between re-constructive and co-constructive work in research on research in the same field. Researching SS&H vs. researching science & technology differs, among other aspects, depending on the degree of enstrangement from the research object we must invest. We must also handle the epistemological symmetry in professional expertise, since the social scientists we observe would hardly consider themselves being lay persons as for the sociological reflection of their own work.

In a third step I plea for the newer sociology of knowledge (in the tradition of Berger & Luckmann) as a conceptual orientation so basic that it might function to avoid competition between different experts within the same social science. As a heuristic means, it can be helpful to deal with the empirical variety of specialized bodies of sociological knowledges and expertises (e.g. about 'society and genomics issues'), and with the question how sociological knowledges as scientific knowledges become 'real' and attain meaning. To use an existing theoretical language as a means of tertium comparationis has a double function: to avoid re-inventing the theoretical wheel with just another new-speak, and yet to be "conceptually traceable" back to basic epistemological and methodological assumptions. Methodology and contribution to the STS literature: From a methodological standpoint, this paper revisits ongoing debates in STS on "interactional expertise", the status of theory in STS and SSK, "crossing boundaries", and "serviceability", and applies these on the study of SS&H through theoretical reflection on the basis of empirical data gained from non-standardized interviews, document collection and participant observations.

Collateral Realities

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This is a paper on survey research. Specifically, it is a paper on Eurobarometer and what it says about European citizens' views about farm animal welfare. The short story is that Eurobarometer says that European citizens care (though variably) about farm animal welfare.

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This is important because it adds weight to current attempts to improve farm animal welfare within the European Union.

Step back from the case. The instruments of social science produce findings about the social world. A standard realist-inspired account of this tells us that some methods are better, or better carried out, than others. Or, more flexibly, it tells us, pragmatically, that methods are like tools: surveys such as Eurobarometer may teach us about extensive realities (public opinion in a collectivity) whilst ethnographic methods teach us, intensively, about local cultures and practices.

STS has a quite different story about method. It teaches us that methods practices simultaneously enact both depictions of reality, and those realities themselves. Such is one of the lessons from Latour and Woolgar's Laboratory Life. The lesson is also carried in ANT and its successor projects, in Haraway's feminist technoscience studies, and more generally in Foucauldian and post-Foucauldian analyses of episteme. The implication is that it is less interesting to ask whether Eurobarometer is true to the facts, than what kind of European-citizen-who-cares-about-farm-animal-welfare it helps to create. And where this configuration might hold.

Where. The results of such surveys tend to circulate in particular locations: within the European Commission; in the livestock and meat trade; amongst the lobby groups for animal welfare; amongst some academic groups; possibly, to a limited extent, in the news media.

And what does it take to these sites? The answer is, not just one thing, one object, one concern, one reality, but a whole set of them. While the official object of the Eurobarometer is 'public opinion' there are lots of others too. I will call these collateral realities. Such collateral realities include: versions of subjectivity ('citizens' with 'opinions'), territory (the EU, or its constituent nation states), population (a set of countable individuals), representativeness (the opinions of 300 million people can be properly sampled), authority (polling agencies are credible sources of social knowledge), quantification (is a source of representativeness), locations of politically discretionary power (the European Commission), the location and character of economic discretionary power ('consumption' choices in the market), and a neoliberal division of power between state ('citizen') and market ('consumer').

My proposal is that the fate of social science representations and the realities they describe rests crucially on the successful enactment of collateral realities: on the more or less tacit versions of the world that they also carry. Exploring those collateral realities offers us a practical way of simultaneously exploring and interfering in the truth and the politics of reality representations.

3.2.11: Surveillance Assemblages: STS Perspectives on Transparency, Surveillance, and
Social Sorting

Mapping Complex Translations in
Digitally Mediated Surveillance Infrastructures

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While the technologies and practices of surveillance have a long history, the relatively recent incorporation of digital techniques, such as biometric encoding, broadband networks, digital video, tera-byte databases, high performance media servers, facial recognition algorithms, data mining and so on dramatically expand the depth and scope of surveillance. As digital mediation increasingly characterizes everyday transactions, surveillance capabilities are becoming more integral to societal infrastructures. The taken for granted activities of shopping, banking, corresponding, travelling, etc. not only produce a wealth of fine-grained behavioural data linked to identifiable individuals, but also can become sites for intervention in real-time and on the move (e.g. entry denied, suspects apprehended, credit charges queried, waiting queues jumped).

This ongoing digital turn raises new questions for researchers, as well as posing significant conceptual and methodological challenges. While incorporating digital techniques into surveillance assemblages can increase their reach it also greatly complicates the research task of making sense of what it is actually going on. Not only are more and varied players translated into the actor-network, but also previously separate networks become more closely coupled when linked through systems interconnection. For instance, the digitalization of previously standalone analogue CCTV systems brings in databases, equipment and software vendors, systems integrators, and tele-communication experts. In addition, with the adoption of suitable standards, it enables linkage between CCTV systems and to automated facial identification systems, as well as public webcasting. Digital networking also means that system boundaries and who is watching whom become blurred and ambiguous, as seen in the unintended surveillance affordances of popular social networking sites such as MySpace and Facebook.

Drawing upon ANT insights regarding heterogeneous assemblages, as well as more technically oriented cybernetic control systems modelling, this paper will explore approaches to mapping digitally mediated surveillance infrastructures. It will discuss the potential usefulness of such mapping exercises for a critical analysis of:

▷ translating new players into surveillance actor-networks
▷ the visibility of surveillance assemblages to their subjects and accountability to regulatory oversight
▷ security vulnerabilities and civil liberties challenges
▷ possibilities for resistive strategies and alternative subject positionings

The paper will also discuss the goal of developing ways of mapping surveillance assemblages to enable long-term collaboration among researchers such as those engaged with the New Transparency project.

Illustrative examples will be drawn from the surveillance practices and possibilities that involve facial digitizations, such as biometric ID, (passports, enhanced drivers licenses), CCTV, and social networking (e.g. Facebook, MySpace)

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Ubiquitous Identification:
Concepts of Identity in Ambient Intelligence

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With digitisation and automation processes pervading virtually all aspects and domains of society, the routine registration of personal identifiable data is increasing exponentially. On the one hand, the need for reliable identification and verification of identity (e.g. to secure interactions, control access to buildings or information, provide personalised services, assess rights and entitlements, and to secure and track movements of people, goods, and data) leads to increasing reliance on IT-based technologies for automated recognition of individuals. On the other hand, the mere growth of digital communications, interactions, and transactions in itself produces vast amounts of personal data, because the technology is set to log information on every action, thus generating and storing details of peoples' behaviors. Clearly, access to and control over personal data, i.e. digital identity management, is at the heart of many contemporary strategic innovations, ranging from migration management, law enforcement, crime and health prevention, 'e-governance', internal and external security, to new business models and marketing tools. On the other hand, the awareness that these developments come with great potential risks and challenges to fundamental rights like privacy and non-discrimination is growing.

Coinciding with these developments is the fact that 'identity' is also a key concept in contemporary social theory, and in contemporary conceptualisations of the relation between technology and society, ethics and normativity.

From a social-theoretical perspective, 'identity' is a multi-layered concept, with psychological, social, cultural, even literary (narrative). Common element in most of these multi-disciplinary conceptualisations of 'identity' is a fundamental anti-essentialism, meaning that 'identity' is thought of as interactive, mediated, relational, and dynamic, as opposed to something pregiven to be 'expressed' or 'registered'.

The interdisciplinary field of surveillance studies, for example, taking its cue form a.o. the work of Michel Foucault, is studying the way in which ICTs are transforming identities, and the extent to which they are contributing to phenomena like social sorting, automated discrimination, categorical suspicion, and panoptic. It argues that the current predominant focus on privacy issues tends to restrict insight in societal and ethical consequences of ICTs to an unfortunate extent.

Within the field of social studies of science and technology, more particularly, actor network theory, 'identity' has been theorized as something that is produced or 'performed' in the very interaction between technology, persons/bodies, discourses, institutional arrangements and practices, or, put differently, within hybrid socio-technical configurations. Based on this view, it is argued that a redefinition of the nature and location of normativity and socio-ethical aspects of technology is called for.

This paper intends to build on these recent insights in order to contribute to the articulation of social and ethical aspects of digital identity management systems (IDMs) and concomitant transformations of the notion of identity. It will try to achieve these aims by zooming in on case studies in the area of Ambient Intelligence and migration management.

3.2.11: Surveillance Assemblages: STS Perspectives on Transparency, Surveillance, and Social Sorting

Privacy as a Rhetorical Resource in the Development of Computer-Aided Passenger Profiling

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Surveillance involves an articulated assemblage of practices and techniques of identification, monitoring, analysis, and response. Surveillance practice produces social identities, positions, knowledges, and norms. Scholars have repeatedly warned that calls for increased privacy protection are inadequate responses to the reconfigurations of social relations inherent in the rampant institutionalization of techniques of surveillance. Indeed, Lyon has suggested that references to privacy, in focusing on the individual, distract from the discrimination among groups and types that is at the heart of surveillance, and so in fact may sustain and stimulate surveillance practice.

This research offers an empirical examination of the usefulness of privacy as a rhetorical resource in the negotiation of surveillance practice.

In 1996, TWA Flight 800 exploded over Long Island. Although this explosion was later determined to be due to mechanical failure, the disaster nevertheless spurred fears of terrorist bombings, and the U.S. Department of Transportation began implementing a Computer-Assisted Passenger Profiling System (CAPPS). This system analyzed passenger itinerary information against certain unpublished rules of behavior to identify those passengers who warranted additional security scrutiny.

In 2001, hijackers flew two passenger jets into New York City's World Trade Center. In response, the newly created Transportation Security Agency began developing CAPPS II. Rather than simply analyzing itinerary data, CAPPS II was to link passenger data with commercial and government databases to generate an "identity authorization score" denoting the level of confidence that the data provided by the passenger was authentic, and a "risk score" categorizing the passenger as an acceptable, unknown, or unacceptable risk. This risk score was to be transmitted to the check in counter, to determine whether the passenger was to be subject to normal or heightened scrutiny, or to be taken into custody.

In 2004, CAPPS II was scrapped in favor of Secure Flight, a system intended to verify passengers' identities, then match those identities against a relatively stable list of persons to be scrutinized or apprehended before boarding.

Each of the systems - CAPPS, CAPPS II, and Secure Flight - was understood to potentially mediate and constitute specific relations among individuals, identities, information, corporations and the state. Their evolution was negotiated by institutional actors (including politicians, corporate database operators, airlines, public intellectuals, and civil liberty watchdogs) strategically interested in that constitution. In this struggle, these actors called upon, among other things, cultural resources such as fear, patriotism, individualism, and respect for law.

This research analyzes one site of that contest - public Congressional testimony - to see how privacy was used to justify, explain, or support certain policy options. In doing so the research illuminates whether and how privacy can be wielded to structure the production of knowledge of individuals and groups.

3.2.11: Surveillance Assemblages: STS Perspectives on Transparency, Surveillance, and
Social Sorting

Sociotechnical Systems of Accountability:
Democracy, Surveillance and Transparency

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Surveillance and transparency practices are generally treated separately. Surveillance is understood to involve collecting data about individuals with or without their knowledge or consent, for purposes of an analysis which sorts those individuals or entities on the basis of their identified characteristics. The sorting in turn leads to consequences, e.g., an offer of credit is made, an individual is interrogated at the airport. Transparency practices, on the other hand, are generally understood to be practices in which a data subject (an individual or organization) releases or displays information about itself, having gathered, formulated, and displayed the information voluntarily or according to specified requirements. Examples include the requirement that persons running for political office release information about their fund raising activities or a government reveals the processes by which it selects contractors.

In this paper we bring surveillance and transparency together as parallel sociotechnical systems of accountability. Both systems require giving an account of one's behavior (or characteristics) and those accounts are measured against some kind of normative standard. In both systems there are watchers and watched and the relations of power between them are constituted in part by IT. We draw on democratic theory to argue that systems of accountability are essential components of democracy and, hence, surveillance and transparency practices provide a site for understanding the democracy-technology connection.

Our analysis seeks to show how each kind of system constructs and positions individuals, what role information technology (IT) plays in constituting the system, and how the relationships of power are arranged and maintained. The paper examines critiques of these practices and seeks to understand how conditions of being watched are negotiated. We conclude by asking whether and how one kind of system might be better than another - for democracy, for particular functions or contexts, or from an ethical perspective.

3.2.12: Constructing and Reviewing Nature

Self-Regulation and Performance in Cross-Border Agri-Food Chain: Finding the Match between Viable Institutional Arrangements and Real Solutions to Material Puzzles in Tiered Organizations

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This paper starts from the observation that public concerns on, for example food safety or environmental sustainability, induced the implementation of strict and prescriptive standards or codes of practice in international agri-food chains, partly demanded by activist civil society organisations. Although these standards and codes expect upstream producers located in a development context to enhance their performance in the fields of food quality or environmental sustainability, the institutional arrangements accompanying may appear to be incommensurable with this aim. The paper uses case studies in coffee and banana to describe the institutional dimensions of arrangement governing performance improvement in tiered agri-food chains. In the case studies, the paper aims to unravel the combination of real material outcomes of performance requirements and socially negotiated arrangements or modes of control.

Accordingly, the paper accepts that the idea of technically defined performance is socially negotiable and malleable, but only to some extent. In the end, unsafe food or chemical pollution pose real technical puzzles to the actors connected within the division of labour in an agri-food chain. This explains the interest of the paper in understanding the impact of institutional arrangements and social settlements on the capacity of actors to manage materiality. This technographic approach further refines the notion of social construction because it examines the socially embedded nature of relationships and how this interferes with the use of skills and knowledge to handle technological puzzles. In the discussion, the paper tries to search for the social engineering implications of this position by identifying institutional experiments, which alter the socio-technical configuration currently steering the controlist modality in agri-food chains. This experimental interest reflects both on technological trajectories and managerial styles constituting corporate strategies as well as on the modes of governance and control resulting from public pressures on lead firms in cross-border agri-food chains. The papers asks whether the current institutional modalities for performance improvements primarily aim to reconstruct the work place in agri-food chains rather than reconfigure the socially embedded performance skills in line with new demands and external pressures.

Science and Social Uses in Forest Governance: the Boreal Forest (Eastern Canada) in Contention

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Forest policy has become contentious almost everywhere. New actors, new regulations, policy change, forest degradation have all contributed to this contentious climate. Is science less uncertain and surer of its conclusions to lead actors and institutions to consensus, or is

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science also an agent of contention? Based on a sociohistorical study of forest governance in Eastern Canada over the last three to four decades, and using a social world perspective (A. Strauss), the paper will present a social and technical controversy over forest decisions in some detail. A socio-technical controversy can be seen as society (in parts more or less large) in the making over important issues. Forest economy and use have been important in Canadian history and they still are. Indeed, environmental problems, forest use and management in this case, is revealing of society's change as well as scientific change. Ecosystem management, based on 'sound' ecological principles, has come to dominate the management, or governance, discourse. People and participants to forest governance are keen to embrace the idea. But it seems that the very idea means different things to different people and social groups. Some define it as integrated management, where a variety of actors' demands over uses of forest resources are met, while others insist on its ecological basis and the limits it sets on these demands.

The paper will present a brief history of forest regimes in Canada; the reasons for their successive replacement; the role of science in defining forest management principles. It will examine the current debate about forest management principles and evaluate the impact of forest regulations change on the nature of this debate. Finally, the paper will conclude on problems that remain and on the continuing controversy. Scientific forestry plays, of course, a leading role in the emergence and evolution of this public controversy. But it hasn't taken over forest policy and governance; some people are often keener to use science to their own ends than to bend to scientific advice. However, they cannot ignore scientific principles, which they negotiate to particular and often local situations. Owing to its inherent uncertainty, science appears as a necessary condition for action (none of the actors ignores it), but not a sufficient one.

We Are Anthropocene: Critical Issues for Science Studies

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The most fertile ground for issues currently facing Science Studies is not in physics, bioethics or climate change. The nexus for questions dealing with the human-nature boundary, experimental intervention, and social construction is front and center in geology. In May 2000 Nobel Laureate and Chemist Paul Crutzen suggested that the current geological epoch should be termed Anthropocene ("New Human") rather than Holocene ("New Whole") as designated by the International Geological Congress in 1885. Crutzen believes that the evidence supporting human-determined geological signatures is sufficiently robust to ensure a distinctive stratigraphic boundary when compared with previous geological records. In February of 2008 the Geological Society of America (GSA) also concluded that "sufficient evidence has emerged" to warrant proposing Anthropocene as the approved geologism. The hypothesis is that humanity has sufficiently and irreversibly intervened in nature to permanently alter what is considered to be nature; any reasonable distinction between human and nature may no longer be arguably apparent. If Crutzen and the GSA are right, geologists qua scientists are declaring that nature is, at least in part, socially constructed. Science Studies is concerned not only with what scientific knowledge is, but also how it is acquired and how it impacts society. As such, it is well-situated to address the significant policy, philosophical and social consequences from designating the current epoch as

3.2.12: Constructing and Reviewing Nature

Anthropocene. Official recognition of any such renaming by international scientific bodies will directly confront the science policies of some nations which contest human-induced climate change. In addition, Science Studies must address the implications of wittingly creating future geological artifacts -- that is, both consciously and socially creating stratigraphic evidence today which will serve as the basis for future scientific observation.

This paper will draw upon Science Studies constructs as well as historical literature in the geological sciences to address the conceptual issues that geology is currently presenting to the scientific and Science Studies communities.'

3.2.13: Acting with Telecare Technologies, III

Cooperative Telemedicine regarding Treatment of Dermatology Patients on the Faroe Islands

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Our research focused on a telemedicine system put in place by dermatologists at Roskilde Hospital and Landssygehyset (county hospital) on the Faroe Islands. We opined that the introduction of a new technology would mean changes in workloads among the parties, which would alter the importance of each individual as well as their responsibilities.

Our research included personnel on the Islands and in Roskilde as well as representatives of the provider. From this material we illustrate the impact on responsibilities and power balances among the clinical personnel caused by the introduction of a telemedic system.

The Faroe Islands is a part of Denmark with a population of 50.000. In need of special medical treatment the inhabitants usually have to travel to Denmark or wait for an occasional visit by a specialist.

The web based dermatology journal was introduced in 2003. It is used by dermatologists in Roskilde and the nurse at the out-patient clinic on the Faroe Islands. In addition, one third of the family doctors on the Islands has now joined this solution. For all practical purposes patients can now be treated by a specialist without leaving the Islands.

The nurse takes pictures and conducts a complete history. The data is recorded into the web-based dermatology journal, and the specialist makes the diagnosis and prescribing treatment through the same system. The nurse then informs the patient of the treatment.

It is the chief physician on the Islands that has the responsibility for the patients in the out-patient clinic, while it is the dermatologists in Roskilde that have the responsibility for the treatment of patients in the out-patient clinic.

Thus, the responsibility is split between the care of the patient and the specific treatment. Our research shows that introducing telemedicine requires attention on several fronts: How do the various implicated parties view their participation in the treatment, and how are those views reconcilable with those of other interested parties?

Implementing telemedicine will cause the impact of the various parties to change. This is most notably seen in the importance that the nurse will have compared with her previous functions and responsibilities.

The paper adds to the literature on STS by describing a simple and yet complete system of telemedicine, in which we have been able to separate the actors and their interactions relative to the focus on where the responsibilities and accountabilities lie, inspired amongst others by Larry Greiner and Michel Foucault.

3.2.13: Acting with Telecare Technologies, III

National Strategies, Local Adaptions. The Case of Electronic Interaction across Boundaries in Norwegian Health Care.

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This paper addresses the local adaption of a national strategy for strengthening collaboration across organisational borders in health care in Norway.

Background and aim of paper. The challenge of communication across organisational levels in the health care sector has led the Norwegian government to formulate strategies on electronic interaction in health care. Electronic interaction is considered a means for obtaining continuity of care for patients through improving the information flows between the actors in the sector. The latest strategy ranging from 2004-2007 is called Te@mwork 2007. In Te@mwork special emphasis has been put on the municipal health care sector through a priority programme, called the "Municipality programme". The objective of this part of the strategy has been to design and implement systems for electronic interaction between municipal health care and collaborating actors (e.g. hospitals and GP's). The systems were to be innovative and they should also have a general value for other municipalities. Six projects were initially funded, while only four completed the project period. The aim of this paper is to sum up and discuss the Municipality programme for electronic interaction in the health care sector.

Methods. During the Municipality programme's 3-years project period (2005-2007) we followed the projects on a regular basis through a number of meetings and through participation in bi-annual project leader meetings. In addition, for the aim of summing up the whole Municipality programme, we conducted 25 semi-structured interviews with 50 different actors, covering physicians, nurses, enrolled nurses, clerical staff and project leaders. Both individual and groups interviews were performed. The interviews took place over three periods during 2006 and 2007. In addition, document studies were performed to get insight into the project planning.

Analysis. Of the six projects that started, two were stopped after its first phase, while the other four are described as successes by the projects members, even though only two of the projects actually established systems for electronic interaction. Given the same framework (e.g. financing, project support), how can we explain the different results that the projects obtained? The project work took place in an extremely complex context. A large number of actors had to participate (ranging from employees in the municipalities, vendors, governmental actors and researchers), in order to establish electronic interaction. This called for the need for constant adaption and adjustment of the project work, e.g. re-definition of goals, expanding financing and compromising with the collaborating partners. Put broadly, the paper thus discusses how national policies are adapted at a local level, and how attempts of re-organising health care looks like in practice.

3.2.13: Acting with Telecare Technologies, III

Cultural Divides in the Construction of
Socio-Professional Medical Practice

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This paper discusses the intersection of the public and private domains in professional medical practice within two countries: the US and Ghana. In particular, we address the impact of recent innovations in telemedicine in bridging these two domains, and the role of doctors, governments, international health authorities, and academics in cultivating or rejecting this phenomenon. We begin with an initial discussion and overview of how physicians conceive and portray their roles as service providers when they are off-shift: what boundaries they create between their personal and professional lives and in what instances they choose to overstep those boundaries, both on their own initiative and when interacting with a colleague or a friend. Next, in a study of the behaviour of 60 active doctors in Ghana, we address the stress created by advances in ubiquitous connectivity (cell phones) and rural connectivity (store-and-forward telemedicine), which allows formal aspects of the practice to infiltrate previously disparate lives (personal or social) in the form of an innocuous text message or email. How do doctors in such a demanding social position cope with this imposition; why do some reject and others welcome it? We identify a variety of salient influences, including institutional, political, and social actors. Further, we explore how these various influences affect the evolving concept of medical practice both locally and globally. Lastly, drawing from interviews with a dozen doctors in North America about the intersection of formal and informal practice, we distinguish between professional boundaries which are more rigid in the West - where they are more clearly delimited by time and location - and the fluid model of interaction which exists in Ghana. An interesting counter-phenomenon is found, however, in the niche community of Ghanaian diaspora in the US, whose cultural ties to their homeland supercedes their current socio-political context, particularly in communications with their colleagues in Ghana. We close by outlining implications for the new socioprofessional information flows in which modern transnational physicians are engaged.

3.2.14: Queer Performances / Gay Desires: Acting with Internet Sexualities

Un/Becoming Millennial Youth:
Digital Cultures, New Media, and Contingent Identifications

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Benedict Anderson argues compellingly, that "communities are to be distinguished, not by their falsity/genuineness, but by the style in which they are imagined." (p. 6) "Millennial youth" surely represent precisely the kind of "imagined community" to which Anderson's prescient argument applies. It has become commonplace for narratives concerning youth, including queer young people, whose lives are situated within cultures saturated by convergent media, unproblematically to reproduce assumptions regarding the meliorative role of access to networked digital media (e.g., Boyd, Jenkins, Gee and others). In these accounts, learning is co-extensive with play, access with participation, logging in with belonging, and the consumption of digital artifacts is read as meaningful engagement in networked socialities. Techno-rationalist accounts concerning Net Gen youth and new media likewise tend to consolidate in narratives that foreground a putative impact accorded to "access" to techno-social networks, the possibility to overcome inequities that would otherwise accrue as a function of problematic participation and citizenship in a public. Our invocation, here, of "un/becoming" signals (a) the complexities of a critical relation to the very idea of "millennial youth" relative to normative discourses of developmental accomplishment, (b) attention to groups likely to be at-risk of stigmatization, and relatedly, (c) fluid and intersectional notions of identification rather than binary logics of identity, and related implication in affective topographies.

Discourses concerning the potentially democratizing significance of the Internet as a cultural technology highlight mobility, play, and possibilities for a redistribution of rights of recognition, communality and knowledge in a significant public sphere. A discursive logic of mobilization and heterogeneity likewise organizes discussions of "queer". A considerable body of historical research suggests important chronological shifts in "sexual stories" across epochs, but there is a paucity of accounts that investigate the formative role of communicative media in accounts of sexual identification and community formation. In particular, this paper attends to the generative role of the Internet in accounts of sexual self-formation by "millennial" queer youth - youth whose adolescence is situated in a networked, digital culture. The paper explores the significance of communicative media for queer youth narratives, with a particular focus on the negotiation of complex identifications, communities, social networks, and knowledge practices. Using a critical, sociocultural approach, the authors make illustrative use of 22 in-depth interviews conducted in diverse locations in two Canadian provinces, British Columbia and Alberta. The interviews are part of an ongoing research project (www.queerville.ca) that situates media practices in the quotidian. The data analysis highlights the complex, multiplicitous, trajectories of queer mobilities within and across sites that are (a) mediated by a range of technologies, both new and not-so-new, (b) dispersed across multiple offline and online contexts, and (c) affectively charged with persistent agonistic entanglements with the complex politics of recognition, belonging, and a sense of community. With particular attention to the assemblage of gender, sexuality and other modes of identification, this research counters and complicates decontextualized, celebratory narratives of queer youth and cyberspace.

3.2.14: Queer Performances / Gay Desires: Acting with Internet Sexualities

My Internet Penis: Male Panics and the
Queering of Penis Enlargement and Erectile Dysfunction Emails

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Spam emails for penis enlargement technologies and erectile dysfunction medications suggest all recipients, including women, have a penis and investments in male size, potency, and possession of the phallus are endangered. Since erections are a cultural requirement for being a man, and the emails suggest that such achievements are often unobtainable, masculinity is deeply compromised. In a Wired article, Brian McWilliams indicates men's investments in being always hard and ready when noting that an exposed order log for male supplements "revealed that, over a four-week period, some 6,000 people responded to e-mail ads and placed orders," including a number of male executives. These performances of masculinity are different than the self-presentations that are visible in many public spaces. Instead, they evoke the fragile masculinities described by such scholars as Meika Loe and Kaja Silverman. Penis spam emails and men's consumption of untested products from unverified sources depict disabled men, even though many of these men were previously rendered as empowered subjects. These emails and men's Internet-based reactions, where they make excessive assertions about their size and potency, render normative masculinity as a disability. Penis spam and related narratives indicate men's psychic pain and the conflicted demands to be always functioning, technologically and medically mediated, and natural. When considered along with sexuality studies approaches and the enacted and described positions of readers and penis technology users, these messages also offer possibilities for queering varied binaries. In these cases, the breakdown of normative male sexuality offers theoretical possibilities for rethinking gender, race, sexuality, and mobility - all of which are articulated and used to produce empowered masculinity.

Repetition and Hyperbole: the Choreographies of Online Porn

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As a popular genre, pornography tends to rely on clear divisions based on identity categories such as gender, class, sexuality, or "race", which are often tied to (explicit, exaggerated) hierarchies and relations of control. Drawing on textual analysis of 366 porn email spam messages, this presentation addresses some of the generic features of commercial heteroporn, as well as their gendered underpinnings while also arguing for the necessity of resisting literal readings of their meaning. Rather than conflating the notion of control with that of power, the presentation investigates the role of reiteration, recognizability and hyperbole within and for online porn in an attempt to chart some of its carnal modality.

3.2.14: Queer Performances / Gay Desires: Acting with Internet Sexualities

Desires at Play: Queering World of Warcraft

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The multifaceted domain of 'gender and games' is expanding steadily, but little has been said on how game spaces are sexed. There are many questions that deserve more attention. How do corporeal desires and belongings map onto games? How may the bodily sensations of high-paced in-game traveling - and fighting - be understood and articulated? In what ways can we understand the many possible connections between female game bodies, sexuality, and the powerfully violent subject positions of warriors and fighters?

3.2.15: The Making of Europe: National and Transnational Leisure Regimes

Social Tourism in Post War Netherlands and Europe

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Within the context of post-war reconstruction and the construction of a welfare state, the Dutch State started playing a central role in societal organisation. The State became the major actor regulating (un)employment, wage policies, the labour market, labour relations and social security. Through the lens of paternalist social-democratic and social- Christian corporatism, citizen-consumers were routinely treated as incompetent and dependent in need of help, protection, guidance, and education. This was also visible in the organization of national leisure and tourism. Within the context of the cold war 'democratization' of consumption was considered crucial, which took the form of state guided and state organised consumption. With respect to leisure and tourism the concept 'social tourism' emerged, meaning the organisation and regulation of mass tourism.

A number of state and non state actors, including the Dutch Tourist and Touring Club (ANWB), The Building Centre (Bouwcentrum, charged with coordinating reconstruction activities), the Hotel and Catering Industry (Bedrijfshoreca), the Ministry of Reconstruction and Social Housing (Ministerie van Wederopbouw en Volkshuisvesting)and the Government Department for the National Plan (Rijksdienst voor het Nationale Plan), were charged with the material translation of 'social tourism'. According to these actors social tourism would apply to 4/5 of the population, for the major part consisting of families with a yearly income not exceeding 4000 guilders. The actors had to make plans that would allow a family of 4 persons (2 adults and two children) to spent a one week holiday that would not cost more than 150 guilders, because the 'average worker' then received 50 guilders holiday pay.

At the same the concept of 'social tourism' surfaced at a transnational level with the establishment of the European Organisation for Social Tourism and Le Bureau International de Tourisme Social. What where the outcomes of the Dutch programs? How were the Dutch and European programs related?

The Construction of a Danish Automobile Culture

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This contribution stems from a research project dealing with the way modern leisure life was invented, constructed, presented and appropriated in Denmark from 1920-1989. Leading questions in this project are: How was leisure constructed as an ideology of collective consumption and recreation in the democratic welfare state? How was the technology for this new life of leisure produced and introduced to the individual consumer in Denmark compared to other countries in Europe after 1920? Who were the inventors and initiators? What inspired the mediators to propagate these new modernistic ideas? Were the ideas imported directly from America or were they of European origin? Who formulated and introduced the ideology of leisure as consumption in Denmark? How was the ideology mediated in the

3.2.15: The Making of Europe: National and Transnational Leisure Regimes

public and appropriated by new organisations of consumers transforming it into a collective vision of the good life for the modern individual? Which role in shaping the new technology of leisure was played by the consumers in the construction of a cultural identity and in building a material reality that allegedly would benefit every citizen from childhood to old age?

The conference contribution deals with the question how a Danish automobile culture developed both as a structure and a car travel mentality. The focus will be on Danish motorist organisations and their role in the making and the development of a car mediation junction where matters of information and advertising, car service infrastructure, car exhibition, the establishment of a travel agency for organising car holidays abroad, transportation policies, traffic laws, road and bridge construction, traffic education and tax policies were negotiated.

Central thesis is that the culture of Danish automobilism was primarily constructed around and appropriated through leisure activities. Important leisure activity was touring or 'tourism' as it was called. Excursions into the countryside with the motorist club, visits to fellow clubs in other countries, regular car holidays and memberships of European Organisation contributed to the formation of a Danish Car Culture. How Danish, European or American was this culture?

Separate Summer Homes:
Scandinavian Leisure Consumption and its Ideologies in the 20th century

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In this contribution it will be argued that there has been a specifically Scandinavian model of leisure consumption in the period 1918-1989, taking the form of separate summer homes. By paying specific attention to two 20th century de-location patterns in the areas of transportation and leisure activities respectively, the shaping of a Scandinavian model of leisure will be analyzed. Transportation technologies and leisure ideologies will thus be brought together in order to understand the phenomena of separate summer homes.

In the development of the Scandinavian model of leisure three phases can be distinguished, each highlighting a specific spatial interdependence between transport and separate summer homes.

1. 1918-1945. In this period, the train was the dominant means of transport. The ownership of separate summer homes was limited to the wealthier social groups and took the form of sport cottages close to highly esteemed nature types, such as mountainsides or lakes, easy accessible by train. Important actors were tourist organizations. However, during the latter part of the period, labour unions and cooperative organizations entered the stage, initiating and influencing vacation reforms of the 1930s, offering the possibility of separate summer homes for workers.
2. 1945-1970. In this period, cars and leisure time were truly democratized. The numbers of cars quintupled in Sweden between 1950 and 1960, and vacation was extended to three weeks in 1951, to four in 1964. Two types of processes may be observed during this

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period. Firstly, existing cottages and houses on the countryside - abandoned as a result of the ongoing urbanization process - became more accessible by car allowing a socially more widespread ownership of separate summer homes. Important intermediary actors were the car lobby in close collaboration with tourist organizations. Secondly, centrally planned "summer cities" started to appear on the drawing-tables of city planners. The summer city was typically located on the periphery of the metropolis - perhaps a two-hour car ride away from city centre. Ideally it would be located in a traditional agricultural and cultural landscape that no longer fulfilled its original purposes.

3. 1970-1990. Travel by air increased dramatically, as well as vacation possibilities for both white- and blue-collar workers. In Sweden, vacation was extended to five weeks in 1978. As a result, the geographical dispersion of separate summer homes, now more accurately denoted separate vacation homes, started to transcend national borders. Villages of separate vacation homes, in essence fragments of the Scandinavian model, appeared in Spain, Greece, and elsewhere. Important intermediary actors during this phase were building contractors as well as travel agencies and real estate agents. In the third phase, typical intermediary actors no longer planned more room for vacationists, spatially or temporally. Instead, their ambition was to create and sell a desirable alternative to existing separate summer homes.

Using this periodization, the importance of combining materialistic and ideological explanations for understanding Scandinavian leisure consumption with separate summer homes becomes evident.

3.2.16: Rethinking Relationships between Public Engagement, Participation, and
Policy/Non-Policy Contexts as Sites of Action, II

Science Shop Networks and Research Agendas

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If we are looking for socially robust knowledge development we could do with closer co-operation between scientists and non-scientists. Brian Wynne and Alan Irwin, among others, have shown the benefits of doing so (or the perils of not doing this). Nowotny & Gibbons call this Mode-2 science and society interaction. In many science shops (or community based research centers) around the globe, faculty, students and community organisations work together to apply science in response to social concerns, to the benefit of all three stakeholders. Although science shops necessarily work on the local scale, a network of science shops can articulate broader social demands and agendize these in larger programs. I dare call this a system of interactive science communication. A few steps have been made, but as a network we are still a long way from achieving this, despite all the great work locally. Study of this process may be of interest to STS scholars. However, they may need to become PARTICIPANT observers first... How can a network like 4S/EASST and its members help?

Science, Technology and Civil Society - Civil Society Organisations as Actors in the European System of Research and Innovation

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The issue of civil society involvement in research has received so far little attention. However, civil society organisations (CSOs) increasingly play a role in domains such as health, disability, environment, agriculture, international solidarity, gender, social exclusion and poverty, both at local and global levels. They are important knowledge producers and aspire to be accepted as full partners in research. A third sector of knowledge production and innovation (beyond the state and market sectors) has thus emerged within Civil Society.

The gap between the established research system and Civil Society can also be seen in the field of biomedicine. Possibilities, risks, consequences, desirability and legitimation of biomedicine are widely discussed in science and in public. The debate however suffers from not taken seriously or even ignoring the perspective of people living with impairment. Despite the fact that medical-technical developments in many fields improved the life of people with a disability they are rarely included as partners in designing research projects.

There may be various reasons for this. CSOs may neither have enough information about nor be enough interested in research issues. Researchers may define research priorities according to the logic of a confined research process not taking into account interests of CSOs. Research agendas are set up with scientists, decision makers and industry but almost never with civil society actors.

An important issue for the European project STACS* is to define ways to increase the societal relevance of research. The project aims at exploring the feasibility of future academia-civil society partnerships in different research areas and how to optimize the interaction between science dynamics and the needs and concerns of society.

Leading questions of this project are: In which cases and by what means can civil society be fruitfully involved in the regulation and production of scientific knowledge? What is necessary to enable CSOs to participate in research projects, foresight and science policy activities? What makes scientists interested in projects with CSOs?

Hence we will present and analyse in our paper the process and the results we obtained in organising a series of capacity building workshops and "research project nursery workshops" focusing on the identification of research topics and possible cooperation between organisations of Civil Society and scientists. The workshops on biomedicine and disability will serve as a case study.

STS Approaches in Co-operation with Civil Society. Organisations in a University-Based research Science Shop.

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The Science Shop at Technical University of Denmark (DTU) has organised research with labor unions, environmental NGOs and other civil society organizations since its founding in the mid-1980s. Most of the co-operation has been based on requests from civil society actors and students doing projects as part of their curricula. Another element has been embedding of topics from this co-operation in research and curricula (urban ecology, organic food, sustainable development). A third element has been a more supply-oriented type of co-operation, where science shop researchers have initiated co-operation with civil society actors (employee participation in environmental management, transnational product chains, sustainable innovation and transition, analyses of hypes and hopes in nanotechnology and functional food).

STS approaches like SCOT and ANT have increasingly played a role in the day-to-day science shop work and in the research and teaching. The potentials for a strengthening of research and education at the Technical University through a focus on co-operation with civil society and a more strategic role for the Science Shop seems to depend on whether the technology-based research DTU departments are open for co-operation with STS researchers and civil society about the legitimacy of the problems and solutions addressed in the technology research, including dialogue about the translation of civil society concerns into technological strategies within areas such as nanotechnology, functional food etc. A vision for co-operation between the university and the local community about sustainable energy has been developed through the co-operation of a local municipal administration and a local NGO with the Science Shop about CO_2 reduction.

3.2.16: Rethinking Relationships between Public Engagement, Participation, and
         Policy/Non-Policy Contexts as Sites of Action, II

Third Sector Knowledge Production and Social Change: a Cross-Atlantic Grass Roots Action Plan

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In the past three decades, mainstream policies and practices in science and technology have been increasingly contested by diverse groups around the globe. In the process, there has been an uneven development in opening this most insular yet significant domain of contemporary society. A parallel development is the dramatic growth of critical inquiry by civil society organizations, particularly at the grassroots level, into the interactions of science, technology and society, at the same time that similar inquiry has been securely institutionalized and controlled by the academy.

This presentation is concerned with the degree and nature of this participation, and ways of enhancing its effectiveness. Our general questions are: 1) what are the contours of citizen-driven challenges directed to R&D aspects of key industrial sectors in North America and Europe? 2) What accounts for the successes and failures of these challenges? 3) How is success defined?

At present, governments in North America and Europe are increasing research budgets for participation in science and technology decisions, but the intent and outcome of these programs could be construed as promoting research as an alternative to meaningful participation. While remaining open about this claim, we have used it as a heuristic to argue that a rebalancing of participation toward action by civil society organizations can yield more change in research policy. To explore this possibility we will review the work of four grassroots organizations (two each in North America and Europe) that have engaged research policy issues in the course of their activities (e.g., in areas such as access to digital technology, or the health and environmental concerns raised by nanotechnology development). Can an approach driven by the concrete goals of civil society organizations and grounded in action influence the research system?

3.2.17: Governing the Urban

Planning Sustainable Cities in Africa:
Strategies Towards Social Harmony

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Poverty and rapid urbanization are two of the greatest challenges facing Africa today. Africa has a staggering 166 million slum dwellers, and more than 60 per cent of the urban population find themselves in the informal sector where they simply do not earn enough to afford decent shelter and services. The main policy problem addressed by the paper is how best to support and regulate the urban informal sector and irregular settlements in a way that promotes employment, income and shelter for the poor, and at the same time ensures a safe, healthy and socially acceptable environment; how to forestall the growth and spread of slums, and ensure that the existing ones are upgraded and progressively integrated into the urban mainstream. The central argument is that human development ought to be at the centre of the concern for sustainable urbanization in Africa.

While acknowledging the importance of the 'green agenda' for protecting natural resources and ecosystems in order to ensure long term global sustainability, and also beautify the cities, the paper maintains that the proper starting point in the quest for urban sustainability in Africa is the 'brown agenda' to improve the living and working environment of townspeople, especially the urban poor who face a more immediate environmental threat to their health and well being. The human development approach calls for rethinking and broadening the narrow technical focus of conventional town planning and urban management in order to incorporate the principles of urban health and sustainability embodied in Agenda 21, the Habitat Agenda, the ILO's Decent Work Agenda, WHO's Healthy Cities programme, and other recent global initiatives that provide guidance on how to make cities everywhere more inclusive and socially sustainable.

The paper discusses the misguided polices of many African governments that try to repress and outlaw the informal sector, and sometimes to evict thousands of so called squatters in order to build the ideal city of their imagination based on middle class values. It considers how building and housing codes and standards inherited from the discriminatory and segregationist policies of the colonial period have continued to inhibit the access of the poor to affordable land and housing security.

The aim is to identify the lessons that could help to promote a more positive view and policy regarding the poor and the informal city. The concluding section considers ways to improve urban environmental health and the conditions of the poor, paying particular attention to the roles which state and local authorities, the private sector and civil society organizations, the international development community, and the urban poor themselves could play in a collaborative effort to build safe, healthy, just and inclusive cities. It ends with some general reflections on the future of the African city, what form it will take, and how to bring about the changes needed to make these cities healthier, more productive and equitable, and better able to meet people's needs.

3.2.17: Governing the Urban

Closure through Unclosure. The Endless Controversy on the 'MoSE' Dams Project and on the Problem of Flooding in Venice.

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STS scholarly work on technological change stresses consensus among 'relevant social groups' and/or cooperation among actants as main outcomes of the process of successful stabilization of technological artefacts. According to these perspectives, technological controversies resolve and close thanks to the steady convergence of actors towards shared meanings of technology that lead to the formation of technological frames (as in the SCOT model - Bijker 1995), or through the cooperation of actants around boundary objects (Star & Griesemer, 1989), discursive anchors that allow translations in actor-networks in which technologies appear as embedded and black boxed.

Moving from a critical evaluation of these interpretations, I analyze the shaping and stabilization of the 'MoSE' project, a system of draw dams now being built in Venice, Italy, to prevent the flooding of the city and to cope with the so-called 'high water' (acqua alta) problem. The investigation of this controversy is based on the study of historical literature on the issue of the safeguard of Venice and on the analysis of 37 elite interviews to policy makers, technicians and civil society representatives involved in the MoSE dispute, collected through the 'snow ball' sampling technique. The dispute on the safeguard of Venice from flooding is still ongoing after 40 years of debate and the controversy on the project MoSE never came to an end, even after the final institutional decision to build the dams system.

The analysis of this case study reveals how the opposition among conflicting and obdurate arguments, embedded in different technological frames and rooted in diverse technological styles and cultures can influence disputes on technological artefacts in a policy context. I argue that while these divergent interpretations prevent both translations among actants and negotiations on the meanings of technology, they can at the same time account for the stabilization of technological artefacts.

Starting from these considerations, this contribution is a first attempt to consider and discuss, through the analysis of the Venetian dispute on the MoSE project, the concept of unclosure, aimed at interpreting the stabilization of technological artefacts and the settlement of controversies on technology not only as an outcome of consensus and/or cooperation, but also as a result of polarized, enduring and unsolvable conflicts. The concept of unclosure, besides accounting for the never-ending struggles that continue to mark the dispute on the MoSE, allows to consider conflict not merely as an external or disruptive factor, but rather as a possible constitutive element in technology stabilization processes. Building on these basis, the paper argues that the idea of unclosure could be a useful conceptual tool to connect STS research on technological innovation with the study of technological controversies in a policy context.

Bijker, W., 1995, Of Bycicles, Bakelites and Bulbs, Cambridge MA, MIT Press.
Star, S.L. and Griesemer J.R., 1989, "Institutional Ecology, 'Translations' and Boundary Objects, Amateurs and Professionals in Berkeley's Museum of Vertebrate Zoology, 1907-1939". Social Studies of Science, 19: 387-420.

3.2.17: Governing the Urban

Technologies of Governance and the Cultural Productivity of Disaster Recovery Planning: New Orleans after Hurricane Katrina

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In post-Katrina New Orleans, recovery planning has been presented by a number of institutional actors as a process that allows residents to be the intellectual authors of the city's reconstruction directive. The anthropological literature, however, suggests that planning encounters are considerably more complicated processes, where a variety of social actors engage one another with knowledges about the use of urban space that have specific cultural, political, and material histories, and where procedural structures can create conditions that differentiate and privilege expert knowledge and the interests of politically-influential constituencies. Consequently, planning encounters are more than representative technologies of governance, they are culturally-dynamic processes that feature contestation, mediation, and transformation between and among participants. This presentation uses the case of recovery planning in post-Katrina New Orleans to explore a current question in the science and technology studies literature: How do technoscientific knowledge-making apparatuses shape the ontologies of their objects of inquiry, and in what ways do the objects under scrutiny operate as agential entities in the knowledge-making process? The paper reviews different ways urban space is experienced and used by recovery planning participants in New Orleans' 4th Planning District, the ways these positions are negotiated in the socio-politically complex system of disaster recovery, and the socio-material stakes of official planning processes. The paper concludes by suggesting that, although procedural structures in New Orleans' official recovery planning processes have featured the mobilization of expert knowledge of urban planning for the inculcation of novel ways of experiencing urban space among its participants, the cultural productivity of recovery planning has had diffractive, but not determinative effects on its participants. In this case, I use the term diffraction to convey a model in which the cultural productivity of recovery planning is contingent on the embodied subjectivities of its participants, resulting in a variety of outcomes.

3.2.18: Interdisciplinarity

The Making of Multidisciplinarity in the Science of Aging: Journals, Professional Societies, and Experimental Organisms as the Media of Communication across Disciplinary Boundaries

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Gerontology, the science of aging, began to be established in the United States, when the economic crisis of the 1930s agitated the whole country. The Great Depression threatened the job opportunities, private pensions, and eventually the survival of the nation's elderly, whose proportion in the population had consistently increased since the late nineteenth century. While the federal government responded to this issue by establishing the Social Security Act in 1935, scientists tried to deal with the problem by constructing gerontology as a multidisciplinary scientific field which investigated the complex biological, medical, social, and psychological dimension of aging and old age. For them, the problem of aging, like that of gender and race, was a multidimensional issue that should be cooperatively tackled by researchers across disciplinary boundaries. But how could they maintain the coherence of gerontology and integrate knowledge from such divergent fields that usually did not closely interact with one another?

While admitting that gerontologists' ideal of cooperative approach has not been completely realized, this paper argues that multidisciplinary interactions for research on aging have been quite successful. It will be shown that the interaction among scholars with distinct academic backgrounds was enhanced through at least three means - the professional society's unique structure, its official journal, and the strategic uses of experimental animals as research subjects. Indeed, the Gerontological Society, which was established in 1945, tried to promote multidisciplinary interactions, especially by including the representatives from biology, medicine, psychology, and the social sciences in its governing body. The editorial board of the Journal of Gerontology also attempted to encourage the subscribers to read the articles belonging to different disciplines by adding to each article a non-technical abstract and the author's brief biographical sketch that would promote readers' understanding of current research projects and scholars in different disciplines. Finally, the experimental organisms used by gerontologists functioned as the "boundary objects" linking many distinct fields in the sense Ilana Loewy, Susan Leigh Star, and James Griesemer have claimed. In particular, the aged rats which Clive McCay, a nutrition scientist at Cornell, used for studying the relation of caloric restriction to longevity became an important medium through which a broad range of scientists communicated, including those in nutrition, biochemistry, pharmacology, psychology, and dentistry.

This talk thus offers a historical case study of constructing multidisciplinarity in science, which sociologist Julie Klein has called an "additive juxtaposition of disciplines." This presentation argues that multidisciplinarity in the case of gerontology was much more integrative than Klein has claimed and was deliberately promoted by gerontologists themselves.

The main methodology of this presentation is a comparative analysis of published and unpublished papers, especially those at the National Archives, the National Library of Medicine, and the Washington University Archive.

3.2.18: Interdisciplinarity

Psyche via Soma: Assembling Personality (Disorder) within the Laboratory and the Clinic

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Psychiatry is frequently considered a monolithic entity, increasingly ensconced within a neuroscientific paradigm. This paradigm, strengthened by elaborate funding by bodies such as the NIMH in the US, and the Wellcome Trust and the MRC in the UK, as well as by imaginative drug marketing campaigns, is considered to dominate both research and practice. Hyperbolic hopes and fears about the consequences of neuroscience cut through a variety of discourses, within and without psychiatry. This paper complicates this picture of the neuroscientific domination of psychiatry.

Using the personality disorders Antisocial Personality Disorder and Psychopathy as case studies, it will be argued that psychiatry is better seen as a conversation between a variety of approaches; neuroscience is just one (albeit prominent and well-funded) example. Furthermore, it will be argued that the models of personality disorder elaborated by neuroscientists are not as dissimilar to those expressed within specifically psychiatric discourse as might be imagined. It will be shown that despite the extravagant hopes and fears held by a variety of parties about the ways in which neuroscience might impact upon clinical practice, the therapeutic potential of neuroscience for Psychopathy in particular is constructed as relatively mundane - even by those at the forefront of the 'neuroscientific revolution'. The paper will conclude with reflections on the implications of these arguments for the social and ethical analyses of neuroscience and psychiatry.

The paper draws from data collected for PhD research into 'Neuroscience, Clinical Practice, and the (Re)Construction of Personality Disorder'. The thesis is qualitative, using data collected from semi-structured interviews with neuroscientists and clinicians in the US, Canada and UK. Documentary analysis was also undertaken using a corpus that included psychiatric publications from 1950 to the present day, and archival materials sourced from the National Institutes of Health, the National Library of Medicine, and the American Psychiatric Association. The research examines the changing models of personality disorders, and the ways in which new neuroscientific research has interacted with contemporary understandings of these disorders.

Problematising concerns about the neuroscientific domination of psychiatry, this research draws upon STS work on geneticization, extending its ideas and insights into the area of neuroscience. More generally, this research contributes to the growing STS literature on psychiatry, neuroscience and society.

3.2.18: Interdisciplinarity

Ethics Commissions - a New Way for Science?

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Outline
Today, many societal problems cannot be solved by one single scientific discipline anymore. For instance, most cases of death and dying take place in hospitals or nursing homes. The process of dying is often highly regulated by physicians and health personnel. There are often difficult questions to be answered, for instance about the continuation or abandonment of life support (e.g. parenteral nutrition or artificial respiration). One may ask how the health personnel deal with those issues. Physicians cannot make those decisions alone anymore. There is the patients will that needs to be considered; there are legal regulations to be regarded; there are even economic aspects which cannot be overlooked. So how should those problems be solved?

In this context ethics commissions on different levels of society become more and more important. Ethics as a new or maybe not so new scientific discipline seems to emerge. Many hospitals already have their own ethics committees, and also on the political level more and more ethics commissions are being established to prepare advice for such difficult societal questions. But how do these commissions deal with those difficult end of life subjects? How do they find solutions? How does knowledge emerge in these commissions? And: Who selects the commissioners of those committees? What kind of members get selected for those committees? Do commissions develop their own, internal logics?

I will try to answer these questions by taking a closer look at two ethics commissions, which were to prepare recommendations for the legal regulation of advance directives for the German Parliament and the Government respectively. Both commissions met almost at the same time, but came up with very different recommendations.

Summary of Methodology
Participant Observation et the meetings of one ethics committee was used to get first impressions of the research field.

29 expert-interviews with members of both ethics committees were conducted. The resulting data is currently beeing analyzed with the methods of Grounded Theory following Anselm Strauss.

Documents of both commissions were collected for a document analysis. Specific consideration will be given to different draft versions and the final report of one commission, including all changes during their discussions.

Contribution to STS literature
Based on the assumption of our society as "post-social science society" (Knorr-Cetina 1998), I will analyze the networks around the problems of dealing with death and dying, and take a close look at the ethics commissions mentioned above. I will analyze the "seamless web" (Law 1991) around the regulation of advance directives, and look for networks following the concept of ANT (Akrich/Latour 1992, Latour 1996)

Knowledge in Process: Producing Useable Knowledge for Local Health Policy in the Netherlands

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Introduction
In the Netherlands all municipalities are legally obliged by the Public Health Preventive Measures Act to draw up a local Health Policy memorandum every four years. The challenge of these local memoranda is to integrate health policy, with several other local policy domains. Next to that the local memoranda have to be developed and implemented together with stakeholders in the field and they should be based on epidemiological knowledge. This makes intensive interactions between research, policy and implementation practice necessary. Due to the fact that a lot of actors, interests and goals are involved in local health policies, the use of (local) epidemiological knowledge becomes a complex multi-actor process. Decisions in this process are made in different settings and by different stakeholders. Now the question arises how these complex multi-actor processes take place and in what way(s) epidemiological knowledge is being used.

Theoretical perspective
In earlier literature study within the public health domain, we identified interaction between researchers and policy stakeholders as the most important explaining variable for "research use" in policy development. Also we identified four barriers which can influence this interaction namely: different expectations of research and policymaking by stakeholders (actor perspectives), transfer issues like language, acceptance of the research by stakeholders and interpretation of research by stakeholders. In the paper we operationalise these concepts in order to provide a theoretical framework for analyzing the empirical data.

Empirical research
We conducted case studies in three municipalities in the Netherlands. During the case studies we observed the production of epidemiological knowledge and reports on one hand and on the other hand the process of local health policy making. We used a network approach in which the complexity of policy processes, and the role of interactions and actor perspectives are being emphasized. All actors involved in research, policymaking or both were considered stakeholders in these case studies.

In the paper we analyze the barriers of interaction in practice and the "use" of epidemiological research within the policy process in order to explore the dynamics between research and policy and mechanisms behind it.

The analyses are based on interviews, observations of meetings and obtained documents.

Link to the STS studies
This study is a co-production between Public Administration sciences and Public Health sciences. This study focuses on the complexity and dynamics of networks in which different public, private and professional actors interact in order to achieve shared and individual goals. The understanding of the logic of policy processes is relevant to the STS studies because it enriches the insight in the production and use of knowledge within processes that are dominated by political struggle and policy dynamics. Knowledge about producing and

3.2.18: Interdisciplinarity

using knowledge on the other hand is relevant to the public administration studies, because it enriches the insight and understanding of micro politics in policy networks.

3.2.19: Expertise in Action, I

Interactional Expertise and the Congenitally Blind

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The 'strong interactional hypothesis' holds that it is possible to acquire fluency in the discourse of an esoteric domain purely by immersing oneself in the discourse without any engagement with the practices of the domain. The imitation game - the forerunner of the Turing Test - can be used as a test of the strong interactional hypothesis: those who are 'contributory experts' in a domain can be compared with those who are merely 'interactional experts;' if judges are unable to guess who is who then the strong interaction hypothesis is supported. The strong interactional hypothesis has implications for technological decision-making in the public domain because fluency in the discourse acquired through immersion in the language should feed into expert committees in just the same way as fluency acquired through practical immersion. The strong interactional hypothesis has been tested with the colour blind who can talk fluently about colour. The next step is to test it with the congenitally blind. The congenitally blind ought to be just as fluent about colour and anything else related to vision if the hypothesis is really true. Attempts will be made to find out if this is indeed the case. The results, as well as bearing on debates within STS, also bear upon the the 'minimal embodiment thesis' which argues that the individual human body sometimes plays a small role in the acquisition of skills and cultures; evidence is found in the abilities of those with bodies that vary from the norm. The role of the body in defining culture lies at the collective level.

Rethinking Expertise:
What's in it for ELSA Genomics Researchers?

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Research into the Ethical, Legal and Social Aspects of genomics (so-called ELSA genomics) is becoming increasingly important. As genomic science develops so the ability of traditional categories and institutions to adequately conceptualise and regulate these developments becomes stretched, perhaps even to breaking point. ELSA genomics, with its explicit reference to, and claims of, expertise in these debates is now a routine part of genomics policy-making. But what kinds of expertise are involved in ELSA genomics and how does their role within the public sphere relate to more the general calls for a more democratised science?

Drawing on the Periodic Table of Expertises set out in Rethinking Expertise, this paper analyses two different scenarios in which ELSA genomics may be developed and used. On the one hand, ELSA genomics could remain an expert level debate. In this scenario the contributory expertises of ELSA researchers are complemented by their interactional expertise in genomics to license an approach in which ELSA researchers contribute a technical expertise to debates that take place, and are resolved within, the conventional confines of the scientific community. In such a setting, which corresponds to the technical

3.2.19: Expertise in Action, I

phase in the 3rd Wave paper, the participants enter the debate by virtue of their specialist expertise and it is the internal politics of the expert communities they constitute that resolve define what is or is not to be permissible.

In contrast, if the public nature of these issues is stressed a more wide-ranging role for sees as ELSA genomics emerges. Rather than being the 'representative' of society within the scientific community ELSA becomes the mechanism by which the political dimensions of scientific issues are taken to a wider audience. In this scenario, the emphasis is on the political rather than the technical phase so that it is not just the expertise of the ELSA researchers that matters but the expertises available within the more general population. Depending on how these expertise are understood to be distributed, legitimate civic inputs may take the form of opinion poll data (assuming little more than common knowledge is required) or more intensive participatory forums such as citizen juries (assuming some training is needed if citizens are to appropriately informed). In this case, ELSA genomics appear as experts alongside the biomedical colleagues but the ultimate decision about what is or is not permissible is no longer theirs to take.

In summary, these two different roles for ELSA researcher reflect two different relationships between genomic science and society. In the expert-led scenario, the implication is that the concerns raised by ELSA genomics can be handled within existing institutions, in the more populist scenario, the implication is that the issues at stake have already escaped the experts' grasp. Understanding expertise not only helps understand these problems, it also helps understand how to resolve them.

Scientific and Other Expertise in Risk Governance

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Based on an analysis of the Health Council of the Netherlands (with Roland Bal and Ruud Hendriks) Bijker will argue for a risk governance approach that specifies the contributions by scientific experts, stakeholders, and the general public for different risk situations. Such a comprehensive approach would seek a balance between participatory, representative, and expert-based forms of democratisation of technological culture. Within this approach, the precautionary principle plays a specific role as will be illustrated with the case of nanotechnologies. The paper is set in the current debate between those who would prefer to see a strong element of democratic participation in every decision-making institution which bears upon new science and technology and those who consider that the gulf between public understanding of science and the understanding of the experts so great as to make too much democratization dangerous. Here it will be argued that though the trend toward democratization cannot be halted or reversed a separation of scientific and democratic roles should still be maintained. One way to do this is to run parallel institutions for so-called 'lay' inputs and for scientific inputs. Under this model, in spite of the pressures, institutions such as the Health Council of the Netherlands would maintain their current style of operations - a style which stresses scientific expertise. Democratization would be achieved by instituting separate institution to balance or verify the Health Council of the Netherlands' conclusions. This model is preferable to one in which scientific and 'lay' roles are intertwined within the same institutions.

3.2.19: Expertise in Action, I

Types of Immersion and Expertise

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The differentiation between types of specialist expertise (Collins and Evans, 2004; 2007) opens the discussion on 'types of immersion' within a technical domain. Types of immersion is used here to designate the various kinds of experience one or more individuals can go through within a form of life or collectivity, such as practice, reading, watching and so forth.

The existence of an expertise that is not acquired through hands-on practice indicates that concepts such as socialisation, apprenticeship or enculturation now require qualification. If there were only two types of immersion - 'no immersion at all' or 'hands on experience' - interactional expertise brings in a 'third way': 'linguistic socialisation' (Collins, 2004a: 127).

A closer analysis of the proposed definitions on types of expertise enables the identification of four types of immersion connected to their acquisition: 'non-immersion', 'self-study', 'linguistic socialisation' and 'physical immersion' (Collins and Evans, 2007: 31). A fifth type - 'physical contiguity' - is added as the result of the analysis of how Portuguese-Japanese interpreters acquired linguistic fluency in the steel industry (Ribeiro, 2007). The overall goal is to understand the connection between types of expertise and the way they are acquired.

Here the difference between linguistic socialisation alone and linguistic socialisation plus physical contiguity is illustrated by a case of technology transfer. Interviews with Brazilians who were in charge of absorbing technology from Australia and apply it in Brazil are used as an attempt to draw the boundaries between these types of immersion. The question to be answered is: how much could Brazilians have learned without making technical visits to Australian plants and firms?

3.2.20: Tensions in Standardization, II: the Politics of Standards

The New ICT Standardisation:
Reflexive Modernisation in the Network Society

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Changes in the ICT standardization landscape in the last fifteen years have been widely recognized. The locus of standardization has moved outside national standardisation bodies to include a plethora of emergent standardisation consortia. The importance of standardisation activities for both industrial firms and state governments has also been widely recognized. The relocation of ICT standardisation from hierarchical, state-sponsored processes to extra-governmental and extra-organisational institutions has been explained by the need for faster development of standards more closely tied to the needs of users.

This paper reflects on fifteen years of ethnographic studies of standardisation undertaken from an STS perspective to argue that, while current standardisation discourses recognise the significance of the changes in standardisation, they under-estimate the significance of the under-lying social changes. The paper will critically review these studies through the lens of two theoretical positions: Castells' Network Society and Beck's Reflexive Modernisation.

Castells claims that we are witnessing a transformation in how the constitutive processes of society are organized, with a shift from hierarchies to networks, as a result of three trends: the growth of ICTs, a crisis of industrialism and the cultural challenge mounted by freedom movements. The emergence of standards consortia, with global networks spanning organisational boundaries and decision processes based on consensus, seems to fit with Castells' thesis.

Beck's claim that we have entered a period of reflexive modernisation has been applied to ICT standardisation by Hanseth et al, who focused on the complexity of ICT standardisation as symptomatic of reflexive modernisation. To fit Beck's claims for reflexive modernisation the process must be reflecting back to impact on structures. The current changes in standards development, from a focus on a negotiation of the best means to reach an accepted end into processes where the purpose of the process itself is being negotiated, may therefore be exemplary of radical reflexive modernisation.

The paper relates the claims of Castells and Beck to structural changes in ICT standardisation observed empirically, arguing that there has been a progressive attenuation of the influence of the state and a slower, but equally significant, emasculation of the firm in standards development. It has been argued, for example by Froomkin, that the open decision making of new standards bodies represents an example of Habermasian communicative rationality, in which conflicts between all interested individuals are resolved efficiently through discourse. However, we would argue that this view, that sees the decline in influence of state and corporation being balanced by an increase in individual power, is unsupported empirically, and that in practice standards processes become autopoietic systems. Considering the significance of the decisions reached and the potential diversity of participants, it is not the frequency of conflicts in ICT standards development that is most surprising, but rather their rarity.

This paper examines the tensions in efforts to develop a standardized methodology for measuring emergency needs in responding to famine. There seem to be compelling reasons for governments and humanitarian agencies to adopt such standards, ranging from greater assurance of consistent information to increased ability to compare and prioritize needs across different instances of famine around the globe. Moreover, a standardized methodology would seem to reduce the tensions and outright conflicts that result from donor government concerns over the political manipulation of needs assessment results. In short, the argument goes, a standardized methodology will help determine needs more accurately and reduce the possibility of interested parties inflating the numbers to suit their own purposes. However, the standardization of methodology does not address the tensions inherent in quantifying something as messy and difficult to define as famine needs; indeed, recent theorizing on famine points to the need to understand each instance of famine as a unique process that defies one-size-fits-all solutions. Further, the process of selecting and implementing such a methodology carries its own tensions - e.g., whose methodology becomes official and what are the ramifications of this for the organizations involved, much less the famine-affected people? Thus, an effort to smooth over a source of contention in humanitarian action - multiple determinations of need arising from the use of multiple assessment methodologies - not only obscures tensions, but produces still others as well. Drawing on participant observation data gathered in Ethiopia during an early stage of the effort to choose a standardized national needs assessment methodology, this paper explores how technical staff in humanitarian agencies negotiated the tensions that emerged as they sought to field test, adapt, and perfect a standardized methodology in the aftermath of the 2002-2003 Ethiopian famine. It presents an example of how standards, as efforts to resolve political tensions, mask the political processes of their own emergence, and yet at the same time embed these politics in the social relations that they produce.

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When the Vital Systems Fail:
Enacting Electricity Infrastructure Breakdowns

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In recent years, there has been a newly found idea that technological infrastructure systems like the electricity supply underlie the modern cities' ability to function. Emerging security initiatives in the US, European states and the EU have turned their focus at the security, health and welfare of infrastructure users, who are seen as vulnerable and at-risk from breakdowns. This is illustrated by the powerful new security concepts "critical infrastructure protection" and "vital systems security". (Collier & Lakoff 2008.)

3.2.20: Tensions in Standardization, II: the Politics of Standards

The proposed paper studies the breakdowns of electricity supply ("blackouts") in this context, and is based on an ongoing sociology PhD project since 2007. The project relies on an ethnographic approach at two sites: Finnish and Nordic seminars related to electricity supply reliability and interviews from Finnish infrastructure reliability experts. Some interviews have been conducted in the control rooms where electricity production and consumption is balanced. The proposed paper shall present and analyze the various risk techniques that the reliability experts employ, emphasizing on the styles of reasoning that are managing and imagining the uncertainties of electricity use. The analysis draws on pragmatist ideas of chance and habits of live.

The main theoretical contribution of the paper for both STS and urban studies comes from the scrutiny of risks and uncertainties of urban infrastructures. The noted STS scholar, Thomas P. Hughes, famously claims that electricity supply systems have acquired momentum: they should be bureaucratical, centralized and hierarchical in structure, with a minimal role for external uncertainties. But the subject of uncertain and risky systems requires much more active picture of urban infrastructure technologies. It is necessary to underscore that infrastructural systems have to be constantly performed and achieved in order for them to function, which, in turn, emphasizes on the engineers, technicians and civil servants who are making urban life possible.

Background to the whole work are the contemporary reproblematizations of urban infrastructures as technologies of welfare. Currently, market-based infrastructural models are widely spread, providing for the welfare of "consumers" (Silvast & Kaplinsky 2007). The paper claims that the contemporary situation places unusual demands for managing the uncertainties of electricity systems, which also makes it a novel field for a study of actors in the making of the contemporary societies.

In addition to having a degree on sociology, the author has worked on and is studying systems sciences.

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Dealing with Tensions in Standardization:
Free Market Ideology versus Public Safety Policy in the Development of the Tetra Standard

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In the early 1990s, several European governments (among which The Netherlands, France, Belgium, the UK and Germany) started to think about the introduction of advanced digital

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communication systems for their safety and security services (police, ambulance and fire services). These initiatives were taken in the context of the Schengen Agreement (signed in the late 1980s), which expressed the ambition to create a Pan-European network for public safety and justice, and to enhance the cooperation between police services in different EU countries. The envisioned means to construct this network was technological: by connecting the communication systems of the police of the various European countries. The European Tetra standard, developed by ETSI, the European Telecommunications Standards Institute and sponsored by the European Commission, was created to make these transnational connections possible. In the course of the 1990s it became clear that, indeed, several European countries wanted to base their national communication system for public safety on this ETSI standard. However, at the same time, another technology, called Tetrapol and developed by the French Matra company, also gained support in some EU countries. Matra even endeavored to get its technology acknowledged as a standard by ETSI. This situation, the possibility that two standards would become accepted for the public safety domain, caused serious tensions, and even contradictions, within the policy decisions of the European Commission and several of the countries involved: Should the free market ideology and the European tender law prevail and should all EU countries thus be free to choose whatever technology they like for their public safety system? Or should the Schengen agenda of European integration take priority and should one standard be stimulated in order to fulfill this commitment? This paper addresses the question how key actors such as the European Commission, companies such as Matra and Motorola, ETSI and some of the EU countries involved (mainly UK, the Netherlands, France and Germany) dealt with this tension. It shows the dominance of industrial political arguments rather than public safety arguments in this debate and raises the question whether this is appropriate, both from a European integration point of view and from a public safety point of view. In discussing this question, we aim to contribute to the current STS debate on the vulnerability of (critical) infrastructures and to the research agenda on the hidden (technological) integration of Europe. The paper is based on archival research and interviews with key actors.

3.2.21: About Methods and Normativity

Responses to the Loss of 'Peerness' in Evaluations

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The aim of our paper is to demonstrate that the content of what is commonly named 'peer review' is changing because all participants in a peer review exercise must respond to the 'loss of peerness', i.e. the increasing mismatch between peer knowledge and subject matters of evaluations. Our discussion is based on several empirical studies of peer review processes including our own empirical investigations of interdisciplinary research processes and of peer review processes in small science systems.

From a sociology of science perspective and in the expectations of the evaluated scientists, a peer who assesses one's work would be a colleague who is engaged in the same collective knowledge production process, i.e. is a member of the same specialty. This concept of peer review is being hollowed out because the internal differentiation of knowledge production increases the likelihood of three characteristic situations of 'loss of peerness':

1. Whenever interdisciplinary research processes are based on a new combination of fields, it is unlikely that any reviewer can be a competent judge of the whole research process or of manuscripts resulting from them.
2. Small science systems often cover all fields of knowledge production but do so with very few researchers. As a result, national peer review processes in those systems are likely to encounter situations where there is no second competent researcher in a specialty who could act as reviewer without conflicts of interest.
3. Whenever a country or organisation conduct an evaluation that covers all major research fields, a committee-based peer review of reasonable size and time frame becomes impossible.

All participants in the peer review process respond to these situations a by changing their practices. Academics appear to respond by simplifying their project proposals and addressing them to an 'imagined generalist' rather than to an 'imagined peer'. Reviewers either refuse to judge contributions outside their field and defer to the disciplinary authority of fellow reviewers (Lamont et al.), or resort to second-order criteria such as journal impact factors. The authorities that organize peer reviews respond to the shortage o peers by procedural innovations such as empowering applicants or 'email order peer review'.

The convergent result of these responses is that 'peers' acting as assessors are ceasing to do what peer review originally promised, namely judge the content of research. Instead, peer review is being replaced by the taylorised judgment of formal aspects of knowledge production.

Assessing Value and Use of Research in the Social Sciences and Humanities

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The current debate regarding the relationship between research and policy (or science and society) centers around concepts like the 'knowledge gap' and 'valorization', in particular in the context of Europe's ambition to become the leading world economy by 2015 (Lisbon agreement 2003). These concepts refer on the one hand to a perceived lack of productive interactions between research and the economy and society at large (knowledge gap), and on the other hand to the political aspiration to judge research in term of its value for the economy (valorization).

More traditional ways of judging the value of research focused on articles in the scientific literature (often by using bibliometric measurements) or on peer review. In the present context, both these instruments are under pressure. Peer review because it has difficulties judging research in other than scientific contexts. Traditional bibliometrics too is under pressure because it focuses mainly on the scientific literature, which arguably doesn't tell us much about socio-economic relevance, nor takes into account the obvious differences in the way fields in the social sciences and humanities interact with users in varying societal contexts.

The demand of policymakers to demonstrate and increase societal relevance of publicly funded research activities is increasingly reflected in procedures and criteria of assessments. In this paper we will illustrate how a variety of contexts and use can be included in assessments, by elaborating on the EriC initiative (www.eric-project.nl). We will present an empirical example by way of an evaluation of the Social and Cultural Planning Office of the Netherlands, in which we seek to do justice to the broad mission of this research agency. The SCP at the same time wants to do research of high scientific standard, which is relevant for policy makers and for the broader societal debate. Using various databases and internet-browsers a robust image can be given of the use that is made of reports and documents of this key Dutch planning bureau. A wide variety of use and users can be indicated in various social sectors, in particular the public sector. The findings exemplify new ways in which 'valorization' can be regarded.

"Trust Me, I'm a Researcher" : Performing Research Ethics In Practices

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There is widespread agreement that conducting research in an ethical manner is crucial. Internationally, there are ethics review boards, research codes of practice, and ethical guidelines to assure research organisations, funding bodies and the general public that research conduct is ethical. However, there is little research that has systematically

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investigated what happens in the practice of research ethics. This research is part of a three year project (2006-2008) examining how human research ethics committee members and health researchers in Victoria, Australia make decisions about ethical issues in health research. Eighty-eight individual, in-depth interviews have been undertaken: 34 ethics committee members across all categories of membership, and 54 health researchers in fields including biomedicine, epidemiology, clinical and social health research. The research has examined how health researchers and ethics committee members understand and think about research ethics and how, in practice, they address ethical issues in research. The focus of this paper is on the ways these health researchers perform ethics in everyday practice. Not surprisingly, the health researcher participants all considered themselves to be ethical, but what this meant to them was not the standardised notion of abstract ethical principles. For this group of health researchers, research ethics is not separate or distinct to their practice of doing research; the ways that they think about and do research were inherently ethical. Ethics is embedded in their research practice, from the early stages of research design, their relationships with their participants, through to the dissemination of findings.

This paper will examine how this group of health researchers negotiate ethical review of their research and their relationship with institutional ethics committees who play a crucial role in mandating their research. In Australia, the National Statement on the Ethical Conduct of Research Involving Humans officially guides the conduct of all research on humans, covering all areas of research and all academic disciplines. All researchers in Australia must sign that they have read and understood, and will abide by the National Statement when applying for ethics approval. Although the health researcher participants claim general awareness of the National Statement, what is of interest is their interpretation and working of these guidelines in their everyday practice. This paper uses STS approaches to address the competing knowledges and practices of research ethics-an area that has been under-examined. It explores the meanings attributed to research ethics by those central to the research enterprise - researchers and ethics committee members, and examines the relationship of this to the conduct of everyday research practice.

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STS and Sustainable Urbanism: Towards New associations

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The argument for the analytical potential of connecting STS and urban studies is not new. Looking back ten years or so we can find calls for just such a marriage in the work of, for example, Brain (1994), Aibar and Bijker (1997), Guy and Shove (2000), Moore (2001), Graham and Marvin (2001) and so on. What characterises the desire for this engagement is a conceptual means to mediate the relationship between the materiality of buildings and cities and the heterogeneous processes and practices through which the built environment is designed, developed, inhabited, redesigned, demolished, rebuilt and re-inhabited. Dissatisfied with readings of the city that saw buildings as a mere backdrop or 'theatre' for social interaction, or alternatively, readings of city form as determining social structures and practices, these researchers argued for a more relational understanding.

Such an approach has been particularly productive in engaging with policy prescriptions to identify a single model of 'best practice' for design (whether of buildings or cities), which the application of STS methods has helped to problematise and to offer alternative accounts. Contesting a hegemonic policy view of buildings as embodying technical homogeneity, describable in terms of form and performance irrespective of geographical location, patterns of ownership, occupation or operation, STS inspired research has argued that such buildings often differ dramatically in the actor-networks that under-pinned them, arguing that processes and practices of design and development need tracing as complex negotiations and translations between different actors worlds (from agent to investor to developer to architect to user), and that such micro-negotiations are always framed by shifting associations between market, legal, technical and professional rules and norms.

This paper will attempt to look back and forward in exploring the synergies and tensions between STS and wider urban studies approaches to analysing buildings and cities as forms of urban technology. Focusing on debates about buildings, cities and climate change, the paper will ask how STS researchers might best engage with the wider social sciences in the development of climate resilient urbanism.

Cities, Climate Change and the Governing of Socio-Technical Energy Systems

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Too often, cities have been taken for granted as the backdrop against which the profound transformations of climate change will be played out. However, if we consider cities as dense networks of interwoven socio-spatial processes that are simultaneously local and global, human and physical, cultural and organic (Swyngedouw and Heynen 2003: 899), it is clear that the very nature of urbanization is profoundly connected to climate change. Seen thus, cities are critical sites in the socio-technical networks of energy provision. However, to date

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the urban infrastructures which mediate technologies, policies, practices, and environmental processes have been neglected within analyses of the urban response to climate change. This paper considers the potential of socio-technical systems perspectives for the analysis of urban responses to climate change. Drawing on the case study of London, it examines how socio-technical energy systems are figuring in the politics of climate change in the city. In particular, in this paper I will discuss and explore how socio-technical systems are being governed and the consequent implications for the whereabouts of climate politics. The paper suggests that a particular contribution a geographical perspective brings to such research is to question the scales and boundaries of socio-technical systems, and the means through which change in such systems occurs.

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Situations of Opportunity in City Transformation - a Futures Studies Based, Cross Disciplinary Approach Developed through Case Studies of Three Stockholm City Districts

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To keep global warming at 2°C, society faces challenges of a totally new magnitude. In Sweden like any high-income country, it creates a powerful incentive to city transformation. Tackling this challenge of sustainable urban development poses problems for planners and researchers alike: What urban processes, practices and form enable the transformation, how can its stakeholders combine forces to utilize their potential freedom of action? In this paper, we explore how Futures Studies, scenario techniques and backcasting can enable a cross-disciplinary research approach that defines the challenge in scope and time while retaining its complexity. Futures' Studies can indicate the probable as well as supply visions of the desirable, it can be normative as well as descriptive. For our purpose, it is mainly normative and focusing on what we deem necessary. In our project, researchers within the fields of Energy Technology, Urban Planning and Environment together apply backcasting to develop scenarios that explore the path of transformation from today's climate changing society to a 2060s vision of a sustainable city - a 2 kW Society. Three Stockholm City Districts provide case studies. A main assumption is that there are shorter periods - Situations of Opportunity - when inertia against change is low, and the stakeholders' pooled Field of Options is wide. For each district we identify "seeds" to Situations and then develop consistent pictures of their planning and realization in the upcoming decades. Each picture consists of three parallel representations: The Scenario is a narrative of the Situation as a process of change, seen from the future looking back. The computerized Energy Usage Model quantifies the outcomes of measures taken in terms of reduced energy use. Finally, the Stakeholder Network designates the Situation's agents of change and their forms of co-operation. One example of a Situation is the upcoming refurbishment of a large share of the Swedish housing stock. Utilized to its full potential, this Situation could contribute largely to the necessary reductions in energy use - or else become a chance lost for fifty years, until the next refurbishment. Within this research approach we get manageable units of analysis, enabling the simultaneous study of "what to change" and "change by whom". Elements of our approach could also be developed to contribute to the practice of strategic urban planning.

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Understanding the Political Ecology of Urban Infrastructures: What Can We Learn from Technology Studies and Urban Studies?

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Networked urban infrastructures like energy, water, wastewater, and transport systems are "material mediators between nature and the city" (Kaika/ Swyngedouw 2000). They can be regarded as both, a vital root cause of many environmental problems of cities, while also offering important keys for reducing the urban ecological footprint. These socio-technical systems are co-evolving in a dialectic relationship with cities: On the one hand the development of the modern city was made possible only by urban infrastructures that guide and facilitate urban functioning and urban life in a multitude of ways. On the other hand the urban environment was a precondition for the development of these "urban machines" and still socio-technological and socio-environmental innovations of networked infrastructures are mostly located in cities. The co-evolution between cities and technical infrastructures and the ways in which we develop, govern and renew our infrastructures in cities are thus key matters of urban political ecology and societal relationships with nature.

The objective of this paper is to scrutinize, how different literatures in both, urban studies and technology studies reflect this interrelationship and the urban conditions of sustainability transitions. It is hypothesized that none of the concepts discussed in these literatures is entirely appropriate for understanding the ambivalent socio-ecological role of urban infrastructures, for explaining the complex interrelation between cities, urban technologies and natural environments and for conceptualizing how urban governance can contribute to promoting socio-technical innovations. The paper shows, however, how urban and technology studies might inspire, complement and benefit each other in conceptualizing the urban political ecology of networked infrastructures. Interlinking the hitherto largely distinct analytical concepts and theoretical traditions, it is argued, could on the one hand illustrate the places and scales of socio-technical regimes and of their "transition management" or governance towards more sustainable practices. On the other hand such integrated approaches could create opportunities to enrich urban sustainability studies by explaining that stable and path dependent techno-structures and socio-technical regimes create opportunities as well as restrictions for urban governance and change.

Transport, Space and Society in Copenhagen and Bogota, 1940-2010

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This paper explores the way urban space, transportation networks and urban societies co-evolve and shape each other in time and how this process impacts the development of specific infrastructure projects in cities. To illustrate and analyse these processes, I examine the space design and transport planning history of Copenhagen and Bogotá since the 1940s and how the heritage of decisions and non-decisions shape some of the urban and design

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features of the most recent transport projects in both cities: the Metro in Copenhagen and the Transmilenio in Bogotá. At the core of the argument is the assumption that history can become an actor in the multiorganizational and complex process of developing large technological systems: For instance, in Copenhagen the five finger plan of 1947 still determines global and detail planning decisions and in Bogotá the master plan of Le Corbusier issued in 1950 defined the main transport corridors taken up by Transmilenio 48 years later; In both cities the complex of decisions and non-decisions related to the development of infrastructure for cars since the 1950s and the unsuccessful anti-congestion policies since the 1970s also shape the present projects as both the Metro and Transmilenio were promoted as high end means to move commuters out of their cars and into the public transport system. Based on the work of Ulrik Jørgensen, I propose that a city can be considered as an arena of development where different actor-networks interact and thus shape and are shaped by social processes such as the space development of the city, the enactment of certain discourse of self representation (cities as regional poles of development for instance) and the daily routines of city dwellers and their living choices, among others.

This type of sociological analysis forwards the benefits of bringing together disciplines such as Urban History, Science and Technology Studies and Engineering Studies, with special emphasis in the multidisciplinary Actor-Network Theory and the Large Technological Systems tradition. The cases considered here are an opportunity to discuss the works of Thomas Bender (urban history), John Law (on ANT and post-ANT), Bruno Latour (mainly Reassembling the Social), John Urry (specially his work on mobilities and also his papers on the sociology of automobility), Nigel Thrift (on space), Steven Graham and Simon Marvin (mainly Splintering Urbanism) and Thomas Hughes and Jane Summerton (on Large Technological Systems).

This paper is part of a PhD research project that will examine the transformations in transportation in the cities of Copenhagen, Denmark and Bogotá, Colombia. The project is carried out at the Design and Innovation Research School, at the Technical University of Denmark. This space provides a rich interdisciplinary environment where the traditions of engineering, design and social sciences are combined with STS and other interdisciplinary efforts for education and research purposes.

Modelling Practices as Mediators of Design in Sustainable Architectural Decision-Making

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Understanding the co-evolution of human behaviour and technology is a key policy challenge, critical to the achievement of sustainable architectures, with huge research effort and significant resources being committed to developing models that accurately map this relationship.

This paper aims to explore how these models are pre-figured by particular assumptions about their role as decision support tools, with particular imagined uses and beneficiaries through the mapping of modelling practices and identifying the imagined users and uses prefigured by the different modelling practices. This is achieved through exploring relevant

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case studies and evaluating the role played by modelling practices as decision-support tools.

The work has developed from a synthesis of three distinct literatures. Firstly, a cross-disciplinary debate about ways of representing the world through modelling. Secondly, debates surrounding the sociology of science and technology within the environmental and social sustainability arenas. And finally, literatures focussing on the sociotechnical framing of the use of modelling in design practice. Out of this, case study examples have been chosen to exemplify the aims and objectives above, exploring and testing the assumptions made by architectural decision-makers by following the design, development, testing and use of recent models using a rigorous interdisciplinary framework.

The presentation will focus on the outcomes of the fieldwork relating to the main case study, which is a model in practice in the form of the BREEAM Environmental Assessment Method (EAM). This case was chosen as BREEAM is considered by many to be the world's longest established and most widely used EAM for buildings. EAMs are a major form of modelling used in architectural and building studies and form the backbone of many sustainability assessments. It was thought pertinent to choose BREEAM as a case study as it is the most popular EAM used in UK buildings with over 65'000 buildings being BREEAM certified to date and a further 270'000 currently registered for assessment. It is therefore highly influential, to such an extent that some parts of it are to be introduced into legislation. As this is the case, it is important to explore the claims that BREEAM is built upon.

Members of the many different groups involved in using BREEAM in the design process have been interviewed with the hope of understanding how their practices shape and construct the way BREEAM is used and its potential and apparent effectiveness with reference to its stated aims. These groups include architects, sustainability consultants, BREEAM assessors, modellers, and developers among others.

This presentation will be of key interest to model designers, to the policy-makers and planners identified as model users and to the research councils who fund their development, and will hopefully connect interests across many disciplinary boundaries, seeking to unite both architects and social scientists in the hope of increasing the efficacy of the tools used to ensure our buildings are sustainable for future generations.

and nanotechnologies remain blurred. The article argues that the current debate on the definition of nanotechnologies goes far beyond an issue of mere terminology. As a case study, the ongoing debate on the definition of nanomaterials among different actors in the German risk debate on nanomaterials will be analysed. I will show which different definitions of nanomaterials are at stake in this debate and which consequences are intertwined with the different definitions.

Firstly, the paper will demonstrate that the definitions of nanomaterials and nanotechnologies vary according to the professional and institutional background of the actors involved, according to their interests and according to the contexts they act in. Secondly, these different definitions serve as a discursive strategy and are a matter of boundary work (Gieryn 1983). The power to define nanomaterials and nanotechnologies, that means the power to draw the boundaries of nanomaterials and nanotechnologies, involves also the power to define which risks are at stake. These boundaries are at the same time also the boundaries of the nanotechnological risks which are discussed and which are to be regulated. To define which objects belong to the realm of nanomaterials also implies the question of which risks are important and of how to regulate them. To draw the boundaries of what nanotechnologies are is to draw the boundaries of the risk discourse on nanomaterials.

To conclude, the way nanomaterials are defined has strong implications for the framing of their potential risks as well as for the assessment, the handling and the regulation of these potential risks of nanomaterials.

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and nanotechnologies are under constant negotiation.

Against this background it is striking that some social science approaches tend to blackbox "nanotechnologies" and leave aside the issue of defining "nano" when enganging with these technologies. All the more this might surprise as the debate on the proper definition is deeply interwoven with issues on governance, regulatory policy and last not least with public discourse on nanotechnologies.

In my paper I will explore how actors from nanosciences and nanotechnologies handle the vagueness of "nanotechnologies". Do they benefit from it or does it impede their progress in the field? How do they position their stakes in regulatory and policy discourse with regard to malleable definitions? How do they stabilise their standing under conditions of nearly arbitrarily drawn boundaries?

The observations I will present are drawn from a project that investigates and visualises the ongoing risk debates on nanotechnologies in Germany. The study is based on a discourse analysis of documents from policy, industry, science and civil society, in addition to qualitative interviews with researchers and R&D coordinators from university and industry.

The results suggest that the negotiable definition serves most actors as benefit. Depending on recent changes in public attitude from a widely positive media coverage to more and more concerns about the potential risks of nanotechnologies, definitions of nanomaterials are adapted and "nanotechnology" is re-interpreted by actors in order to stabilise their position within the field. It will be discussed how de-stabilising boundaries of "nanotechnologies" are used to stabilise the involved actors' position.

Coming back to social sciences' engagement with "nanotechnologies" I want to argue for opening the blackbox and for a more scrutinizing approach to "nano" as "nanotechnology" is a flexible notion that is under permanent construction.

Organizing Nanotechnology Research. The Uncertainties of the Relationship between Laboratory and Experimentation.

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Co-location of technological and human resources is a central issue in the development of nanotechnology research (Robinson et al., 2007). In particular the rise of technological platforms concretizes the theoretical distinction between laboratory and experimentation (Knorr Cetina, 1995) and re-articulates the relationship between laboratory and experimentation. The presentation deals with uncertainty about the reconfiguration of such a relationship and tries to better characterize it. It is mainly based on the data collected in a new research centre in micro and nanotechnologies gathering several research laboratories organized around various technological platforms. The method I use is based on a data combination coming from interviews, archives and researchers observations in their everyday, individual and collective activities. Drawing on these data three kinds of uncertainty in the relationship between laboratory and experimentation could be distinguished. The first uncertainty concerns boundaries between laboratory and

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experimentation. It deals with the case of a laboratory where experimentation is physically delocalized out from the laboratory. It describes and questions the boundary work that is engaged by researchers to negotiate and build their own (local) definitions of laboratory and experimentation and draw the limit between both territories. The second uncertainty deals with the "models" of articulation between laboratory and experimentation that are produced by researchers. It describes how these "models" circulate thanks to some scientific work that is performed in some places of science outside of the laboratory. It shows that the relationship between laboratory and experimentation is formed through competing "models" proposing strategic and organisational choices concerning the way of doing research (including typical way of experimenting, technical standards, access procedures to instrumentation, etc.). The third uncertainty deals with the diversity of processes constituting technological platforms as specific and concrete entities. The diverse ways of enlisting the participants (instruments, technicians, researchers, etc.) in technological platforms is historically built through contingent processes differentiating various relationships between experimentation and laboratory. This contingency of the concrete relationship between laboratory and experimentation is a key feature of nanotechnology research organisation: regulation about access to experimentation is built, maintained and adjusted through a specific work of categorisation that deserves to be deeply studied.

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Upstream STS Engagement in TA regime: the Development of Regional Technology Assessment in Belgium

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New technologies are putting public authorities under pressure for a stronger framing and control of these socially invasive developments. Lack of certainty on crucial technological issues (eg.nanotechnology) is fueling political controversies and sometimes stronger social protests. In order to not only support but also publicly control these developments, several countries have developed complex sets of instruments and institutions, as well as specific tools such as office of Technology Assessment (TA).

The first European parliamentary TA office in France had as foremost mission to "enlighten" the parliamentarians. Other TA offices were created in North-Western Europe and some took a participative stance, with the view to foster social acceptability of technologies by associating stakeholders to the decision-making process. That is e.g. the case of Flanders (northern region of Belgium), who choose to settle a TA with a dual mission: to serve members of the Flemish Parliament and to foster S&T public debate.

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Whereas current technological applications seem to face fewer boundaries, intelligence on technological innovations is however not provided the same way within the country. Indeed, in Wallonia, there is no political debate nor interest about the opportunity to develop such a TA office, in spite of a strong tradition of STS studies.

Given this situation, we plan to analyze the Walloon case study in order to take a concrete example of one STS approach passing from observation to participation in the construction of public policies on Technology Assessment.

First, we will analyze the existing practices (mainly dispersed and informal) of TA in this region, considering also the interactions with the other regions and the relevant levels of public policies (federal and European). We will further raise research questions e.g.: what aspects of TA seem of interest? How useful is such institutionalization and professionalization considered? How participative should TA be? What are the obstacles? Is there support to the STS to engage actively in such issues in the construction of public policy? Our methodology is based on qualitative analysis of practices in some policy domains (eg Economy, Research, Employment, Health, Environment) considering politicians, public administration but also experts and industrialists.

In a second stance, we will open the discussions to members of parliamentary committees to evaluate their expectations on this issue at the regional level. This will be done by associating them with the former groups within a Delphi process. An interactive workshop will valorize this Delphi by putting together all these actors from the political, scientific and administrative spheres to discuss the mains conclusions. We should then be able to draw the main lines concerning a concrete TA project for Wallonia.

Through this analysis, we plan also to analyze the level of interest raised by our interventionist approach as STS and to spotlight whether and under what conditions STS researchers can act as a catalyst to foster a political (re)action in this particular field. This might be an illuminating starting point for concrete STS engagement in public policy which could be referred to as a case study in other countries.

Epistemology of the Interrelation of Funding,
Methods and Models in Reproductive Gentics
- Changing Boundaries between Genes and 'Living Things'

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This paper analyzes the ways by which a change in public funding pushes towards the application of gentic/genomic methods and what this means to the outcome of research on the conceptual level. The paper discusses how the use of different methodologies and instruments shapes the language, models and concepts of biomedical disciplines with different epistemic cultures, which join to shape the new academic field of reproductive genetics. This newly emergent and rapidly growing discipline investigates (inter-)sex, development of the reproductive system and fertility and infertility mainly applying the methods of genetics. It is therefore an ideal subject to investigate current changes in life sciences and a crucial discipline in exploring and constructing new configurations of the biotic, of human and sex/gender on the level of genetics, genomics, organs and organisms. In analyzing this subject, the paper raises some central epistemological questions related to novel developments in the field of human biotechnology. A key question while tracing the interrelation of differences in methods, instrumentations and models in life science-research projects from the 1970ies on is:

Are there common theories or a common way to model within the new discipline of reproductive genetics? This paper maps the yet new field and its progenitors. In doing so it shows, that not so much theory and model serve as the common basis but rather the orientation towards one common research question of high applicability. It offers the necessary reduction to the genetic language and to primarily genetic methods. However complexity and diverging languages emerge as soon as the encoded entities and the genetic effects in the animal or human body are modelled.

Differences in governance thus seem to shape concepts and boundaries in reproductive genetics. By tracing these changes this papers furthers the sts-understanding of the governance of science, technology and innovation.

Is There a Failure of Concern on Modes and Impact of
Material Transfer Agreements? A Review of the Empirical Evidence.

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A significant number of scholars (e.g. Dasgupta and David, 1994; Eisenberg, 2003; Mowery et al., 2004; Nelson, 2004) shaped by Mertonian norms have articulated their writings to describe the concern that the privatisation of the scientific commons may undermine the traditional norms of academic openness and scientific advance itself by restricting access to

research materials (Andrews et al., 2006; Cohen and Walsh, 2008). As to sharing research material, the exchange can be formalised through material transfer agreements (MTAs).

Substantial research effort has been devoted to gather empirical evidence to study predictors and consequences of secrecy in science (Hagstrom, 1974; Walsh and Hong, 2003) or data and material withholding in genetics and life-sciences (Blumenthal et al., 1997; Campbell et al., 2002; Campbell et al., 2006; Cho et al., 2003; Vogeli et al., 2006), biomedicine (Walsh et al., 2005; Walsh et al, 2007) and science in general (Hansen et al., 2005). However, there have been relatively little empirical studies on MTA modes (Hansen et al., 2005, Walsh et al., 2005; Walsh et al, 2007) and its impacts on science (Rodriguez et al., 2007a; Rodriguez et al., 2007b; Rodriguez et al., 2008) or commercialisation (Mowery and Ziedonis, 2007).

The aim of this article is to critically put into perspective the empirical findings on MTAs vis-à-vis commonly accepted concerns formulated in a Mertonian fashion for the case of academic science developments or from the perspective of the transaction costs and anticommons tragedy for the case of academic commercialization developments. In other words, by taking into account the existing empirical literature, a crucial question is intended to be answered: Are MTAs harmful or innocuous for scientific and commercial developments in academia?

Of Greenhouses and GMP: Finding a Space for Molecular Farming

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Biotechnology is divided into medical (red) and agricultural (green) fields, in terms of corporate and regulatory structures and in European public attitudes, as repeatedly argued by Eurobarometer studies. However, it has become a truism in research in science and technology studies that biotechnologies involve transgression of boundaries between the natural and social, human and non-human, and public and private. This paper attempts to reconcile these perspectives by examining how new biotechnologies challenge this red/green separation and how the establishment of new spaces of biotechnology serves to both bind and address the transgressivity of biotech.

The paper uses the example of molecular farming, the production of biopharmaceuticals in genetically modified plants, to examine how separations between the agricultural and medical in biotechnology are located. It investigates how the spaces of medical and agricultural biotechnology are co-produced with wider understandings of medical and agricultural space. The paper examines the importance of the characteristics of these spaces in locating molecular farming, which itself appears to encapsulate many of the hybridising challenges of biotechnology.

Drawing on interviews with members of an EU-funded molecular farming research consortium, regulatory and research literature and repeated focus group discussions in the United Kingdom, the paper argues that the question of containment has come to play a key role as in defining characteristics of medical, agricultural and molecular farming space. In the face of concerns about contamination of the pharmaceutical product, risk to human health and the environment, uncertainty about public perception and pressure from the food industry to draw a 'bright line' between food and medicine, contained spaces provide a way

3.3.5: Governance and Public Policy

of negotiating room between medical and agricultural biotech. At the same time however, the technical advantages of producing pharmaceuticals on an agricultural scale are restrained. Containment thus becomes the focus of efforts to align plants as a mainstream biopharmaceutical production method sufficiently, but not excessively, removed from agriculture.

Closing the 'Regulator's Regress'
- Making Things Work in International and UK Stem Cell Banking

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In this paper we develop the concept of the 'Regulator's Regress' as a mechanism for relating regulation as document to regulation as practice. In doing we make visible the contingent interpretation of these documents in the local setting, and consider what this means for our understanding of the governance of modern bioscience. We frame our argument within a rich empirical setting drawing upon three and a half years of ethnographic work conducted at the UK Stem Cell Bank and a subsequent project following the International Stem Cell Banking Initiative. Both projects chart the development of innovative institutions and networks in cutting edge science. These environments are typified by the co-development and reciprocity of innovative science and new regulatory agencies, or 'institutional biosociality' (Brown & Michael 2004). In such settings this formation of regulation as lived practice is a day-to-day pursuit for the staff and their associates.

Through this empirical focus we develop Collins's (1985) concept of the 'experimenter's regress' and Jordan and Lynch's concept of the 'procedural regress' to address the literature on the regulation of contemporary bioscience. Doing so is beneficial for two reasons. Firstly it provides a language for discussing the local negotiation and interpretation of regulatory scripts. Secondly it makes the collocation of regulatory autonomy explicit: both those who produce regulatory documents, and those who use, interpret and implement them, have substantive input into shaping regulatory action in practice. The paper discusses how this inter-relationship affects the everyday work in laboratory settings, and how the everyday work in laboratory settings affects regulation.

3.3.6: Historical Perspectives on Health Care

Unanticipated Consequences of Contructing the 'Scientific' Definition of Death: a Case Study of 'Acting With' Policy Makers and/or the Public Understanding of Medicine in Japan

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This paper explores ways in which the Japanese official standard for brain death diagnosis was constructed in tandem with social scientists' involvements in this process. From the late 1960s to the early 1990s, brain death was an important agenda for the so-called developed nations. In brief, there was a socio-medical endeavour to modify the medical and legal definition of death from the physiological condition of irreversible cardio-respiratory failure to that of irreversible coma, namely brain death. Japan was no exception, and the administrative attempt at such change in the early 1980s aroused intense public debates.

In what ways and on what terms did researchers and critics of social science engage in this process? The attempt at change was arguably urged by the emergence of the need for organ donation from a heart-beating cadaver. Accordingly, Japanese policy makers intended not only to allay the possible growth of public fear that a premature death condition was to be authorised as the determination of death in order to allow organ harvests, but also to encourage public understanding of brain death and organ donation. For these purposes, both medical authorities and administrators aimed to produce a 'reliable' criterion for brain death diagnosis, which should be not only based on 'scientific' knowledge, but also parallel with '(worldwide) authentic medical knowledge', in order to foster public support for this change. It was in this context that social scientists and media were expected to participate in the debate, by contributing to the public understanding of, and thus support for, the proposed new definition of death. The actual result, however, was chaotic public controversy, thus raising the question: what actual impacts had their engagements made?

This presentation thus considers the meaning of 'scientific', '(technological) reliability' and 'authenticity in medicine' for different actors in medical policy making in Japan, as reflected in the production of such new definition of death. In particular, I cast light upon

1. how the terms 'scientific', 'reliable (technology)' and 'medically authentic' vis-à-vis this novel concept of death was articulated differently amongst social scientists, neurologists, neurosurgeons, pathologists, policy makers, and the administrative research council for brain death;
2. in what ways these differences influenced the course of public debates; and
3. how, for almost all of them, an acceptable diagnostic criteria of (brain) death was finally forged alongside public understanding of this medical matter.

The focal period of this analysis is 1983-1997: from the commencement of the administrative attempt to the establishment of a legitimate code of practice for brain death diagnosis. Hence, it will offer a case study of social scientists' involvement in policy making and public understanding of medicine, with special reference to the unexpected results of that involvement, and to how such consequences were dealt with.

Re-Making Psychiatry Political.
Ways of Intervening with Psychiatry in Post-War France.

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We are habituated to seeing the history of psychiatric institutions after World War II in terms of a critique of the confinement of the mentally ill and his release to the community. The French reform movement of psychiatry was nevertheless initiated within psychiatric hospitals by psychiatrists committed to their institution. They criticized the way their forerunner were to think their engagement with the patient as deriving from an authority, scientific and social, external to the institution. They thus built an alternative conception of psychiatric intervention based on the idea of an immanence of the norms of psychiatric work within the relationship between the psychiatrist and his patient. For those psychiatrists, it was only from their encounter with the patient that a definition of the object of their discipline as well as limits to their intervention could be derived. What emerged was a way of making psychiatry both as a practice and as an institution, medical and political. The "collective psychotherapy" psychiatrists envisioned in the 1940's as well as the "sector psychiatry" they constituted in the 1960's were both ways of accomplishing psychiatric work by building and rebuilding around the patient institutions that would cure his illness. In both projects the psychiatrist was thought of in terms of its ability to derive a mental health policy directly from the clinics. This conception of psychiatry would be of greatest consequence in making social scientists such as Michel Foucault engage with a critique that would radicalize this project of making psychiatry political in the late sixties.

This paper will explore the multifaceted ways of intervening with psychiatry in post-war France. It aims at rethinking the way psychiatry could be political in an era of reform. It is based on a study of the psychiatric reform movement in France between 1945 and 1970 that relies on a reading of the leading professional journals, on the studying of the archives of French administration of health and on interviews with noteworthy actors.

The Public Understanding of the Design of Clinical Trials

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The adoption by regulatory agencies of a standard to design clinical trials for drugs is most often discussed in terms of the cogency of the underlying statistical technique. In this paper we want to analyse the public understanding of these designs through two case studies. First, the British adoption of the standard design based on the frequentist conception of probability, which took place in the 1940s on the occasion of the streptomycin test. Through an analysis of its impact on the press we will contend that, for the British public, the statistical design was mostly understood in terms of the fairness of the allocation procedure (randomisation). Even if its mathematical properties were not properly grasped, we contend that this normative appraisal of randomisation is basically correct: the public wanted an impartial allocation procedure and they correctly judged that randomization was one such

3.3.6: Historical Perspectives on Health Care

procedure (as further investigation of its properties proved). At least, the public is demanding from the design of the trials what most bioethicists request: impartiality regarding the various interests at stake.

To assess the scope of this normative standard we will analyse the current debates around the possibility of adopting Bayesian designs for regulatory purposes. We will present here the results of a questionnaire sent to the leading advocates for a Bayesian approach to clinical trials, polling their opinions about the public understanding of their proposal. We will contend that, despite various decades of patients' activism, most statisticians are not fully aware of the normative demands of the public.

For Profit and Prosperity: the Construction of Public Works in the Dutch East Indies 1800-1950

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Roads, railway lines and bridges, harbours and cities, irrigation and drinking water supplies: evidence of the presence of Dutch engineers in the former Dutch East Indies may be found everywhere in Indonesia. The public works once constructed by Dutch engineers have greatly influenced the way in which Indonesia has become what it is today. This paper reveals how all of that happened and it does not merely confine itself to the technological aspect. The relevant social developments are also dealt with. The paper provides an insight into the way in which civil engineering evolved in the Dutch East Indies and, in addition, shows how civil engineering technology and colonial society influenced each other in the archipelago.

When, in 1942, the Japanese invaded the Dutch East Indies, an area at least as big as Europe from the point of view of its geographical extensiveness, the following had been achieved in terms of public works:

▷ 1.5 million hectares of agricultural land had been devoted to 'technological irrigation'; in Java and Madura 1.3 million hectares of the 3.3 million hectares of paddy fields had been provided with modern irrigation (two-fifths of the area of the Netherlands);

▷ there was about a 5,500 kilometres long network of railway lines in Java and at least 2,000 kilometres of tracks in Sumatra (the Netherlands had roughly 3,300 kilometres of rails in 1940);

▷ a road network comprising 12,000 kilometres of asphalted surface, 41,000 kilometres of metalled road area and 16,000 kilometres of unmetalled surfaces (the total of 69,000 kilometres is equivalent to 1.7 times the earth's circumference);

▷ harbours for international shipping in places such as Medan, Batavia (Jakarta) and Surabaya;

▷ 140 public - particularly urban - drinking water facilities, largely in Java.

These civil engineering works, many of which - either rehabilitated or not - are still widely in use, formed and still form the material substrate of the Dutch East Indian and Indonesian

3.3.6: Historical Perspectives on Health Care

state.

This paper shows how these results were achieved and why, in terms of the efforts involved, people went to such lengths. The construction of public works in the Dutch East Indies will be described and analysed in terms of 'socio-technical systems' and 'technological regimes'.

There were roughly two heterogeneous socio-technical systems: (1) a transport system with roads, railways, bridges and harbours; (2) a water system with irrigation, public health and urban flood protection works as well as hydropower plants. The colonial state steered technological developments via two general technological regimes: the exploitation and the development regimes which respectively expressed the imperialistic and the 'modernistic' interests of the colonial state. The two complexities of 'infrasystems' correlate to a degree with the two regimes, the transport system with the exploitation regime and the water system with the development regime. Transport technology served imperialistic interests whilst water technology served modernistic interests. Later on, though, transport technology also became a kind of developmental technology whilst water technology was at first purely there for exploitational ends. There is thus no one-to-one correlation to be detected in this.

making, New York: Collier Macmillan.

3.3.7: Technical Expertise and (Public) Participation in Water Management

Modes of Non-Conventional Public Participation in Water Controversies: an Examination of the Perspective of Catalonian Citizens' Perceptions.

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Nowadays Public Citizen Participation is considered a basic element for transforming scientific and technological controversies as well as public policy making. Such is a case of environment policy in general and of regulation of water use and distribution in particular. That is why it is necessary to take into account not only scientific indicators which support decision making but also political problems related to conflicts among the affected by the hydrological and hydraulic projects, those who benefited from them and those interested in them. In Spain, the controversies arisen around such projects traditionally were an area of engineers (especially of civil engineers) and politicians exclusively, but since the end of the 20th century they became open to other social actors' intervention (fundamentally non-governmental and environmentalist organizations). This fact has made Public Citizen Participation a key theme in Spanish water policy and especially in water management at the basin level. Having carried out several focus groups we come closer to the way how the citizens of seven cities in Catalonia (Spain) understand this phenomenon. Firstly, to give context, a historical route through the main last-century debates on the water policy in Spain is presented. Secondly, different generic definitions of "participation" given by the interviewees are examined, establishing a division between the participation spaces opened by the authorities and those of the "non-conventional" character. Finally, the focus is made on what was said about "non-conventional participation" as well as on the way how different actors' "knowledge" and "interests" appear as key issues in discourse.

Visions, Actor Worlds, Promises and Expectations: a Review and an Analysis of the Effects of Backcasting Experiments after 10 Years

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There is an emerging literature on visions (also refered to as Leitbilder), which is a academically growing research and discussion topic among STS scholars, especially in Germany, as well as on expectations and promises. Visions / Leitbilder can be divided in: generating visions through interactive learning and interaction among groups (of actors) like in backcasting (Quist 2007). Visions can also be subjected to vison assessments to explore possible value conflicts and other value-driven and interest-driven differences among actors and stakeholders in the development of new technologies (Grunwald 2006). Visions / Leitbilder and their corresponding networks can be turned into conceptual and analytical frameworks to map and explain socio-technological change, as was shown by Dierkes et al (1996).

The purpose of this paper on visions is threefold. First, it will review and compare various vision and related concepts including Leitbilder, promises and expectations, actor worlds and visions in transitions towards sustainability. This review also considers promises and expectations within the dominant technological regime, as well as emerging ones outside the dominant technological regime.

Second, the paper will go into participatory vision constructing during backcasting experiments involving a wide range of stakeholders, as well as discussing dynamics around and different functions and roles of visions and vision development in backcasting.

Third the paper will adjust the the Leitbild concept as proposed by Dierkes et al in such a way that it can be applied to mapping the diffusion of visions and other effects five to ten years after backcasting experiments have been completed. This is illustrated by mapping and analysing the recent (and accumulated) follow-up and spin-off of two backcasting experiments that were conducted in the Netherlands in the mid 1990s as part of the Sustainable Technology Development programme. One backcasting experiment dealt with so-called Novel Protein Foods (NPF) and meat alternatives and one backcasting experiment dealt with Multiple Sustainable Land-use (MSL).

The Healing Potential as a Persuasive Creator?

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Both visions and expectations created around the possibilities with the outcome of embryonic stem cell research have been very visible in the research community and in the public since the discovery in 1998. The various scenarios created around the healing potential have also had a rhetorical power in the public policy debate. On grounds of its potential, many actors

promote stem cell research, and not the actual medical progress already made. Therefore the stem cell case is a very interesting case to examine with regard to the construction of meaning concerning biotechnology in conjunction with the possibilities promoted. Visions and expectations are notions that are interesting when looking into the stem cell debate, to compare and contrast the notions, but also to look into the construction and creation of visions and expectations connected to the scientific development within biotechnology. With the use of stem cell technology, many diseases can hopefully be healed in the future. The vision production and expectations concerning healing is especially connected to western diseases. However, who are the active creators of these visions and the expectations regarding healing, and why have they gained such an importance? Callon (1987) describes a technological development as a consecutive process from the birth of a good idea to its commercialization which is realized by the innovation. The many back and forth processes involved will be influenced by technological as well as economical conditions. In the case of stem cell research, the many moral and ethical considerations complicate the picture. The vision and created around the stem cell technology healing potential creates perhaps a space for action by way of the expectations, where new research and praxis in medical research is constructed simultaneously with the ethical debate.

The focus in the project is to examine the co-constructing of the desired (visions) and the possible (fact), leading to construction of factish's (Latour 1999), connected to stem cell research and the possibilities promoted. This is a case study of the Norwegian stem cell debate. Empirically I use web analyses, interviews, and document analysis to see how the research community, among others, promote and communicate visions and creates expectations for stem cell research in Norway. Although, this is a field that is very much connected to a global market and therefore, the Norwegian case has to be compared to an international development. REMARK: The author has not mentioned her interest/preference to be in the 'visions meet expectations' session when submitting her abstract for the Rotterdam conference, but has mailed us after the session organizers had submitted their session proposal and received abstracts. The organizers would like to include this paper/abstract in the 'visions meet expectations session.

Competition and Negotiation of the Future of Korea in the Case of Nanotechnology

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This paper explores the construction of a vision for nanotechnology and the future of South Korea. Nanotechnology has been conceived as leverage for economic growth and prosperity in the country where there has been strong public belief in progress driven by science and technology. The National Nanotechnology Development Plan was initiated by the Korean government in 2001, a year after the launch of the US National Nanotechnology Initiative and a bill for nanotechnology R&D was passed even before the US counterpart. A series of nanotechnology initiatives were symbolic events to show the transition of Korean science policy from "fast-follower" strategy to "first-mover." Accordingly, the shift, reflecting the changing self-perception of the position of Korea in the global competition, required a new configuration of science, technology, and society. Since 1990s, industry and society has been regarded as more important stakeholders in science policymaking and the government

3.3.8: Visions meet Expectations: Differences, Similarities and Relevance for STS, II

has allegedly moved to a coordinator from an administrator. Nanotechnology, one of emerging technologies in which Korea can invest in nearly simultaneously with advanced countries, is conceived as a good opportunity to experiment an advanced governance model: participatory and socially-relevant model.

Based on publications and interviews of participants in decisionmaking from science, industry, government, and civil society, I will illustrate how different values of different groups were virtually assumed, actually negotiated among participants, and practically implemented as a practice and institution. In doing so, I focus on the different conceptions of 'economy' and 'society' among participants. Representing two competing values and stakeholders, those concepts can be a lens to see competition, interpretation, negotiation, and mutual coordination among the actors.

Shaping the Future of Ecological Genomics: Visions in Dialogue

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Given their guiding role in technology developments, visions are particularly interesting as key elements in developing and conducting CTA processes. When CTA addresses technologies in their early phases of development, visions of the future are necessary in order to stimulate learning about possible impacts and to orient future actions. Within the framework of the Dutch ecogenomics initiative (called the Ecogenomics Consortium), we experiment with a CTA process in which desirable futures are articulated and discussed from multiple perspectives (e.g. technology developers and a broad range of potential future users) [1]. The aim of this process is to broaden the design of technological innovations, and shape the research agenda together with relevant actors. As a first step, we investigated the technology developers' guiding visions through interviews and focus groups. As a second step, groups of potential future users (e.g. bioremediation companies, environmental laboratories, nature conservators, farmers) reflected on the technology developers' visions, and articulated desirable futures from their own perspectives. In this paper we discuss the third step in this process, in which the ideas on desirable futures of different actors are integrated in dialogue meetings.

Three dialogue meetings were conducted in which technology developers, future users and policy makers discussed their ideas on desirable futures of ecogenomics in the fields of soil pollution, agriculture and nature conservation. The aims of the meetings were to discuss ecogenomics from multiple perspectives, and to investigate whether some form of allignment of visions could be reached. Identifying possible interest-driven and value-driven differences was a central element in designing and conducting the dialogue meetings. The Ecogenomics Consortium specifically requested to develop concrete plans on how to proceed with ecogenomics in the future (both on a content and organizational level).

In this paper, we present and discuss the findings of this third step. We investigate to what extent learning took place about the assumptions underlying ones own and others' visions. We also reflect on wether it was possible to indentify or develop a shared perspective on a desirable future for ecogenomics, and what the characteristics of this future are.

3.3.8: Visions meet Expectations: Differences, Similarities and Relevance for STS, II

Within the design of our CTA process we integrated a form of future assessment stemming from the 'leitbilder' tradition. Given the extent to which different traditions in assessing the future are intertwined, it is interesting to look at our data from an 'expectations' perspective. Therefore we reflect on the relation of our empirical data to discussions on both concepts in literature. What additional insights does this provide and does it raise new questions?

Vision Assessment in Interactive and Participatory TA

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Vision assessment predominantly belongs to the domain of participative/interactive TA. It is openly normative: the development/articulation of normative visions aims to enhance both (stakeholder)participation in technology development (input, procedure) and better technology (output, outcome). By contrast, the normative content of the sociology of expectations is, as yet, less clear. It rather tends to be descriptive, at times even cynical. Whereas the former approach celebrates the power of imagination, the latter prides itself for its sobering realism.

I will argue that the two can and should be combined. To make this possible, the sociology of expectations should first take seriously the ethical content of many of the expectations and promises that accompany new and emerging technologies [NEST]. These shouldn't be reduced to underlying strategies and interests, but accepted as motivating, although not autonomous, forces in their own right. The next question then becomes: how do technology and morals co-shape each other in a dynamic interplay? Describing this dynamics will help to make vision assessment both more realistic (grounded in technology dynamics) and more creative. The problem of current vision assessment is that it often involves evaluating the technology of tomorrow according to the moral standards of today. But we need to imagine new moral visions, so as to avoid a conservative bias. Investigating the patterns in the ethical discussions accompanying emerging technologies [Swierstra & Rip 2007] will help us to anticipate upcoming ethical controversies, to develop new visions, and to speculate in an informed way about the plausible moral changes that might be induced by some emergent technology. This will result in more inspiring (or disquieting) visions that can be fed back into the discussion about the direction of the development of a specific technology.

Is There any Korean-ness in Korean Science and Technology?

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"Other than functional and academic market considerations, are there other and perhaps deeper reasons for establishing an East Asian STS journal (EASTS) in East Asia? Haven't we taught our students STS with good case studies still largely from the West? And haven't we theorized our East Asian STS case studies also mostly from established Western theoretical perspectives: SSK, SCOT, ANT, Social World, cyborg feminism, bio-medicalization and all that? In other words, what's the difference between East Asian STS studies and East Asian 'area studies' that apply Western STS perspectives?" This is one of the key questions posed by the new EASTS journal published last December 2007. And this would be one important problematic of this roundtable discussion. The more STS becomes popular or established among societies outside the West, the more pressing this question becomes.

On the other hand, perhaps originated from various orientalist studies, sinology, or later from the Cold War era, how are we going to envision some new "area studies" problematic in the 21st century world, when global areas and postcolonial relationships are drastically different from the 19th and 20th centuries, centuries of colonialism, modernity, wars, and science and technology (S&T)? Traditionally, we might articulate the West as the modern and S&T, with "other areas" as the cultures and languages. In this articulation, perhaps no other issue is more critical and problematic than the relationships between the S&T and local societies and cultures. Instead of writing again "national and modern" history of S&T in various areas of the world, perhaps some new perspective of "local STS" would be crucial in re-articulating S&T and Area Studies itself.

In this roundtable, I will compare the analysis of Korean science and technology done by Korean STS researchers with those done by Western scholars, and plan to highlight the transfer, assimilation, and appropriation of methods and theoretical concepts of STS in Korean cases.

Acting with the East Asian STS:
Thinking from the Singapore Case

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3.3.9: Thinking and Acting with East Asian STS

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These questions acquire added urgency as East Asian governments invest more and more expertise and resources in becoming fully fledged knowledge economies and global actors in scientific R & D. While during the 1980s and 1990s Singapore, Taiwan, South Korea and China were regarded as 'applying' North American and European scientific innovation in their high technology manufacturing sectors, now these governments are focused on becoming centres for innovation and basic science themselves. As a consequence, East Asian societies are coming to grips with a high accelerated process of technologisation and biomedicalisation, which raises issues about public understanding and participation, human rights and scientific citizenship. What role can East Asian STS scholarship play in articulating and modulating these issues, and how should European and North American approaches be modified/developed/critiqued to enable this work?

Acting with East Asian STS:
Thinking from the Japanese Case

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"Other than functional and academic market considerations, are there other and perhaps deeper reasons for establishing an East Asian STS journal (EASTS) in East Asia? Haven't we taught our students STS with good case studies still largely from the West? And haven't we theorized our East Asian STS case studies also mostly from established Western theoretical perspectives: SSK, SCOT, ANT, Social World, cyborg feminism, bio-medicalization and all that? In other words, what's the difference between East Asian STS studies and East Asian 'area studies' that apply Western STS perspectives?" This is one of the key questions posed by the new EASTS journal published last December 2007. And this would be one important problematic of this roundtable discussion. The more STS becomes popular or established among societies outside the West, the more pressing this question becomes.

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3.3.9: Thinking and Acting with East Asian STS

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In this roundtable, I plan to offer the Japanese STS scholarship to reflect on the knowledge production of STS, as well as the challenge that East Asian STS faces to act with the emerging technoscientific transformation of East Asian societies.

Acting with East Asian STS:
Thinking from the Japanese Case

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I plan to offer the Japanese STS scholarship to reflect on the knowledge production of STS, as well as the challenge that East Asian STS faces to act with the emerging technoscientific transformation of East Asian societies.

Acting with East Asian STS:
Thinking from the Knowledge Economy

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I will take the challenges posed to the US and Europe by the East Asian burgeoning knowledge economies and what STS can do in terms of a critical analysis of this.

Acting with East Asian STS:
Thinking from the Taiwanese Case

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Other than functional and academic market considerations, are there other and perhaps deeper reasons for establishing an East Asian STS journal (EASTS) in East Asia? Haven't we taught our students STS with good case studies still largely from the West? And haven't we theorized our East Asian STS case studies also mostly from established Western theoretical perspectives: SSK, SCOT, ANT, Social World, cyborg feminism, bio-medicalization and all that? In other words, what's the difference between East Asian STS

3.3.9: Thinking and Acting with East Asian STS

studies and East Asian 'area studies' that apply Western STS perspectives?" This is one of the key questions posed by the new EASTS journal published last December 2007. And this would be one important problematic of this roundtable discussion. The more STS becomes popular or established among societies outside the West, the more pressing this question becomes.

On the other hand, perhaps originated from various orientalist studies, sinology, or later from the Cold War era, how are we going to envision some new "area studies" problematic in the 21st century world, when global areas and postcolonial relationships are drastically different from the 19th and 20th centuries, centuries of colonialism, modernity, wars, and science and technology (S&T)? Traditionally, we might articulate the West as the modern and S&T, with "other areas" as the cultures and languages. In this articulation, perhaps no other issue is more critical and problematic than the relationships between the S&T and local societies and cultures. Instead of writing again "national and modern" history of S&T in various areas of the world, perhaps some new perspective of "local STS" would be crucial in re-articulating S&T and Area Studies itself.

I plan to offer the Taiwanese STS scholarship to reflect on the knowledge production of STS, as well as the challenge that East Asian STS faces to act with the emerging technoscientific transformation of East Asian societies.

3.3.10: Acting with Patient Safety

Ghosts in the Machine: Some Facts, Artefacts, and Artifacts in a Feminist Technoscience account of Medical Images & Medical Practice

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My work responds to Donna Haraway's assertion that by engaging with the metaphors and materials of visualisation technologies, feminists may find ways to speak of the 'reality for which we must be accountable'. Accountability for patient safety is an NHS priority, but one spoken of in stories of social and/or structural frameworks: human errors and/or system errors. Donna Haraway asks for accounts that include the semiosis and production of facts (e.g. practices, locations, rhetoric) and artefacts (e.g. craftings, objects); and which extend feminist reflective practice into diffraction: a method for recording interference, interruption, intervention and difference. Donna Haraway suggests that diffraction is a preferable metaphor for feminist attempts to 'make a difference in the world'. My concern is this: if we privilege facts and artefacts we may marginalise or overlook manifestations 'in the world' that include the uninteresting, distorted, aberrant or hidden. In my work I am considering the potential of a feminist STS approach using Haraway's strategy but also including artefact's homophone (and sometimes homonym) artifact: the errors, distortions and aberrations found in medical images, visualisation technologies, and medical practice. I describe my use of artifact as a heuristic device, a metaphor and a means for performing Haraway's diffraction on ethnographic data. My intention is: to attend to patient safety performance and accountability without reliance on human/system error constructions. This is work-in-progress on a research project within the NHS, concerned with finding ways to consider issues of patient safety and the effect on safe practice of situational learning, using a Science & Technology Studies (STS) and feminist framework.

Re-Placing Research: How Entanglements among Staff, Consumers and Researchers can Perturb Existing Clinical Practices

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This paper presents an account of a recent project conducted for the Australian Commission on Safety and Quality in Health Care. The project focuses on involving hospital clinicians and consumers in video-based methods to re-think clinical information exchange processes ('handover'). The project situates the clinicians and consumers as co-researchers, inviting them to co-direct the filming of practices and work with the footage thus produced. To make this process tangible, the paper runs through how the filming was initially discussed; and how video footage of one hospital department's handover processes were collected, fed back to staff and consumers, and used to engage both parties in enquiring into existing work practices. This process will be illustrated with three kinds of clips: footage of existing processes before clinicians and consumers considered the visual data; footage of feedback meetings, and a visual account of how clinicians and consumers acted on the discussions about video data. The paper moves on to re-theorise this strategy of positioning practitioners

3.3.10: Acting with Patient Safety

and consumers as co-researchers, comparing and contrasting it with participative, reflexive and interventionist research approaches.

The paper concludes, first, that this research into practice does not just allow practitioners/consumers to speak, but expects them to co-direct the research process, underscoring these practices' contingent and dynamic-open character. Second, it is not improvement, critique or reflexivity that form the principal rationale of this strategy, but friction resulting from enabling participants to see their practices 'from under a different aspect' (produced by viewing oneself and others on-screen) leading towards indeterminate outcomes.

Accounting for Patient Safety in Heart Surgery. Performing Integrity in Managerial and Professional Practice.

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Questions of patient safety have over the last few years increasingly been put at a systemic level, emulating developments in other fields like transportation and the process industries. As Caspar Bruun Jensen has recently argued it is however unclear within these systemic analyses where the boundaries of systems are put. In this paper I will elaborate on this tension through the analyses of two investigations of the cardio surgery clinic and at the Radboud University Hospital in the Netherlands.

The Radboud case came to the fore through an anonymously forwarded e-mail by the newly appointed professor in cardio surgery. The professor, who had sent the e-mail to the professionals involved in cardio surgery at the clinic, stated that the elevated mortality and morbidity levels in the clinic were unacceptable and even went as far as stating that he would not have himself treated at the clinic if need be. The anonymously forwarded e-mail triggered a series of events not least the temporal closing of the clinic and the resignation of the complete board of the hospital.

Three investigations, of which one internal, analyzed the events that led to the rise in mortality and morbidity. The public ones, by the Health Inspectorates and by the Board of Accidents respectively, put the blame not so much on any specific circumstances but rather pointed at systemic issues, mainly focusing on the integrity of processes. The two investigations did this in rather different ways. Were as the Health Inspectorate pointed at problems in the integrity of the care process, emphasizing the lack of coordination of care, the Board of Accidents pointed at the lack of integrity of the managerial process, including the oversight by the Inspectorate.

In the paper I ask, first, how the reports perform and bound system integrity. Next I analyze how the two investigations relate. In discussing respective performances of system integrity and break down, I analyze the effect of different performances of patient safety.

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Ad-hoc Teams and their Infrastructures of Attention

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This research project intends to engage with the real-life complexities of clinical practices and processes, and is concerned with how constituents of knowledge are enacted in situ. In this presentation I will focus on collaboration as being an essential part of patient safety. Besides formal collaborative acts, to cope with the unexpected on a tertiary health care practice also requires the constitution of ad hoc forms of collaboration, so-called ad hoc teams. In the area of Science & Technology and Medicine several STS authors have called attention to processes of alignment. In their opinion the focus should be on the process in which different definitions of risk, safety and reliability struggle to become prominent and the specific socio-material network that emerges in these processes that we need to pay attention to. Therefore we have to look at the synergy between formal standards and the expertise of the staff members. The implication of a focus on the synergy between procedural standards and professional work for my research project is that it will not be about the product of action or, for that matter, about more or less experience and/or expertise. Instead the focus of my study will be on: processes of alignment, fine-tuning and synergy between the involved forms of knowledge in the constitution of a reliable collective. Different modes of knowledge, like improvisation, ambivalence, intuition, simplification, anticipation and tacit knowledge are considered as crucial elements in stabilizing and strengthening collaborative processes.

By carrying out an ethnographic study on an intensive care unit in a Dutch and Australian hospital, this study aims to identify and understand those processes in which different streams of action transform into one coherent ensemble of action. A fine-grained analysis of sources of coherency in critical care practices, like intuitive and rational, experiential and monitoring modes of attention, will not only provide insight into successful collaboration and as such into the optimization of patient safety, but also in the interaction between modes of knowledge and the capabilities of the health care system in which they operate?

During my presentation I would like to discuss how staff members are able to cope with the unexpected on basis of an analysis of an unexpected admission on an intensive care unit. Special attention will be given to the identification of action anchors and the reconfiguration of infrastructures of attention.

3.3.11: Engaging with Converging Technologies, II: the Policies of Convergence

Communicating Nano: 'Breaks' and 'Black Holes' between Basic Research and Consumer Products

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Although there is a widespread consensus that social science should be involved in the Societal and Ethical Implications of Nanotechnology (SEIN), there is no consensus about what form this involvement should take. One solution is to move involvement upstream, but this may not be as easy as it seems. We are currently involved in a project that tries to locate the societal and ethical implications of nanotechnologies where people are most likely to make contact with them: in consumer goods that incorporate nanotechnologies. We focus on 'nanotextiles' and 'nanocosmetics', since these are most available in the two consumer markets (UK and Norway) under study.

On the one hand, the aim is to investigate (through focus groups) the understanding of consumers of the role of nanotechnologies in these products. On the other hand, we want to get an understanding of the supply chain from initial scientific or technological research to a consumer product on the shelf. We are interested in the idea that something is (or is not) 'nanotechnology' and how this is promoted by the different parties in this process. In particular, we are investigating whether the identification as 'nano' (or as 'nanotechnology') is deliberately used or avoided in the communications and discourses implicated in bringing products to market and selling them to customers.

To investigate this, we are currently undertaking a series of interviews with retailers, brand managers, buyers, importers, technologists, etc. who work in the textiles or cosmetics industry.

Preliminary findings (reviewing the literature, gathering information available on the Internet, and initial interviews) suggest that there is a 'knowledge black hole' in research on supply chains, i.e., in the processes of knowledge transformation and communication between basic research and development and eventual consumer goods. That is to say, very little is known about the processes through which developments in nanoscience and nanotechnologies find their way into consumer goods and about the ways that knowledge about nanotechnology is communicated in this process. Of course, there are good reasons for this 'hole': commercial companies are often more reluctant to talk to social scientists (due to legal and competitive concerns) than both laboratory scientists and consumers. Furthermore, the decision makers are difficult to identify and located all around the world. Thus, for example, in the case of nanotextiles (e.g., stain-resistant jeans) it is not just the retailer (perhaps based in the UK) or the developer of the nanotechnology (perhaps based in the US), but also the various mills (probably based in South East Asia) that have licensed the technology and produce the garment, that have to be taken into account.

In our paper, we will report both 'substantive' elements from our research, as well as think about the role of commercial companies in the development of nanotechnology-based consumer products and the implication of this for the role of social science.

3.3.11: Engaging with Converging Technologies, II: the Policies of Convergence

Terms of Engagement

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Both, the US- and EU-approaches to "converging technologies" rely on social scientists and humanities scholars to reify and validate their visionary programs. They are asked for critical assessments, ethical reflection, or the facilitation of public participation - but their terms of engagement are more general than that. This becomes especially apparent in the case of nanotechnology and its lure of the "yes": This technoscientific enterprise is marked on the one hand by nearly unanimous endorsement and on the other hand by an apparent absence of power. Social scientists are invited to become entangled in a seductively structured space of options. This space is unbounded in multiple dimensions and establishes a politics of abundance and possibility rather than a negotiation of limits. - Correspondingly, the engagement of philosophers with "converging technologies" (e.g. as rapporteur of a European expert group on the issue) is one of surrendering to the lure of the "yes" and of reinscribing its conditions of operation. This process of reinscription is confronted with a critical effort at disentanglement.

The Ontological Politics of Convergence

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This paper examines the discourse and rhetoric around converging technologies. It draws on materials from an historical and institutional analysis of the emergence of converging technologies, focusing in particular on the rise of post humanism; and on an analysis of interviews carried out with scientists, technologists and commentators who are contemporarily involved with converging technologies.

The first part of the paper describes the parallel constitution of the debate on CT and on nanotechnology-related far-ranging visions and of intensified discussions about "human enhancement". We look at the historical "roots" of transhumanism and of extreme images of a posthuman future which relate to highly collectivist visions of the first half of the 20th century. The recent and often extremely individualistic adaptations of these visions serve as powerful instruments in the ontological politics of convergence. These visions - "utopian" as well as "dystopian" ones - often function as central elements of worldviews with deep roots in the Western history of ideas and a political significance which exceeds research and technology policy in a narrow sense. One important consequence is that decisions about which social sciences and humanities approaches are appropriate to understanding CT, are themselves shaped by the ontological politics in play.

The second part of the paper takes a closer look at the ways in which ontologies are enacted, kept alive and performed in contemporary discussions about CT. Our textual analysis of the transcripts of interviews with CT participants and of the protocol of an online conference was based on the assumption that a text (the interview transcripts; the cyberchat

protocol) is constitutive of the phenomenon it describes (CT) as it introduces certain entities and performs relations - communities of actants/the moral order - between them. The paper examines the ways in which CT are constituted by (re)defining boundaries between different constituencies/actants. The individual and collective actants to which various kinds of agency are ascribed include, for instance, individual scientists, policy making bodies, corporations, and members of expert/public domains. Specifically, the textual analysis shows how expert membership in CT is performed, how the dynamics of NBIC components is assessed, and how participants position themselves in terms of various redefinitions of human "essence".

A key to obtaining insight into the wide range of characteristics of the CT phenomenon is to focus upon the ways in which different kinds of entity - human and non-human - are enacted in CT discourse. Attention to the ontological politics of CT can give insight into the kinds of emerging subject position, in a broadly Foucauldian sense. The upshot of ontological politics provides a series of subject positions which organise the possibilities for response and impact. Following work by Mol, Law, Thompson and others, the paper assesses the theory that ongoing ontological politics significantly shape the possibilities for research, take up and impact.

Scientific Practices and Political Initiatives in Converging Technologies

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New and emerging technologies like those labelled with the term Converging Technologies (synergistic combination of nano, bio, info, cogno) have increasingly become a subject for scientific reflection. In addition, growing concerns and expectations of possible effects on societal structures and concepts are related to technological convergence.

Science and Technology Studies (STS) play a major role in exploring these effects and the changing cultural patterns that are altered (see McNaghten 2004). An important task for social scientists engaged in these topics is not only to explore possible effects but to understand the very process of construction of these new technologies. Seen from a STS perspective, converging sciences and technologies can be conceptualized as a social process where political institutions and actors with competing strategies are involved (Yoshinaka/Clausen/Hansen 2003: 117).

In this paper we would like to shed light on the interaction of science and policy in Converging Technologies. Findings in STS and Science Policy Studies suggest that boundaries between science and policy were redefined when states more strongly intervene in the autonomy of science since the 1980s (Rip 2002; Etzkowitz et al. 2000). Science and Technology policies now have a huge impact on the emergence of new technologies especially in early phases of technological development. One important instrument to orient science towards technoscientific goals are specific research programs. Often the aim of such initiatives is to strenghten inter- and transdisciplinary research in application and problem solving contexts (Gibbons et al. 1994). During the last twenty years the number of such programs and initiatives increased dramatically. A good example for the development of such instruments is the initiative on Converging Technologies in the US which was initially

of human enhancement without any empirical proof that the breakthroughs will take place or indeed any estimate of how probable they are and on what timescale they might be achieved, if at all.

The "speculative ethics" labelled by Nordmann will be contrasted with empirical findings on individual developments subsumed under the label of converging technologies. In particular, the paper will examine the question of whether there is a collective dynamics of the various developments towards a breakthrough in the enhancement of human performance or whether the cumulative effects of individual technological developments will bring about a fundamental change in the way human beings function in their environments.

While the speculative nature of the debate on ethical and other issues can be demonstrated for converging technologies quite easily, this is not the sole cause of the radical visions. Another cause is a phenomenon which we label "speculative interdisciplinarity" whereby scientists make far-reaching assumptions about the potentials for future development in disciplines other than their own, while being quite realistic about the potentials in their own field. In the field of converging technologies, the "jobs of the others" are assumed to hold the more radical potential, while developments in one's own discipline are considered more realistically and often more modestly.

The paper will demonstrate the phenomenon of speculative interdisciplinarity using examples from the field of converging technologies. The consequences of this phenomenon for the governance of converging technologies will be discussed and some tentative conclusions drawn regarding the further development of research policy in this area.

3.3.12: Post-genomics, Converging Technologies and the Life Sciences

promises and gives prestige to university research. Post-academic science is at the same time big science, technoscience, industrialised science, collective science, finalised science, strategic science and characterized by many other neologisms that intend to mark the new mode of science that is being done in these areas. NBIC and the life sciences are knowledge domains that are both being examined and promoted in policy documents, scientific literature and popular science magazines.

The visions about convergence of technologies have a strong component of social and economic expectations. It is thought that converging technologies will boost innovation and bring about a new economy. The life sciences are pervaded by a strong ethos of promises about the next coming breakthroughs that will revolutionize the prevention, diagnosis and treatment of diseases.

3.3.11: Engaging with Converging Technologies, II: the Policies of Convergence

instead of discussing these on the "if and then" basis. This will be shown using examples from the debate on artificial intelligence which have re-emerged in another form in the debate on converging technologies.

The reasons behind this are probably not simply a matter of ideology, different worldviews or of paying lip-service to the perceived mindset and wishes of decision-makers, but also due to a lack of experience with interdisciplinary work and false assumptions about what prospective partners from other disciplines actually have achieved or will be able to achieve in the near future.

Based on a discussion of these aspects, the paper identifies a preliminary agenda for actions and further research on interdisciplinary aspects of converging technologies, such as the identification of realistic goals for convergence, the potential contribution of each discipline, role definition and organisation of work etc.

3.3.12: Environment, II

From Peak Oil to the Apocalypse

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Thirty years ago the use of computer-based models in "The Limits to Growth" touched off an enormous controversy. Today, these same issues have returned in debates over peak oil and global warming. This paper will examine some of the cultural factors affecting the public understanding of scientific modeling. In particular, the paper will explore cultural myths, those deep narratives which ground people's identities, legitimate the social order and structure frameworks of meaning. These myths may play a key role in how models of climate change and/or resource depletion are understood by the public and the kind of responses that are made to them.

Scientific models are not independent of culture. The paper will begin with a short history of systems dynamics modeling. Using the reflections of Jay W. Forrester and others who pioneered systems dynamics, the paper will consider cultural myths which may have shaped the pre-theoretical assumptions underlying these models and which may have had consequences for their reception.

Secondly, the paper will examine the broader cultural context which may be decisive in shaping the public understanding of and response to a model. Cultural myths form a framework through which people interpret scientific models. Specifically, over the past several decades myths of progress have declined and apocalyptic thinking has increased.

The major part of the paper will analyze public responses to both "The Limits to Growth" and current discourse around peak oil and climate change. Using both published and internet sources, a typology of responses will be developed. These responses can be roughly classified as denial, as adaptationist or as apocalyptic, with several variations within each. One factor in these responses is the deep narrative, or myths, which grounds each discourse.

Worldmachine (Blueprint v0.9.1):
the Mathematical Certainty of Global Environmental Catastrophe

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Climate forecast models are considered to be 'the fundamental tool' of climate science by the Intergovernmental Panel on Climate Change. It defines them as 'mathematical representations of the climate system', which in turn is described as the 'totality of the atmosphere, hydrosphere, biosphere, and geosphere and their interactions'.

This paper explores the length of the complex, collective (and diaphanously veiled) process of translating the climate system into a mathematical computable description. Specifically, it examines its production of coherence and its treatment of uncertainty as an excrescence to

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be conquered by progressing the quantitative knowledge of the 'totality'. The uncertain thus becomes that which is not yet quantifiable, not yet tractable or not yet translatable into the code of mathematical forecasting models, to be iteratively overcome until the day the model is in accordance to the totality ("kat hólon"): version 1.0.

Is the design of computational global models (AOGCMs) designing a future that excludes the non-quantifiable as irrelevant? Can numerocracy lead anywhere but to a future colonised with cataclysmic events? What futures do we preclude by excluding that which is relevant but not quantifiable, and what other modes/methods of cohering can we resort to in addressing climate change?

The Communication of Certainty Concerning Human-Induced Climate Change

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The issue of dealing with climate change has slowly but steadily moved up the political agenda to the point where it is now present on election manifestos and seen as a reality that must be addressed with urgency. Key to this change in affairs has been the comprehension and public acceptance of the science that asserts an anthropogenic origin to this global phenomenon. Scientific consensus concerning the human link has become more explicit, as further empirical data and climate modelling allow for greater degrees of certainty, which is then in turn communicated to policy-makers and society in general. This paper analyses how the scientific understanding of certainty has been rendered understandable for people with a potential for effective action, and also how this certainty has been subsequently reflected in wider society.

The principle means by which the scientific consensus on human-induced climate change has been expressed are the periodical reports of the Intergovernmental Panel on Climate Change (IPCC), whose recent 2007 report marks the latest and most complete contribution towards progress on a global scale since its creation in 1988. As such, the reports, conferences, and proceedings of the IPCC show a notable evolution in terms of the scientific data that confirms climate change and the certainty of the link with human activity. Commensurate with this scientific certainty has been the drive to improve communication in a terminology that favours rapid digestion for policy-makers. This has been achieved through statements of probability and visual information based on past trends, present interpretations, and future projections. Potential scenarios given in the form of "storylines" have brought into focus the possible social and economic repercussions dependent upon future human activity and decision-making. Long-term climate projections impact on all aspects of human welfare, and thus the degree of certainty attributed to them is the tipping point between inaction and the formulation of effective solutions.

Based upon research of the activities of the IPCC, together with its public reflection in the press, this paper aims to show that the communication of certainty has and continues to be the main catalyst for a political response, and that the means of encoding certainty determine the resonance it has in wider society.

3.3.12: Environment, II

Data Friction and Computational Friction in the History of Global Climatology

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This paper presents two concepts useful in understanding the history of global climatology (and probably of other sciences as well). Data friction references the costs in time, energy, and attention required simply to collect, check, store, move, receive, and access data. It very often interacts with computational friction: the resistance that must always be overcome in manipulating numbers and other symbols. Computational friction includes not only physical and economic limits on processor speed and memory capacity, but also the work involved in programming, operating, debugging, and repairing computers; discovery and refinement of numerical methods; coping with round-off error; model testing and verification; and many other aspects of machine (and human) computation. Where data friction slows the work of gathering and vetting data, computational friction reduces the amount of information and knowledge that can be extracted from a given input. Both forms of friction include crucial, but often ignored social work, such as convincing others to accept as valid the results of calculations so extensive they could never be directly reviewed by human beings.Statistical analysis of climate requires long-term data from many locations, consistent across both space and time. This requirement implies a lengthy chain of procedures including not only observation, but also recording, collection, transmission, quality control, reconciliation, storage, cataloguing, and access. Every link in this chain represents an information interface subject to data friction. Every point at which data is moved or transformed represents an opportunity for data loss or corruption. Even leaving data alone can lead to damage. Paper records can burn, rot, or get wet; fragile magnetic surfaces and silicon chips can be damaged by magnetic fields, cosmic rays, and dirt. Interfaces between human beings and machines are points of special vulnerability, as are those between organizations. Questions of trust, data quality, access, and other issues concern not only the numbers, but the people and institutions who recorded and transmitted them and the policies and practices of those who hold data and provide access to it. To turn the metaphor back on the atmosphere itself, friction can also create turbulence. In social systems, friction means conflict or disagreement, which (metaphorically) consume energy and produce turbulence and heat. Both computational friction and data friction have both physical and social aspects, consuming physical and human energy.

Acting with Media to Act on Global Climate Change: Constructing a Self-Described New Social Movement

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This paper uses the case of "Step It Up," a self-described new social movement, as an entry point to examine recent developments in the discourse of global climate change. Founded in January 2007 by environmental writer Bill McKibben and a group of his students, Step It Up has organized two "national days of climate action" involving more than 1000 rallies across

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the United States. One significant feature of Step It Up is that it is largely a "mediated social movement," relying heavily on web-based communication and social networking tools to recruit and mobilize participants. As might be expected, this approach has been most effective with a young demographic group. Most recently, Step It Up has used the capabilities afforded by new communication media to link its efforts with those of a number of other groups involved with the climate change issue.

Methodologically, my analysis is grounded in ethnographic and textual data collected by a network of communication researchers based at more than a dozen US colleges and universities, of which I am a member. The research group has compiled a shared data archive and is in the process of developing a book-length study. Three primary themes provide the focus for this paper. First, I examine Step It Up's unique and innovative uses of new media strategies. Second, I examine how Step It Up exemplifies a recent shift in US climate change discourse, from disputes over the reality of anthropogenic climate change to a debate over how to act in response to a widely-acknowledged problem. Third, I examine Step It Up's strategy to establish itself as a new social movement, and the benefits and constraints associated with that strategy.

This analysis contributes to the STS literature in a number of ways. First, I frame the global warming issue in the context of Beck's "risk society," a society that finds itself threatened by the products of its own industrial development. I argue that global warming is an example par excellence of the conditions of Beck's risk society. Second, I utilize Luhmann's concept of "ecological communication" to explore how mediated communication establishes a set of concerns that become sites of social action. Third, I utilize Walter Fisher's version of narrative theory to examine how global climate change has the potential to breach the usual discursive boundaries separating "technical" discourse from "public" discourse. In classical rhetorical terms, global warming provides a moment of kairos, an exigence calling for timely intervention. Furthermore, the "globality" of global warming - a paradigmatic case of Beck's "democratic" risk - marks it as among the most public of problems in Fisher's sense. Communicative actions such as those of Step It Up have the potential to expand the conversation about global warming to a wider public audience, and to restore a sense of moral import to the issue.

3.3.13: Postphenomenological Research, I

Visualizations: Modelling Choices

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Scientific visualisations are the output of processes of modeling and simulation. They require a complex interplay between researchers of various disciplines with their associated epistemic cultures, technologies, both in terms of experimental instruments and computational technologies and institutions. This paper focuses on a central question relating to the representational aspects of the visualisations. As the outcomes of modeling and simulation, they could in principle take many different forms;yet on the whole they take a more or less 'realistic' form. For example, in the case of computational biology relating to cardiac processes, the representation visually resembles a heart. These visualisations borrow from both isomorphic and constructed representations.

This paper considers the ossible reasons for the representational choices in these visualisations. Claims that they are more intuitive, or that they are cognitively more effective, need to be placed alongside their rhetorical role in institutional and inter-disciplinary relations. The framing question of this investigation is what are the multi-stabilities in this particular form of representation, which are both highly constructed and insome sense isomorphic. The isomorphism in question is complex as on the face of it and thus on one level intuitivley, the visualizatiaons look like hearts (or some other 3-D item in the world). And, there is the claim that they allow for intuitions of the underlying mathematics. There is an interesting perceptual quandary here, which is at the nexus of a series of questions regarding the epistemological hermeneutics of scientific visualisations. The paper will present a case study on computational biology, and draw comparisons with other forms of visualisations such as imaging and information visualisation.

The Cardiotocograph: a Witness Producing Machine
- a Postphenomenological Analysis

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Throughout the world the CTG is widely used for electronic fetal monitoring during uncomplicated birth. This has become comon practice, even though it has been documented in randomized trials that this practice compared to the use of Pinards stethescopes, leads to unnecessary interventions. Why is CTG becoming the winning technology? To make sense of this contradictory practice it is necessary to look beyond the intended use of CTG: fetal monitoring. In my experience technologies are not as passive as modernists understand them, so I looked for a perspective that could highlight that technologies are not merely tools, but contribute actively in shaping the way childbirth is understood an acted. I did a postphenomenological analysis based on an ethnographic field study at the same site in 1998. I also draw upon my own experience as a midwife and midwifery teacher for almost twenty years. I am here following suggestions laid out by the Dutch philosopher, Peter Paul Verbeek in What Things Do. He argues that a fertile hybrid can be developed by combining

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actor network theory (ANT), and the work done by Americana philosopher, Don Ihde, who studies technologies in a phenomenological framework. Midwifes experience an embodiment relation with the Pinard, and a hermeneutic relation with the CTG. I argue that the CTG has developed into a witness producing machine. This machine produces a trace which answers the question: How does the fetus react to labor? The knowledge represented by the trace refers to nature, and can be distributed in space and time. During this process witnesses are produced. This is quite different from the knowledge produced by the Pinard midwife. She can refer to no authority outside her own senses. The authority of a CTG is produced during a deleting process. The work done by laboring women, fetuses and midwives becomes invisible.

My analysis shows how material artifacts contribute, to the shaping of perception and actions during childbirth. The identities of the involved humans are not pre-existing. Teh CTG actively contributes to constituting the fetus as an independent patient.

The Empowered Patient-Postphenomenological and Posthuman Reflections

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In recent years there have been a number of convergent tendencies in the Danish health care system, involving new or redefined human-technology relations, sometimes names 'pervasive health care.' There is a drift towrd 'patient-centered' medical practices, aiming at greater autonomy for the patients and liberation from physician-dominated hospital regimes.This liberation has become known as empowerment. The aim is for patients to handle their disease in accorance with their own values and desires. This empowerment often involves technological devices and systems to mediae between patient and health care specialists, e.g., hand-held cameras applied by home nurses to let a doctor at the hospital monitor the feet of a diabetes patient. Empowerment is also linked to electronic patient records which 'belong to the patient'. The patient has full rights to access written information abouat his treatment and development.

In this paper I will discuss several related issues in the current development of empowerment, based upon the assumption that sociotechnical empowerment is not a neutral means to support the patient. First I argue that the patient is a multistable figuration, related by a context: a sick person is a biomedical input-output system, a citizen, a user, a kantian subject, a client. Such overlapping figurations are ot just dicursive, but are embodiedd in relaton to he different sociotechnical arrangements. Secondly, the technical systems and devices involved with co-constituting the patient, get their relevant meaning an qualities in the process; they are also being constituted. Any universal conception of the autonomous patient and supporting tools seems insufficient. Hence, it is important to appreciate the work of sociotechnical practices in order to understand the contextualized individuality of the patient as well as the significance of the devices allegedly made to help and empower him.

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Embodiment, Analogy and Professional Visual Literacy in the Cytology Laboratory - an Ethnographic Study

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The recent turn to pragmatism and empirical case studies in phenomemology, labelled postphenomenology, contributes to an understanding that health care is technologially permeated and may guide empirical studies on human-technology relatons in specific health care technologies. This postphenomenology-informed analysis on instrumental mediated professional vision, here aimed at cancer prevention and diagnostics, draws on data constructed from a one-year ethnographic study conducted at one public and one private clincal cytology laboratory in urban Sweden.The study focused upon the cytodiagnosticians, the professional group responsible for screening adn diagnosing normal cervical cytology, and for discovering and suggesting diagnosis of potentially abnormal cells. The cytodiagnosticians should detect aabnormal cells, which can be only a few upon a microscope slide containing up to several thousands of cells. Analysis of the analogies used in talk about technological and visual skills during daily work and interviews show that performing diagnostic cytology constitutes a hybridization of embodiment and hermeneutic features which inform and are informed by the lifeworld. However, the lifeworld on which the analogies draw displays a screening and diagnosing cytology as comonplace visual and bodily skillfulness. As such, the downgrading of the work is bodily and hermeneutically embedded. In conclusion, the cytodiagnosticians need new analogies that account for professional, rather than commonplace visual literacy.

Organ Transplant Technologies and Contemporary Attitudes toward Bodies

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The practice of organ transplantation reveals changing attitudes toward our bodies and their constituitive parts. While these attitudes are shaped to a significant degree by cultural ideologies which have a minimal materiality, there is also a significant material role to be played by the development of medical technologies. Specifically, such technologies and the practices they afford create a distinct middle ground between the living body and the dead body, one where the body is kept "alive" by artificial means but the brain is considered "dead." While brief philosophical can make sense of this new category (by reducing it to the dead body, living body, or by justifying the existence of a middle ground), many common attitudes and practices undermine the clarity and distinctness of these deliniations. Even amongst health care professionals working in the field of oargan procurement and distribution, the boundaries between living, dead, and "brain-dead" bodies are inconsistently recognized. Ultimately we find that our attitudes toward our bodies are diverse even within a single culture and for single individuals, a state of affairs consistent with a developing technological capacity that is simulataneoulsy informed by and aactive in an ongoing construction of the notion of the 'body'.

3.3.14: Ethnography and STS

Situated Agency and Institutional Ethnography in Interactive Research on ICT Expertise

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The paper is based on three empirical studies on the agency and expertise of ICT in Finland, each including more or less the approach of interactive research. It examines the practices of the interaction between the research process and the actors being involved: workers, citizens, institutional actors and policy makers. The first study analyzed gendered ICT expertise through an office workers' study circle, the second one the practices of local inhabitants and their communities, the practices of local developers and organizations that were active in the development of the information society as well as national and regional information society policies, and the third one the shaping of citizens' publicly articulated agency in local politics. The research in them all focused on the agency and expertise of people, the citizens, on the wrong side of the Digital Divides off gender and region.

The research approach starts from the practices of people located in particular places and situations and examines the social and cultural orders that organise those practices, the dynamics of agency The theoretical approach is based on the institutional ethnography of Dorothy Smith (1990, 2005) and the theory of situated knowledge and agency advanced by Donna Haraway (1991). All of the studies consisted of extensive theme interviews and texts and documents collected from relevant local and national institutions. The two first studies further included a follow-up of three interviews with the participants of the study circle and one development project.

In the paper I discuss on the relationship between theory and practice in the research process by paying attention to the theoretical understandings in both research and the processes of development and politics. Institutional ethnography is a good tool for interactive research. It aims to map out the social relations (gender, for example) that organize concrete everyday practices, and the understanding of these relations is valuable to any development project. It starts from the same concrete practices as the development project does. Then, in order to map out the social relations, it examines various textualities that frame the practices. In order to discuss with the projects I needed to have material beyond the mere development projects.

During the research process I examined - (in addition to the interviews and following-up of the particular projects) - regional, national and European information society strategies, media representations of ICT development and use, and most recently, even popular literature that captures and describes the phenomenon for large audiences. Haraway's situated knowledge and cyborg subjectivity took in the studies the form of gendered located politics and situated agency. At the end, I discuss the institutional setting and the competencies needed in the concrete interactive research process and evaluate the limitations of the approach.

3.3.14: Ethnography and STS

"Site-Hopping in STS" : Doing Ethnography in Geographically Dispersed Professional Settings

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Anthropology has a long tradition of reflexivity when its main method of research, ethnography, is concerned. This is exemplified by the writing-culture debate and such concepts as 'auto-' and 'reflexive ethnography'. In this paper we will suggest how the reflexive perspective should be revised for contemporary fieldwork settings that STS researchers are typically concerned with. Some of the challenges posed by such settings are subsumed under the heading of contemporary approaches to ethnography, e.g., as proposed in the anthropology of science and technology and the ideas of multi-sited and virtual ethnography. As allusions to problems of modern fieldwork settings are still rather scattered, in this paper we attempt to bring these problems together more systematically.

STS ethnographers are increasingly investigating 'worlds of interlocking expert cultures'. Fieldwork settings are typically 'elite', technology-saturated and geographically dispersed. While it has often been recognized that ethnographic researchers must be multi-lingual to the same extent that they study multiple fields, it is often forgotten that for the understanding of the worlds of interlocking institutions specialized (technical) expertise often proves to be equally essential (if not more). The STS researcher is thus 'challenged' both culturally and cognitively as he or she is required to rapidly 'hop' from one site to another in order to understand the field in its distributed character.

We contend that the required 'back-and-forth' translations between the various cultural, linguistic and technical contexts, cause a multiplication, if not complication, of the ethnographic work of producing a thick description - which is already a challenge in the more traditional "us/them" settings. This complication concerns the difficulty of taking a standpoint in a multi-sited, multi-lingual and multi-cultural setting. The question we are then concerned with is the following: What comprises the 'situatedness', and/or the cultural bias, for ethnographers following people, things and metaphors across different (physical and virtual) research sites?

In order to investigate this the paper will draw on our fieldwork experiences in geographically dispersed (IT) professional settings. The kinds of fieldwork problems reflected upon include problems of conflicting work cultures, 'studying-up', role ambiguity, and the demands of the various forms of enculturation.

The paper subsequently suggests some solutions to these problems such as: teamwork, collaboration with expert informants, and network ethnography. We will conclude the paper by drawing up the consequences for the work of ethnography in general and the reflexive stand in particular.

3.3.14: Ethnography and STS

Beyond 'Stabilization' and 'Standardization' : Meso Level and Knowledge Considerations in Developing Country Clinical Trials

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"Because when we started the first protocol we were green, we were not really sure about what we were doing but going for GCP training, that helped us to understand why we are doing what we are doing..."

Good Clinical Practice or GCP training, as suggested in the above quote, is seen as both the 'gold standard' and the minimum training requirements for all those involved in drug and vaccine human clinical trials. GCP is an international set of ethical and scientific quality standards developed to guide the design, conduct and reporting of human clinical trials. However, learning what these standards are in the training session does not lead during everyday practice to automatic use of the procedures, protocols and forms recommended in the training. What is required are opportunities to discuss, explore, experiment and learn around aspects of standardised, written down or codified knowledge such as GCP procedures.

As we shall discuss in this paper, the forms and protocols that are used in an AIDS vaccine trial site in East Africa are seen as an opportunity to create order and stability through standardization but result in instability and negotiation in order to account for trial participants, samples and equipment not acting as protocols suggest they should. We shall show how forms and protocols have value as a result of the social interaction and knowledge exchange (the learning) that occurs at a meso or organizational level between staff within the trial site as this instability is negotiated. We will also discuss how although interactions take place within a wide 'clinical trial environment' that includes exchanges with community members surrounding the trial site, the laboratory often becomes a central node (and itself a stabilising force) as a result of the multiple interactions that occur in this realm due to the amount of knowledge exchanged.

This paper will start with an introduction to the theoretical discussions within and related to the STS literature on standardization. In particular we will outline contributions from within Actor-Network Theory and those who have adopted its ideas within medical anthropology to discuss clinical trials and medical procedures. We will then introduce similar ideas that have been developed within the international development and innovation studies literatures around stabilisation, routines and knowledge capacity building. We will use an empirical case study of an AIDS vaccine clinical trial in East Africa conducted over a three-year period involving desk research, interviews and ethnographic study. Finally, this paper will discuss how these various theoretical contributions can create an interdisciplinary perspective that facilitates greater understanding of how clinical trials take place and the implications for subsequent health and innovation policy and actors

3.3.14: Ethnography and STS

Deconstructing the Social Shaping of Technology: Mind Scripting as Research Method and as Reflection Tool

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Our paper deals with software development as social activity and introduces a qualitative approach to software engineering research.

We proceed from research findings stating that in ambiguous situations designers are guided by hidden social scripts which are objectified within technological choices. From the perspective of the social shaping of technology we argue that it is highly important to make these scripts visible in order to allow for discourses on their adequateness. Therefore important questions are: How does it come the software engineers came up with this specific specification? Which assumptions concerning social relations in terms of e.g. assumptions about future users and different standards of software quality have they made? How has their self-understanding determined the system specification?

Clearly this opens up a methodological problem. Therefore, we introduce a new method which we call "Mind Scripting". Mind Scripting is based on the social sciences method of memory-work and has been adapted to the technological field. It is a discourse-analytical and collective method of deconstruction and enables a participating group of software engineers to analyze and reflect on implicit and therefore invisible assumptions in the software engineering process. This method allows the hidden social dimensions of technological artefacts to be made visible and gives insight into specific paradigms and social scripts which system designers have appropriated through their socialization in the technological field as well as through public discourses and everyday experiences. After discussing the method of Mind Scripting we present some exemplary research findings gained in two case studies, one in game design and one in the field of search engine technologies. Based on these results the paper discusses how the research method itself can function as reflection tool and how it can be integrated into the software engineering process. Therefore, we eventually suggest an Enlarged Evolutionary System Design Method.

The results of the two case studies in cooperation with development teams present interesting insights into the practice of software design regarding the social side of software engineering. As in software engineering research qualitative approaches are still rare (as exception see Dittrich 2007), the paper contributes to the transdisciplinary orientation of STS by adapting a qualitative method from the social sciences. The collective and reflective nature of Mind Scripting breaks with the traditional scientific distinction of research objects/participants and researchers and furthermore inspires a methodical approach to feed back the research results to the development process.

Dittrich, Yvonne (ed.) 2007. Qualitative Software Engineering Research, Special Issue of Information & Software Technology, 49(6).

3.3.15: (Information) Technology and Gender

Is Telework Gendered?

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This paper presents some preliminary results of an empirical research that analyzes the reorganization that telework introduces in the worker's work, family and personal life. The theoretical background is based on gender studies, social studies of science and technology and studies of work. The empirical data has been obtained from 24 personal interviews and 10 focus groups to Spanish telework women with familiar duties.

Most of the researches show the existence of a gender digital gap according to what women are underrepresented in technological fields in western societies (business sector and universities careers, among others) (Castaño, 2005, 2008): they use ICTs less than men (Boulianne, 2003; Escofet and Rubio, 2004). However, our study has found that telework reverses this gender digital gap because it is mostly adopted by women, although the companies and public administrations in Spain offer telework programmes without making distinction between genders. Moreover, we will argue that telework could reinforce the women's traditional role as a householder.

Several authors have explored, in the one hand, the gender-technology relationship in order to analyze how women have been excluded from technological fields and how gendered perceptions and values shape design as well as use of technologies (Cokburn, 1983, 1985; Lagesen, 2008; Wajcman, 1991, 2004). On the other hand, the sociology and psychology of work have failed to pay attention to the constitutive role of technology in society (Wajcman, 2007). In this sense, social studies of science and technology emphasize that, while it is important to understand the technical properties and material power of ICTs, the 'technological' and the 'social' are not separate spheres, but one and the same. Therefore, the present abstract considers how a more nuanced analysis of the mutual shaping of technology and society might inform studies of the ICTs and work and also how gendered hierarchies and masculine and feminine subjectivities and practices are created along with domestic and workplace technologies.

What Makes of a Neuron a System?
The Adventures of Mirror Neurons.

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The discovery in the 90s of the so-called mirror-neurons by a group of italian researchers (Rizzolatti et al.) has been widely considered as a turning point of the research in brain and cognitive sciences. For some, they are the key to understand both low (i.e. action) and high processes ("cognitive" functions such as social dynamics). For some, they are a discovery that still needs to be clearly proved.

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The main critics are about the effective role of these neurons in the human brain: the electro-physiology in monkey as proved the activity of neurons in some areas active not only when an action is performed but also when it is just observed. These kind of single neuron recordings is not possible for humans, so that the studies in this field have mainly developed through systems such as fMRI, psico-physics and behavioral experiments. This paper moves from the analysis of the discussion about this case, focusing in particular in the study of a specific and progressive terminological shift. In fact, if for some years it was widely assumed the use of "mirror" to refer to specific neurons supposed to be present in the human brain, then there is been a change: now the same researchers who discovered them are more and more talking about "mirror systems". Systems which are now supposed to be so widely diffused and largely implemented in the brain that there seems to be no more specificity of areas. Is this shift the key to allow mirror systems to be more widely accepted?

This paper aims to describe (i) how this shift as been made possible - studying the evolution of the scientific papers and of the more divulgative ones - and (ii) how this as been possible through the implementation of specific devices. These devices are supposed to allow the passage of "mirrors" from a potential existence (neurons) to an actual and real activity as systems. In this sense, systems are other devices scientific devices and networks can talk of: how it it possible will be our aim, expecting to give a specific contribution to STS literature, both about scientific activity and about the way medicine and cognitive sciences operate.

3.3.16: Interpreting Nature, Science, and Technology

Derridean Deconstruction and the Question of Nature

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In this paper I will consider the Derridean deconstruction and the question of nature in his work. The question of 'nature' seems to occupy a complex position in Jacques Derrida's work. On the one hand, Derrida's critique of the concept of nature as it has traditionally been privileged over technique, culture, society, and so on, constitutes a pivotal part of his project of deconstruction. On the other, the same project - especially his later pursuit of the thematic of animality - aims at dislodging the hierarchical binary opposition of man/animal, where the term 'animal' is not identical to, and yet broadly overlaps with, what has been referred to as nature.

These two strands of Derrida's thought appear to stand, not in a simple contradiction, but in a subtle yet irreducible tension with each other. In this paper, to explore the above conceptual tension, I will reexamine Derrida's early critique of the notion of nature (particularly in his reading of Rousseau) in conjunction with his later engagement with the question of animality.

My analysis will show how his early key concept of the "supplement" becomes tacitly subjected to certain limits by his later focus on the "singular" or irreplaceabe, which may also be called the 'unsupplementable," and how this opens a way to reconceive nature no longer as originary self-presence, but in terms of radical alterity and singularity. I will also discuss the way in which this new conception of nature goes beyond both anthropocentrism and bio- or ecocentrism as they are addressed in contemporary environmental discourse.

Boundary Work as a Hermeneutical Process

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The term "boundary work" was coined in 1983 by sociologist Thomas F. Gieryn in order to describe the process of forming boundaries around science or certain scientific disciplines. Boundary work is a struggle of scientists (or other relevant interlocutors) aimed at either defending or extending the range of scientific expertise, using rhetorical or 'ideological' tools as describing science such-and-such, in order to gain the support of the public in favour of the defended field. Gieryn illustrated and legitimized the use of this term by giving a number of case study examples, such as the controversy surrounding phrenology in early 19th century Edinburgh, or the clashes between science and both religion and technology in John Tyndall's public lectures, or even the so-called Science Wars, the recent turmoil surrounding meta-scientific descriptions.

While Gieryn offered various sociological approaches in order to frame the term in a theoretical context, I argue here that this term can be fruitfully re-interpreted in a hermeneutical theory. I do not suggest at all that sociology and hermeneutics should exclude one another. Rather, I take hermeneutics here as a methodology of conceptualizing

problems and addressing certain types of questions. My claim is that a hermeneutical perspective sheds new light on the problem of boundary work and offers efficient tools to analyze case studies.

Patrick Heelan identifies the essential hermeneutical element in science as shifting the boundary between subject and object, thus invoking different contexts at once in cognition. I propose to extend this notion to the case of boundary work, i.e. to consider boundary struggles as interpretative techniques (aimed at understanding the 'proper' nature of science) involving heterogeneous theoretical or practical contexts. It is crucial to emphasize that the result of such a process is a transition in the public image of science, and thus the cultural and social context always play an essential role here.

Interpretation as a Fundamental Tool in the Construction of Science, Technology, and Society

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There is no stable and well established consensus about certain fundamental problems of the technology - science - society relationships in the recent STS studies. For example it is widely accepted that all of these entities should be considered as the results of human praxis, but there are diverse views about the nature, the characteristics, and the working of this praxis. What are the most crucial characteristics of the relevant praxis? Is it a material, a mental, a cognitive, an individual, a collective, a given, a changeable, a particular, a universal, etc. one? We will argue for a view in which a special component of the human praxis (or a special kind of human practice), the interpretation plays the fundamental role in these constructive activities. Applying this view we can build up a common context for the further investigation of the technology - science - society relationships.

How can be described the role of interpretation in the creation of technology, science, and society? First of all we will describe the interpretation as a specific technology. Technology is a creative activity of human beings based on situation-bound knowing. Human technological praxis builds up meaningful, artificial worlds around us.

Hermeneutics as a practice of interpretation can be considered as a kind of technology at least in four different senses. First of all, traditionally, hermeneutics can be described as the technology of interpretation, i.e. the technology of the creation of meanings. Secondly, hermeneutics has a fundamental role in the real technological processes. Since the primitive human production and use of tools a crucial praxis of interpretation has been performed in every technological situation: a natural being (object, relation, process) is interpreted as a tool in the artificial, technological situation. Thirdly, hermeneutics has a fundamental, creative power in the information technology. It can be argued that production of information is a hermeneutical activity, namely that the information itself is a kind of interpreted sign. In this way the continuously expanding virtual realm of information technology (digital beings, the Internet, etc.) is created fundamentally by hermeneutics. Moreover, there is a special sphere within the information technology: the field of communication. By communication we are able to construct human communities. Fourthly, hermeneutics has a crucial role in the formation of cultures. Every cultural system is constructed (and maintained) by a specific interpretation

3.3.16: Interpreting Nature, Science, and Technology

and reinterpretation of any given natural or artificial beings, practices, relations and values. Cultures define, represent and maintain worlds around us.

In this way hermeneutics as technology creates meanings, tools, communities, culture, and worlds. Using these hermeneutic technologies we can build up sciences and societies. Disclosing the fundamental technologies of these building activities we can characterize the technology - science - society relationships from a specific angle. Some of the most STS relevant consequences will be presented.

3.3.17: How Can the Environment be Made Governable?

'Trying Things Out' : an Experimental Intervention in the Science and Politics of Flood Risk

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The question of how to develop a new relationship between science and democracy (Nowotny et al., 2001; Latour, 2004) or, as Demos (2004) have put it, 'how to make public science more public', is now firmly on the science policy agenda. This presentation will outline an experimental approach to interdisciplinary public science that draws on the working principles of the philosopher of science Isabelle Stengers (1997), for whom risk-taking is a primary guarantor of good research practice. This approach is being developed in a three-year research project on 'Understanding Environmental Knowledge Controversies' funded by the interdisciplinary RELU programme under the auspices of three of the UK's main Research Councils (www.relu.ac.uk).

The project involves natural and social scientists, and local residents in two flood-prone localities, in working together on the knowledge controversies associated with the science and politics of flood risk management. The project focuses on a particular environmental technology - hydrological modelling, exploring how such models are produced; how they become hardwired into the management practices of public agencies and insurance companies; and how and why they become subject to localised public controversies through computerised visualisations like interactive flood risk maps and 'games' (www.knowledge-controversies.ouce.ox.ac.uk). This presentation will focus on an experimental methodology, called competency groups that is being developed and evaluated as part of this project. It is pitched somewhere between the collaborative innovation practices of high-technology industries and civic innovation practices being generated in the public sphere. Flood risk models are one of a number of 'working materials' or 'things' which group members 'try out' together to generate new demands of modelling practice and flood risk management. A secondary aim is to inform the design of a software resource to enable others affected by flooding to intensify their interrogation the models that lie behind flood risk management in their locality.

Scientific and Local Knowledge Systems at the Nexus of Environmental Governance: Ethnographic Research on Participatory Agricultural Development in Mali

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Participatory agricultural development projects provide an ideal setting in which to examine the articulation of local and scientific knowledge systems, as well as the complexly intertwined social processes that constitute environmental governance. In this setting, science and technology studies brings an analytical framework for understanding the production and politics of scientific knowledge systems, and their affects on society, while anthropology brings a strength in examining local knowledge systems, particularly those

regarding agricultural and environmental management, and the broader cultural systems in which they are embedded. Combined, STS and anthropology provide the methodological and conceptual tools to understand the dynamic relationships between environmental governance, the production of scientific knowledge, and the reproduction of local cultural systems.

Environmental governance is a multi-faceted process that occurs at many levels, from the international to the local. Applied projects in agricultural development transect these levels of governance by involving international policymakers, national agencies, research scientists, regional administrators, local leaders, and ultimately farmers themselves. Though the explicit objective in most development projects is to improve the livelihoods of local people through augmentation of knowledge and/or material resources, all of the actors in this process apply different sets of interests, knowledge and values to environmental management and governance. This mix of perspectives results in concepts of governance being continually represented, contested and reconstituted through time and across scales of operation.

However, as international development policies increasingly mandate participatory agricultural research, their epistemological and institutional practices of development need to change. Development projects often turn the simplifying and rationalizing lenses of economism and scientism to local production practices, which, while rational, are embedded in broad and complex cultural systems of knowledge and practice which often fall outside the purview of Western scientific and economic rationality. As a mechanism of environmental governance, participatory agricultural research requires that research scientists and farmers come together in a shared institutional space as well as in a shared system of knowledge production. Because the standards, contexts and meanings of knowledge differ widely, creating these spaces involves cooperation and compromise of both farmers and scientists.

Participatory agricultural development is oriented toward transforming and enhancing local practices by contributing scientific knowledge and methods. However, scientific practice itself must also be transformed in order to be most effective. Epistemologically, it needs to be able to integrate the culturally and ecologically situated nature of local knowledge systems. Furthermore, institutions implicated in science and environmental governance, such as NGO's, governments and universities, need to move beyond the rhetoric of valuing local knowledge and participatory research by acknowledging and rewarding research that positively influences outcomes at the local level, even if formal scientific rigor may have been compromised.

It's Always Dark in Front of the Pickaxe: Ignorance and Surprise in the Remediation of Contaminated Land

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Implementing new technology into real world contexts is always limited by ignorance. This presentation discusses the continuous coping with ignorance in the remediation of areas with multiple contaminant sources and plumes related to industrial activities. The pressure to restore or remediate these so called megasites with large-scale technical devices is augmented by the European Union's aims at prevention and control of groundwater pollution

3.3.17: How Can the Environment be Made Governable?

in order to ensure good groundwater chemical status until 2015. Using examples from a major remediation program for regionally contaminated aquifers as a touchstone, this presentation will discuss processes of restoring these sites with a special focus on the acknowledgement of ignorance and an openness to surprising events by the actors involved. The old German miners' proverb "it's always dark in front of the pickaxe" referring to the permanent uncertainty while digging, has become a rule of thumb for the participating actors dealing with contaminated land, since it is part of the plan in cleaning up a site that you never know what will turn up next. Stakeholders involved in the remediation of contaminated land thus understand surprising events in the process of remediation as the norm and not as failures. Analyzing these processes of dealing with the unknown, it is concluded that a clear acknowledgement and communication about the limits of knowing among the actors involved can be seen as the hinge-joint for successful implementation processes of new technology and the production of knowledge in the context of its application. Consequently, the remediation of contaminated land comprises a fine tuned structure of alternate phases that combine scientific knowledge production and technical application.

Mitigating Pollution: Experimenting with Artificial Wetlands for the Reduction of Pesticides

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This paper will examine current controversies over pesticides and their impact on the quality of water. The quantity of pesticides which are used should soon be reduced. At least this is what the European Directive on Water (2000) implies. Mitigating solutions for the ones that are already in use or trapped in the soil are being surveyed. Our paper will present the results of a research project associating scientists, agricultural advisors, local authorities and farmers for the design and implementation of artificial wetlands downstream intensively farmed drained plots. On which sociotechnical conditions buffer zones and devices are efficient? We will follow the process from the lab experiments to the field back and forth, to the discussion over the first models and the final implementation of the artificial wetlands. We will account for the negotiations that happened between the different stakeholders at each step. We shall also reflect on the question of collective expertise for environmental management. How can the pesticides be made traceable and governable? Which mediations and assemblages are necessary for this? What are the difficulties for bringing them into politics?

Can Science and Democracy Save the Florida Panther?

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Science and democracy are valuable social institutions; however, for each there exists a gulf between rhetorical ideals and actual practice. In the management of environmental

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problems, science and politics both come into play: Can a Science and Technology Studies approach to governance get to the heart of the combined process?

I present research on the co-production of scientific knowledge and management policy for the Florida panther. The Florida panther is listed as an endangered species in the United States, with about 100 animals remaining in the wild. Panthers require large home ranges, but the human population in Florida is growing quickly, and panther habitat is being lost.

According to the United States' Endangered Species Act, the management of endangered species is to be based upon the "best available science". However, various economic and political interests feed into the process, most notably those of property developers and environmentalists. There have been heated, interrelated controversies over both the science and the management, often related to the question of "What is panther habitat?"

For the Florida panther, knowledge production, knowledge translation, and management decision-making take place in a number of connected social arenas. These include arenas centered around field work, scientific publication, advisory committees appointed by the Fish and Wildlife Service (FWS), and internal negotiations within the FWS. These arenas are at once social networks and also loci of scientific and/or managerial judgement. The arenas may have a small number of players, but they are connected to a broader social milieu, and outside interest groups attempt to bring influence to bear upon them. In certain portions of the FWS decision-making process, this involvement is actively encouraged, although it also occurs in adversarial legal challenges.

How does scientific knowledge flow through these arenas and contribute to management decisions? Radio-collared panthers are translated into data sets and incorporated into models of panther ecology. These models in turn affect management policy. However, things are more complicated than a simple downstream flow. With the Florida panther, management needs guide research, and the agencies which use the scientific data and models are also involved in their production.

Likewise, a good deal of the controversy involves how the data are translated into models and policy; but it's also possible for politics flow "upstream" to affect the models or even the data being analyzed. (For example, a land-owner who denies researchers access to his or her land can change the data set of known animal locations.) Importantly, controversy is also translated. The conflicts between scientists resonate with and flow into the conflicts between interest groups. But between these arenas there may be not only overlap, but also differences in the content of the controversy and in what is at stake.

In response to conflict and controversy, suggestions have been made within the broader community of panther scientists, managers, and stakeholders to improve the process. How do we as STS practitioners view these proposals, and can we make our own?

3.3.18: Expertise in Action, II

Book Smarts vs. Sea Smarts: the Turtle Excluder Device

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The invention of the turtle excluder devices (TED) is a case study that offers useful insights into how knowledge, experience, and expertise are brought to bare in solving novel problems. A mandate from the U.S. government required a reduction in the incidental killing of sea turtles in shrimp nets. At the time, there was no single individual that had the needed expertises in sea turtle and shrimp biology and behavior, shrimp fishing gear and procedures, and marine engineering to address the issue. This case study shows how the content, source, and communication of ideas affects decision making. The government scientists preferred the limited expertise of credentialed experts to the more relevant life experience and expertise of the less educated fishers. In part this preference reflects fidelity for the more familiar communication style of scientific writing over the verbal communication style used by fishers. This case study also illustrates how contributory and interactional expertises are useful for understanding the capacity to exchange ideas among stakeholders. Eventually, government change agents, who serve as intermediaries between government and fishers, convinced the government scientists to study fishers' ideas of how to solve the sea turtle problem. The change agents were essential for helping blend these contributory expertises, because they had the interactional expertise needed to communicate ideas between fishers and government scientists.

Expertise, Genetically Modified Food, and World Hunger

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Appeals to scientific expertise are routinely made to justify the following argument. The use of genetically modified crops to address the problem of hunger in developing nations is justifiable on both moral and practical grounds. The main ideas, here, are: (1) given the minimal risk that extant genetically modified crops pose to the environment and to people who consume them, and (2) given the capacity of extant genetically modified crops to increase productivity for resource-poor farmers, using genetically modified foods may be the best way to fulfill one dimension of the moral obligation to obviate the suffering of disenfranchised human beings.

Several objections to this argument have been made. Four of the most compelling concern expertise.

First, the notion of "risk" used to assess genetically modified foods from a technical perspective is oriented around an understanding of how to optimize expected value. This notion of risk differs from the more qualitative conceptions of safety that guide the judgments of typical citizens. When scientific experts lament that citizens act irrationality when they appeal to everyday conceptions of risk to argue against the technical perspective, they fail to appreciate that these non-experts are making justified claims, albeit claims that are justified

according to a different and incommensurate conception of reason.

Second, scientific assessments of the environmental risks posed by conventional and genetically modified crops involve judgments, both ethical and pragmatic. These judgments inform how hazards are identified, how exposure is modeled, and how the comparison populations are selected. Although these links between value and assessment are fully consistent with scientific analysis, ordinary citizens are justified in feeling uncomfortable about extant scientific claims, and in not deferring to any particular scientifically grounded recommendation. At present, scientific claims are impeded by definitional and conceptual ambiguities, and thus are subject to legitimate skepticism by alternative scientific analysis that is guided by other values.

Third, given the centrality of autonomy to the modern conception of the liberal, political subject, people should have the right to eat the kinds of foods that accord with their values. If citizens oppose genetically modified foods on religious or even aesthetic grounds, such grounds provide sufficient justification for demanding access to food that has not been genetically modified.

Fourth, although genetically modified foods can be usefully applied towards meeting the needs of the hungry in developing nations, citizens should be entitled to voice opposition to this proposal, and they should be accorded the respect of having experts take their opposition seriously. Since, as a matter of course, the public has been dismissed as being, in principle, incapable of offering meritorious objections, the norms of discourse ethics have not been met. Consequently, at present non-experts are justified in opposing what they view as technocratic proposals.

We will assess each of these objections, and do so in a manner that brings philosophy and sociology into productive dialog by anchoring our discussion in the Cardiff School approach to theorizing expertise.

Applying SEE to Environmental Conflicts:
Expertise, Technical Decision-Making, and Environmental Justice

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Some philosophers and social scientists have suggested that research in social studies of science could play a role in resolving public disputes with a technical dimension. This suggestion is pertinent for many applied ethicists whose theories of conflict resolution must account for the risks posed by large-scale technologies, from toxic waste incinerators to 10,000+ megawatt dams. Kristin Shrader-Frechette's recent work on environmental justice is an important example. She argues that, in environmental conflicts involving disadvantaged groups, members of these groups have a prima facie right to establish the terms of negotiation according to which the conflict will be settled. She refers to the principle grounding this prima facie right as the Principle of Prima Facie Political Equality (PPFPE). I will argue that the PPFPE is not sufficient for conflict resolution when disadvantaged groups are involved because it does not include a normative theory of expertise. The resulting problem is that, in some conflicts, the PPFPE will render moral verdicts that place

disadvantaged groups in vulnerable positions. A good approach for addressing this problem is Harry Collins and Robert Evans' Studies of Expertise and Experience (SEE). If adapted to environmental conflicts, the SEE approach provides the possibility of rendering claims of environmental justice forwarded by disadvantaged groups consistent with epistemological claims about expertise and technical decision-making.

I will support this point with a case study about Indigenous rights, salmon, and dams in the Pacific Northwest.

Mbeki, AZT, and the Status of Scientific Controversies

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Research in the sociology of scientific knowledge (SSK) has produced valuable knowledge about the ways in which scientific controversies can be sustained over time and how they get eventually get closed down. However, one side-effect of the symmetrical approach employed in SSK is that it is not necessary to distinguish between what could be called "genuine" and "fake" scientific controversies. But distinguishing between genuine and fake controversies becomes highly relevant outside SSK. For example, when policy-making is dependent on contested scientific knowledge, policy makers need to demarcate genuine scientific controversies, which should be taken seriously, from fake controversies, which should not.

The question remains how this demarcation can be made. Here I argue that sociologists who want to contribute to this task have to find reliable criteria that will ensure that the demarcation is made consistently and without self-serving political judgements. A recently developed approach in Science & Technology Studies, Studies in Expertise and Experience (SEE), provides the sociological analyst with a useful classification of different forms of expertise. The classification informs one proposed criterion - the level of expertise of the originator of a controversy - that can be used to demarcate "genuine" from "fake" scientific controversies.

The empirical worth of the criterion is illustrated with a case study that focuses on the provision of antiretroviral drugs to reduce the risk of mother-to-child transmission of HIV in South Africa. Here, President Thabo Mbeki tried to start a scientific controversy with reference to the alleged toxicity of the antiretroviral drug AZT. The analysis of the case shows that President Mbeki's level of expertise can be classified as being Primary Source Knowledge, a type of expertise that is based on reading written sources only and that crucially lacks immersion into a community of contributory and/or interactional experts. Since Mbeki - the originator of the controversy - lacked the necessary tacit knowledge to make an informed technical decision on AZT's usefulness it is argued that the ensuing controversy should be classified not as a "genuine" scientific controversy but as a "fake" one.

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Expertise and Body Construction:
Ontological Politics of Legal Abortion in Colombia

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In 2006 the Constitutional Court of Colombia legalized the abortion inside the following circumstances: Mother Death risk, fetal malformations and sexual assault or incest. Although, the abortion seems a moral matter, the pro-choice group's defense of legalization - and the pro-life response- placed the debate in the expertise field, particularly, to charge of doctors, lawyers and psychologists. The experts' performance shows a specific way for to make public the pain, the blame and the social shame from particularly forms to stage and to construct the body. The legal abortion exceptions gather dilemmas for the publics and experts about risk, blame and pollution in the Mary Douglas view. In the practice, the experts judge, the psychical, medical and legal diagnosis, pivots on the question of fetal viability and the translation from legal interpretation to body interpretation. The meaning of fetal viability here goes beyond the obstetric dilemma, because implies the measure, the balance of the social (moral and psychical) costs of any choice.

This paper attempts to examine different cases of legal abortion in Colombia according the constitutional exceptions and to gather the body's public dimensions and its staging pain. Moreover, the way how in every case the fetal viability is constructed and interpreted. The legal abortion is seen like a very complex process that involves medical (obstetrics, genomics and psychology) and legal technologies. The main question is the construction of the interpretative flexibility in the standardization's process that introduces the abortion legalization through the Social Protection Ministry's set of laws. The standardization of medical and legal process creates a black box, let behind the struggle and the tensions in its construction. Although the viability is a very local matter when the debate is over the contingency of the facts disappears; and the global experts returns.

3.3.20: Tensions in Standardization, III: Tensions in Creating, Negotiating and Using
          Standards

Illusory Standards: the Case of Organic Agriculture

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This paper explores the relationship between written standards and the phenomena under standardisation. Standardisation can be seen as an attempt to simplify practice (Brunsson, Jacobson et al., 2000: 150) by drawing lines in the sand to define phenomena and processes. However, there is an inherent problem in the relation between our concepts and practice. Compared to the world's endless complexity, we only have few concepts and theoretical distinctions at our disposal. This means that the distinctions we make conceptually do not easily match the complexities of differentiations that exist in practice (e.g. Boström and Klintman, 2006).

In this paper, written standards are looked upon as representations of practice phenomena, and the paper argues that depending on the on the nature of the practice phenomenon the standard can represent this to a smaller or larger extent. So although the formalisation of practice into standards is widespread, it is neither straightforward nor uncontroversial.

Along these lines, the aim of this paper is to investigate if the nature of the standardised (the practice phenomenon) has an influence on a standard's trustworthiness. The main argument put forward is that there is an innate risk of creating illusions when creating standards due to the complexities and ambiguities of practice.

We draw on Nørreklit's philosophical model of the relationship between a phenomenon's content and extent (Nørreklit, 1987) and argue that if a standard does not represent what it is said to represent, the standard is illusory. We find that, an illusion develops when there is a lack of compliance between a standards' content and what standard users' expect from its content. A standard that does not keep what it appears to promise is untrustworthy; when a standard is invalid in this manner it may be destructive opposed to constructive with respect to the solutions it was set out to provide, especially so if such standards develop to gain momentum. Such destructiveness appears if the illusion shatters and would manifest itself in mistrust, which inevitably will arise towards the standard or even the standard setter.

Hence, this paper opts for understanding standards according to their ability to validly represent practices and brings forward a general theoretical argument for the risk of creating illusions, due to the inevitable discrepancies between practice and standard. This general theoretical argument is exemplified by the specific case of organic agricultural standards.

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Standards

Competiton between European and Japanese Standard Setting Consortia in Automotive LAN-Bus-System: Analysis of FRC and JasPar

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To develop vehicles that fulfill the criteria of 'environment-friendliness' 'advanced safety' and 'riding comfort', coordination between ECUs (electronic control units) is indispensable. For instance, in Toyota's development of the 'environment-friendly' vehicle "Prius", coordination of the engine control unit with the braking control unit and the motor control unit was essential. Since one or a number of functions is carried by the coordination of separate ECUs, it becomes important to standardize the electronic platform and bus system which securely connect the different ECUs.

The purpose of this paper is to consider the standardization process and the convergence process of the conformance-test specification of 'FlexRay', which has been developed by German origin consortium called 'FlexRay Consortium' founded in 2000 by BMW, Mercedes Benz, Philips and Motorola and Japan origin consortium called 'JasPar' respectively. FlexRay bus system has been already launching to the market by BMW in his X5 SUV, it is expected to be de facto standard status in the automotive high-speed safety protocols market.

By means of turning our attention toward the standardization activities at the standard setting consortia - FlexRay Consortium and JasPar (Japan Automotive Software Platform and Architecture set up in 2004 to promote standardization in software platform for automotive electronic control systems and its bus system), I firstly trace the history of standardization process of LAN bus system, before investigate into the standardization and convergence process of its conformance-test specification between /inside these consortia by invoking the 'Consumption Decision Model' which is normally employed in a basic micro economics as the analytical tool for consumption decision making under some budget constraint, and then trace the characteristics of standardization process of the conformance-test specification at JasPar by means of focusing one of its working groups called 'Automotive LAN Working Group'. Finally, we will discuss the special characteristics of the organizational capability which backs the practical implementation of JasPar's strategy.

Keywords: standardization, consortium, FlexRay, JasPar, conformance-test specification, Consumption Decision Model

Size Matters: the Debate on Determining a Size Standard for US Nanodrug Development

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Nanoscience has been portrayed as a "discipline of scale," situated at the interface of different traditional disciplines. Through claiming that material novelty results from size

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effects, the scientific community accepted size as a crucial parameter requiring careful measurements. Thus the notion of "size" has been mobilized by US nanotechnology policy makers as a mean of integration. It was portrayed as a common ground for researchers from different fields to develop interdisciplinary collaborations, due to the collective goal of "solving the problem of size at the same size scale".

Nonetheless, how to measure size generated confusion within this hybrid community: Measurements methods, protocols and results proposed by scientists from different laboratories and disciplines, each with a distinct experimental culture and tradition, have led to inconsistent ways of performing measurements and interpreting data. This inconsistency has become a hurdle for the commercialization of nanotechnology, particularly in the field of nanodrug development where accurately and coherently reporting size is a necessary criterion of drug efficacy testing within the context of multicenter clinical trials.

Given these considerations, production of a "size standard" was perceived as an urgent task for three US government agencies, FDA (Food & Drug Association), NCI (National Cancer Institute), and NIST (National Institute of Standards and Technology) which formed an alliance to accelerate anti-cancer nanodrug development. These agencies claimed that, once a proper "size standard" could be produced, "correct" nanoparticle measurements would be assured and measurement variation among different laboratories eliminated.

However, the process of negotiating the technical content of the "size standard" involved considerable debate between NCI and NIST. Staff from each institute initially interpreted the notion of "size standard" from perspectives that reflected their particular institutional identity and interests. As a consequence, notions of size and standard actually became a source of controversy rather than providing stability for coordination of a common research agenda.

By retracing the debate between NCI and NIST on the definition of "size standard", I will show that these institutes mobilized different definitions of nanoscale size standard in order to strengthen their political status and redraw boundaries. This strategic usage of the term also reveals that a "standard" cannot be viewed simply as a mandatory rule: Rather, it is a consensus among actors which gives the standard its authority.

Analysis of the Changing Tensions in Standard-Development Organization

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For a long time standardization has been a relatively static process. Within a certain field of activity it was evident how standards had come about, and how standardization institutions could adjust to that standards. Within a given field, demand was relatively homogeneous. Usually, it was clear which Standard Development Organisation (SDO) was 'qualified' and appropriate to do the job.

Due to various developments, the character of the demand within the field of telecommunication and ICT has changed. These developments include among others: liberalization, globalization, fast technological developments and new alternatives;

have the structural and procedural set-up to cope with the increasing rate of technological change and if b) how increasing technological convergence, i.e. the increasing interrelation of formerly separated technological trajectories relate to the absorptive capacity of standardisation.

We use a broad notion of technological convergence that allows us to capture both the emergence of new technologies and the increasing interrelation of formerly unrelated technologies. By drawing on the concept of absorptive capacity we want to assess the degree of "fit" between new and emerging technologies and the ability of standards setting organisations to handle the adoption of these technologies at various stages of their development.

Both of these aspects can be considered a source of tensions in standardisation. Standardisation aims to provide stability to the markets by providing a set of rules and standards that allow for interoperability, compatibility, provide a minimum level of quality or reduce variety. This stability is also important in terms of setting a stable framework for further technological development. This implies that standardisation always tends to sacrifice some flexibility in exchange for stability. The question how standardisation copes with emerging and converging technologies therefore is strongly related to this fundamental trade-off between flexibility and stability.

In terms of research methodology we rely on a broad empirical base using both data from case studies in different technological fields as well as insights gained from a series of expert interviews, mainly at the level of standards development organisations.

The structure of the paper is as follows. In a first step we develop the theoretical framework by linking the two different concepts of convergence and absorptive capacity to the issue of standardisation. Drawing from this conceptual framework we identify possible indicators that can provide insights into the relationship between technological change and standardisation. In a next step we then assess the potential and the limits of the absorptive capacity of standardisation based on our empirical findings and try to link these findings to the theoretical considerations developed in the paper. In a final step we try to extract some policy relevant conclusions that can guide the development of standardisation policies that aim at increasing the ability of standardisation to cope with the challenges of technological change.

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organized into Technical Committees or comparable thematic clusters is able to process converging technologies and b) if there are converging technological trends that can not be processed in this system. To an-swer these questions we propose an analytical and empirical framework that relates indicators and methods based on patent statistics to output indicators of formal SDOs. The advantage of the proposed approach is that it goes beyond the most prominently discussed view of convergence, i.e. the convergence of information and communica-tion technology and also can be used to discover other converging technology trends. Convergence from this perspective is given when over time stable intertechnological patterns emerge. The methods used also allow to distinguish between a focused con-vergence, i.e. convergence resulting from a strongly bilateral convergence of two fields and unfocused expansion of fields into other areas.

To analyse the convergence of technology we use time-series of patent applications filed at the EPO and forwarded to the regional phase with priority years ranging from 1996 to 2003. For comparability of the sphere of R&D and standardisation a concor-dance is used that relates symbols from the Internal Classification of Patents to classes in the International Classification of Standards. This data is then processed to calculate all iterations of possible co-classifications of patents between those fields. We then apply several statistical methods like cluster analysis, measures of width and breadth of the co-classification portfolio of the fields and develop an extended version of the method of cross-impact assessment (CIA) to observe the state of convergence be-tween fields over time. This data is then matched against the co-classification patterns of the output of formal SDOs to conclude if there are misfits between certain converg-ing technological patterns and the capacity of formal SDOs to absorb them.

3.3.21: Acting with Social Sciences and Humanities, III: Inter-Disciplines

Inter/Disciplinarity in Social Sciences:
Distributed Sociology and Boundary Subjects

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Multi-/inter-/transdisciplinarity is usually understood as an adding up (multi-), overlap (inter-) or a transformative encounter (trans-) between pre-existing, historically stabilized disciplinary traditions, which is foremost motivated by a need to solve problems beyond disciplinary grasp [Gibbons et al. 1994]. The disciplinary encounters are conceived as motivated externally and taking place in an "empty", disciplinarily unoccupied epistemic space. Moreover, the attention is primarily focused on puzzles and objects of study, driving the encounters.

We want to problematize this picture on the basis of a long-term ethnographic study (including narrative interviews and text analysis) that we recently conducted at a department of sociology of a Czech university where three subject fields - sociology, social anthropology and gender studies - coexist within the department of sociology. A Czech post-1989 university is an interesting "lab" in terms of disciplinary relations in social sciences as many disciplines (e.g. political science, social anthropology, gender studies) have only started forming in the 1990s. In accordance with Marylin Strathern [2007] we argue that a discipline always already includes interdisciplinarity.

Firstly, we discuss the coming into being of social anthropology and gender studies in the department. Rather then joining sociology, they arose by chipping from sociology. Only secondarily have these subject field been directly fed from outside by the disciplines of social anthropology and gender studies as established at western universities. This chipping of allow on one hand developing and legitimising modes of sociology which was being marginalized at the department; on the other hand it allowed for displacement of the modes of sociology (together with junior and/or female researchers) from the "sociology proper". We analyze the distribution of sociology into social anthropology and gender studies in the multiple ontology terms as developed by Annemarie Mol [2002].

Secondly, we trace inter/disciplinarity though what we call "boundary subjects". Contrary to the emphasis on puzzles and objects of study as drivers for interdisciplinary research, we conceive of researchers as intermediaries of inter/disciplinary relations. Putting researchers' identities and trajectories in focus allows for broadening the perspective beyond epistemic considerations and for including the personal, institutional and political.

We hope to contribute to the STS on inter/disciplinarity mainly by bringing in the constantly underrepresented social sciences, and highlighting the fluid and heterogeneous nature of inter/disciplinary relations.

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Reflexive Engagement of the Social Sciences Component of Multidisciplinary Health Research: the Case of Pharmacogenetics

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This paper seeks to reflexively discuss the role for, and outcome of, social science involvement in large-scale multidisciplinary health research.

In an attempt to critically examine the role and function of social science research the author will outline a case study into the development of a pharmacogenetics (PGx) test for the anticoagulation drug warfarin that is currently being undertaken by way of a multidisciplinary research team based in the UK. Warfarin is a drug that is taken to prevent blood clots and strokes, and one that requires considerable monitoring as environmental, life-style, and genetic factors can influence the safety and effectiveness of the medication. In an attempt to improve the safety and efficacy of the drug, the multidisciplinary study in questions brought together not only geneticists, biochemists, statisticians, and health economists, but also social scientists - to which the author is one of the team members.

As a member of this large-scale research team, the paper will make use of ethnographic methods that allow the author to reflexively examine the various a) expectations of social scientific involvement in multidisciplinary health research; b) expectations of the other project team partners as well as c) expectations of the patients themselves who are being interviewed.

In discussing the divergent expectations of the relevant actors in the production of PGx the paper concentrates on the reflexive question they all converge: What is the role of the social scientist in multidisciplinary health research?

Three possible roles are then discussed: 1) Is the role of the social scientist to assess patients' preferences amongst various treatment regimes and/or prospective technologies, thereby conducting a kind of market research? 2) If not, are the contributions of the social scientists geared towards a kind of pre-emptive politicking through the engagement of traditional ELSA concerns? 3) Or rather, can the social scientist actually contribute to the development of the new medical technology in question through the creation of patients' bio-narratives?

By examining this particular case social science involvement in multidisciplinary health research with a similar kind of gaze that we are accustomed to applying to other scientific disciplines, STS literature and research stands to benefit from increased engagement with critical and reflexive questions. In doing so, we legitimate our position within large-scale health research as a discipline that is ready and willing to investigate own our knowledge production processes.

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Historical Research on Social Sciences and What We Can Learn From it

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Research on social sciences, on the one hand, might help to understand the underlying core principles of social sciences, such as its common denominators, disciplinary boundaries, functions and objectives. Furthermore, it critically reflects the scientific practices that are pronounced to be 'social research'. Investigating the history of social sciences has probably been the most successful way in examining those core principles. Probably even more important, under a historical perspective the crucial and often ignored relations between programmatic ideas and the actual practices of social research are easily to study.

In my presentation I argue that social sciences can be understood as certain social practices in specific contexts and under particular institutional and discursive settings. Analyzing those practices, then, presupposes considerations on the historical process of their establishment. The process of the institutionalization of social sciences and its political debates, thus, are in the center of my research interest. The Fulbright Commission in Austria certainly constitutes a focal point of this development within the Austrian academic landscape. No other organization managed to bring up to 20 senior scientists, a large percentage of them social scientists, from the United States to Austria each year since 1950.

By analyzing its protocol minutes and annual program proposals, one can reconstruct policies, i.e. different strategies and interests of various agents, implying their ideas and perceptions of social sciences. Methods used in this project, thus, relate to the systematic study of historical documents, and appropriate reading. Introduction of social sciences in the Austrian scientific field and its accompanying discussions nearly 50 years ago had and still have strong impact on how those disciplines are received, institutionalized and supported. Based on the Austrian case study, I try to capture general assumptions and suggestions for research on social sciences. This Research, then, needs radically to incorporate the specificity of its historically determined object.

Underground Skills: the Socio-Technical System in the Other Tradition

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The concept of "socio-technical system" has had a long and fruitful career in science studies, where it has been used to extend to technology and artifacts some of the insights gained in the study of knowledge-making in the natural sciences. There is, however, a different intellectual tradition that can claim the concept of "socio-technical system" as its own: the work that researchers at the Tavistock Institute developed in the 1950s, originating in their pioneer studies of the social organization of mining work and "underground skills" in Britain, and of cotton mill mechanization in India. The studies of labor-intensive, mechanized work

systems directed by Trist, Rice and others followed their application of psychological techniques to the war-time effort. In this tradition, the concept of the "socio-technical system" served to integrate a number of heterogenous concerns: the researchers' clinical experience in the use of psycho-social therapy, an interest in worker self-determination and in the social organization of the workplace and its objects, and the managerial emphasis on productivity of their corporate clients. This line of research has continued, affecting a number of fields and disciplines, particularly in management, but barely intersecting with science studies, despite their shared terminology and the similarity of their preoccupations. This presentation, based on archival reseach and on a re-interpretation of the Tavistock seminal publications, will outline some of the historical background to the emergence of the "socio-technical system" as a distinctive concept in this other tradition. The historical and disciplinary conditions under which the concept was developed help explain its relative lack of affinity with work in science studies, but the paper will nevertheless sketch some possible points of contact between the two fields.

Social-Technological Aspects of Collaboratory Projects in Social and Economic History

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The research practices in Social Sciences and Humanities have traditionally centred on the work of individual scholars and small groups. This in contrast to the medical and natural sciences, in which researchers have a longer and more deeply rooted tradition to collaborate with each other. Accordingly, one can see considerable differences in the way SS&H and the medical or natural sciences make use of recent developments in information and computing technologies aimed at creating and sustaining research collaborations. Such virtual research environments, or 'collaboratories', have never developed on the same scale and intensity in SS&H as in the medical and natural sciences. However, recently more initiatives have been taken and this paper discusses some attempts in social and economic history to set up a number of collaboratories. These collaboratories are mainly organized by the International Institute of Social History (the Netherlands) and centre on specific data and research topics, such as wages and prices, strikes, and trade unions. They differ strongly in terms of life cycle (some are well-established, others have just been created, still others are to be created) and in terms of their success.

The collaboratories discussed in this paper are studied in the project 'Social-technological aspects of collaboratory projects in social and economic history' of the Virtual Knowledge Studio for the Humanities and Social Sciences. This project explores the practices, risks and opportunities of the implementation of collaboratories in the humanities. In this paper, some preliminary findings of this project will be presented by discussing how the implementation of the collaboratory 'model' (including specific software) changes research practices in social and economic history. In line with this, the paper explores to what extent the specific characteristics of the humanities obstruct or modify the implementation of collaboratories. In doing so, an effort is made to bridge the gap between the academic debate on collaboraties (which is heavily influenced by research in natural and medical sciences) and the specificities of the collaborations (which are deeply rooted in social and economic history). First and foremost, this effort seems to require a reflexive research approach in which the researcher

3.3.21: Acting with Social Sciences and Humanities, III: Inter-Disciplines

tries to be as sensitive and open as possible. However, since the research object is so 'close to home', one could wonder to what degree this reflexive attitude can be achieved.

The methodology of the project entails an ethnographic study of the practices and experience of the various collaboratories. It combines non-participant observation of the workshops held by the group members with interviews on the expectations and/or hesitations of the organizers and members of the collaboratories. In addition, extensive archival research will be used to analyse the documentation and communication of the groups. In doing so, the project aims to create a holistic understanding of the cases and combines technological, organisational and sociological dimensions.

Travelling Facts about Crowded Rats:
Rodent Experimentation and the Human Sciences

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The paper will explore the influence of ecological studies in overcrowding among rodents in disciplines associated with the "new environmentalism" of the 1960s and 70s: human ecology, environmental psychology and environmental design. Most notable were a series of experiments on rats and mice carried out by the ecologists John B. Calhoun at the National Institute of Mental Health and John J. Christian, of the Naval Medical Research Institute, Bethesda, and the Penrose Research Laboratory at Philadelphia Zoo. Both had similar career trajectories, beginning their work as part of the Rodent Ecology Project at Johns Hopkins in the 1940s and 50s. Both produced very similar facts: that increased density among social animals resulted in a series of stress-related social, psychological and physiological pathologies. Both of their studies were very influential in the human sciences and design professions. However, the reception of their work differed among the various communities concerned with human population growth, density and management. While Christian's sober and cautious treatments were endorsed by ecologists, Calhoun's more expansive and ambitious style was more influential among psychologists and architects directly involved in urban design and planning. In turn, while ecologists associated Calhoun (in contrast to Christian) with a pessimistic even cataclysmic vision of mankind in a crowded world, environmental designers saw cause for optimism. By comparing the different ways that the very similar facts generated Calhoun and Christian's rodent laboratories were put to work in the human sciences and design professions, the paper will not only address how different disciplinary, social and policy interests influence the reception of facts, but the importance of the vehicles used, the styles adopted, and the general packaging of research products, to their transmission.

Transfer of Agri-Technologies: a Study of Agricultural Extension

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This paper explores how 'well' technologies 'travel' from one domain to another. We consider the effectiveness of travel to mean the extent to which technologies travel as well as the degree to which they have a desirable effect on the 'receiving' domain. Although technologies are shaped by the places in which they emerge or travel to, we believe they in turn can also change the places they travel to. We explore the latter explicitly in this paper.

Specifically, we study how agricultural technologies developed by the Tamil Nadu Agricultural University (TNAU), one of the oldest agricultural research and education institutions in India, travelled to the beneficiary farmers of an agricultural extension scheme - and beyond. The focus is on studying the effectiveness and extent of travel and establishing how well and to what extent the technologies travelled. The historical significance of this inquiry is that the TNAU model of transfer is a departure from established models of

that use the measure for comparison or decision making, and policy or program users that use it for measuring the impact of interventions. It is important to incorporate the user domain into the analysis of poverty measures, since it is only in the actual use of the product, that the measures become 'real' and start to influence reality.

The analogy with economic goods points to different issues. For example, does the market function perfectly, meaning the right measures are produced for the right needs, or are there imperfections, and is there for example a monopoly in the production, or branding taking place? Most importantly however, it focuses the analysis of poverty measures on the users and usage domain, which is a perspective often ignored, but which can bring new insights in the understanding and use of poverty measures.

This paper will apply this new perspective to different poverty measures, for example the national poverty measures in the US and the EU, and the international poverty measures of the World Bank and UNDP. This comparison highlights the differences in measures that are produced, the way the production is organized, and the needs they meet in the user domain.

3.3.23:   Policing and the New Forensic Genetics: Constructing
          Expectations Among the Austrian Police

Acting with Expectations:
The Austrian Police and Forensic DNA Technology

Daniel Barben

(no affiliation given)

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that use the poverty thresholds to determine resource allocation, and public users who have an interest in raising awareness and press for action.

In sum, this paper analyses how the measures have been produced and marketed, and in which ways poverty measures form boundary objects (Star and Griesemer, 1989) between producer and user communities. The methodology is case study research on the Human Development Index and the World Bank 'dollar a day.' The insights from existing literature on the importance of quantification (Trust in Numbers, Porter, 1995), and the relation between statistics and state (The Politics of Large numbers, Desrosieres, 1998) are expanded by this new perspective on the producer and user domain of economic indicators.

Cartels and Collaborations in the Popularisation of Science

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Dismayed at the quality of the science being popularised in the early 1920s, publishing magnate E. W. Scripps set up Science Service as a means of "making democracy safe for America." The way Scripps saw it, so many political decisions were ultimately decisions about science and technology that access to scientific information was vital to healthy democracy. Science Service would be politically neutral and at all costs avoid propaganda "unless in the service of science." "Bad" science popularisation would come to be replaced with "good" science population - most all of it issuing from Scripps's Science Service.

In the 1960s, 70s, and 80s, another collaboration emerged: this time between a group of science journalists who formed an "inner club." Despite being nominal competitors, these reporters found there were advantages to sharing information. The result, as Sharon Dunwoody puts it, was that "a relatively small group of speciality reporters played a large role in determining what the US public learned about significant scientific happenings."

Since the mid-1990s, there has been another coalition at work: this one centred around an influential publicist and literary agent whose role in setting the agenda of his writers remains unclear. That agent, John Brockman, counts as clients many of the past decade's most influential and bestselling popular science writers, forming a mutually supportive network. The benefits for both agent and author are clear, the benefits for the reading public less so.

How do these collaborations affect the content of the material being disseminated in this fashion? One important and potentially sinister consequence seems to be the production of a false sense of consensus: the pressures of science popularisation (make it comprehensible, make it interesting) and the particular interests of those within the coalition have led to a misrepresentation of the scientific community these writers supposedly speak for.

This paper updates the work of John Burnham, whose detailed history of the popularisation of science (How Superstition Won and Science Lost [1987]) records a decline-and-fall story, with the quality of science popularisation being inversely proportional to the complexity of the science being popularised; and Philip J. Pauly, whose detailed account of Scripps's relation with science popularisation examines the inherent tension between philanthropy and propaganda that lay at the heart of the Science Service agenda. It also draws on the work of

3.3.22: Acting with Facts: What Happens to Facts when They Travel Across Time, Space or Communities of Practitioners?

STS scholars such as Sharon Dunwoody who have analysed the roles played by coalitions in knowledge production and control.

Re-Modelling Vaccination Policies:
How 'Facts' About MMR are Established and Circulated to Renew Policies? Case of MMR in the UK.

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Vaccination policies are way to act with 'facts'. 'Facts' of increase of disease cases may trigger the urge to renew and change the existing practices (e.g. to move from selective strategies to mass campaigns). 'Facts' may, however, contain 'diminished' value, when they are established by modelling techniques. Moreover, they may be misinterpreted and turned into threatening, experimental 'facts' that are acting upon us.

This presentation studies how mathematical modelling was used for renewing and evaluating vaccination strategies in the UK. The case in focus is MMR (Measles, Mumps and Rubella) triple vaccine that was introduced in 1987 as a response to the increasing trend in congenital rubella syndrome. In the process of implementing the new vaccine, mathematical models were used as evidence-base for refining the optimal age-groups and dose. Models, hence, formed part of the evidence-base for the decisions. This presentation shows the interaction between different fields of expertise that were incorporated in the process of remodelling the policies. Furthermore, the study discusses how models were used for predicting and preventing a measles outbreak in 1994 by legitimising re-vaccination, a 'catch-up' campaign. In conclusion, the flexibility of mathematical modelling in policy-making processes is addressed.

The study is based on archived documents (surveillance reports, memos, meeting transcripts, correspondence, scientific articles) of designing a new vaccination strategy in the UK in late 1980s. The main sources are archives at the Health Protection Agency, London. Furthermore, the study analyses the published scientific models that were used as source of 'facts'. A conceptual frame is developed to understand the relation of facts and evidence through the perspective of different communities that are acting with 'facts'.

3.4.1: Regulating Emerging Technologies: Subpolitics in the Making

Are Cloned Animals Safe Food? Regulating the Use of Animal Biotechnologies for Human Alimentation. A Comparison of the French, European and American Cases.

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During the last 15 years, successful attempts at cloning different animal species (sheep, rabbit, cow ...) have been largely covered by the Medias. Recent evolutions in the cloning techniques, improving its reproducibility and lowering its costs, raise the question of the potential use of such techniques in the agro-alimentary field (directly for food production or, more likely, in animal selection programs). As a consequence, agencies and experts groups have been mobilized at different levels (national, European) to assess the safety and eventually question the legitimacy of such practices.

This paper aims at expliciting the way those assessments have been produced: which questions have been raised, which experts have been chosen and what kind of knowledge did they mobilize to question and qualify food products derived from clones, and eventually differentiate from "normal products". It relies on the analysis of the French, American and European expertise procedures and reports that were published recently (respectively by the French AFSSA, the European EFSA and the American FDA).

Different types of arguments (and of scientific data linked to them) have been mobilized in the controversed evaluation of the safety of the safety of food products derived cloned animals.

Food toxicity evaluation tends to consider those products as strictly equivalent to"normal" food products, thus denying them the qualification of "novel food", and not providing any basis for a regulatory framing of their use and diffusion. But at the same time, genetic and epigenetic differences between normal and cloned animals are under scrutiny by researchers, why consider nucleus transfer as a perturbation of normal developmental phenomena which can have long lasting consequences. Animal cloning is also questioned in terms of ethics, and especially animal well-being: in its current state, the technology still generates many developmental problems which lead to miscarriages and premature deaths of the newborns.

The analysis focuses at the methods and paradigms mobilized for the evaluation of these food products, the similarities and differences between the three different (French, American and European) evaluations and the way such experts produced knowledge is being articulated (or not) with animal biotechnologies as political issue. It also traces the link between the ways those reports were produced (from a scientific and institutional aspects) and the way the broader controversy about GM foods shape debates, controversies and mobilizations in the three considered areas.

Engineering Tissues Regulation. Standards and Discretionary Powers in European Advanced Therapies.

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The regulatory framework for tissue-engineered products and for so called advanced therapies has been shaped through prolonged and extensive discussions and procedures primarily conducted by appointed expert committees. Originated in the European Commission Directorate General Industry and Enterprise, European Regulation (EC) No 1394/2007 on advanced therapy medicinal products was recently adopted. Not only does it frame its subject as a thoroughly technical and specialized theme but its provisions are basically directed at establishing another appointed expert body authorized to adopt all necessary measures in the field. This Committee on advanced therapy is endowed with both regulatory (legislative-like) powers and with the authority (judicial-like) to decide scientific and ethical matters in individual cases. The contribution explores the increasing tendencies to expertising and technicising specific contents of regulation in order to make them less apparently political and, at the same time, to using committees procedures in order to perform very different functions, namely rule-making and decision-making.

May Commissioners of Patents be Policymakers? Patentability of Life Forms and the Boundaries between Technical Expertise and Judicial Jurisdiction.

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In the patent systems Commissioners of patent perform the difficult task to decide whether an alleged invention deserves patent protection or not under the law. The decisions they make call for expertise in the areas of science, medicine and engineering, as well as experience and skill. This expertise represents the basis enabling them to solve complex problems and to apply the appropriate standard of review to any particular patent case.

The nature of their decisions on patentability is mostly considered non-discretionary, as an application for a patent is to be refused where it is determined that an applicant is not by law entitled to be granted and any refusal has to be justified by the examining Commissioner. Moreover the Commissioner, when granting or denying a patent, should not consider the public interest independently of the Patent Act

Higher life forms patenting cases though - and the decisions of the Canadian Courts in the OncomouseTM case - seem to tell a different and intricate story about how the Commissioners' duties and administrative powers have been interpreted by the judicial Courts and the correctness standard has been established and applied.

This paper will focus on the role of judicial Courts in framing the nature of patenting problems related to biotechnological inventions as questions of law, fact, or mixed law and fact and on

3.4.1: Regulating Emerging Technologies: Subpolitics in the Making

the actors who have concretely weighted competing policy interests in evaluating the patentability of higher life forms.

Standard Making Assisted by Scientific Expertise, the Refining of the Risk Analysis Principles in the International Food Safety Standards Processing

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The actual technical developments of modern agriculture are facing fierce debates over potential benefits and risks that citizens can expect. Risks for health that can carry foodstuffs are often a central issue in trade disputes between nation States. Science is used by politics to bring elements and proofs that such barriers are legitimate or not. In most sectors national regulations are more then ever challenged by international bodies, public and private, that elaborate competing standards and norms. In that perspective, the study of the Risk Analysis principles can bring elements in the research area of "subpolitics". In fact, these principles, which frame the evaluation and regulation process of food products, have been recently adopted by the World Trade Organization and have thus gained an international enforceability. This paper will present how the Risk Analysis principles were introduced and embraced internationally and their current refining at the Codex Alimentarius, the intergovernmental body for food standards.

Recent studies explain the diffusion of regulatory concepts from national and narrow arena to an international and broad standard through the notion of "Invisible Colleges". Moreover, it is now known that a specific portion of the scientific community that is also involved in advising policy makers, is gathering in networks where such concepts can be developed in order to fit better regulators' expectations.

This paper will discuss at first the genealogy of the Risk Analysis Principles since its elaboration in 1983 at the US National Research Council to the World Trade Organization agreements. It will demonstrate the trajectory through out the official committees as well as in less formalized meetings and will focus on the supporting role of scientific experts' networks.

The second part will describe current improvements of these principles at the Codex Alimentarius and its experts committees. Those improvements should be read and understood as the result of two types of interactions. First, the experts committees are made of different scientific experts' communities, and therefore specific epistemic cultures try to influence the content and the enforcement of such principles. Secondly, these principles require cooperation between experts and regulators which can be conflicting since one can see it as an opportunity to contest the perimeters of the other.

This research will combine qualitative interviews with experts and regulators involved in the provision of scientific advices and a quantitative analysis of experts' publications.

3.4.1: Regulating Emerging Technologies: Subpolitics in the Making

Fuzzy Genes, Fuzzy Governance Epistemic Inconsistencies and How to Deal with Emerging Technologies

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Newly emerging technologies give rise to high hopes. However, many technology developers fear that some of them might elicit controversies in the public over hidden risks or equity issues. Formerly, regulation was considered an appropriate means to both address risks and to contain controversies; however, past experiences have shown the limits of such a strategy. Rather, early science and technology governance is called upon today, engaging a variety of actors and stakeholders in a dialogue. This strategy implies that the science base of the technology in question is sufficiently clear in order to allow for a consensus over its appropriate applications.

One area that is usually considered prone to controversies is genomics including derived technologies such as gene testing. Genomics is a prolific multi-disciplinary research field featuring prominently in the media. However, reporting is ambiguous at times: researchers promise to abandon fundamental biological concepts, and at the same time to develop practical applications founded in those very concepts. Such discrepancies are often attributed to "gene talk", strategic presentation of scientific insights in order to secure funding and support. Hence, the problem is framed as one of extra-scientific interests determining the way how scientific facts are skewedly explained to non-scientists.

A series of in-depths interviews with scientists showed that the problem of a seemingly ambiguous reporting of scientific insights go deeper and pertain to the epistemic character of (post-)genomics. The emergence of this new field of research is based upon combining several disciplinary approaches (molecular biology, statistics, computer science, etc.); however, the forced co-operation causes intrinsic problems as quality criteria differ according to the discipline. New quantitative approaches in systems biology increase this epistemic tension and challenge the tradition of hypothesis driven experimentation. Consequently, the criteria for consistent and relevant findings become subject to the particular mono-disciplinary context. Despite the rhetoric of inter-disciplinarity, co-operation remains essentially on a multi-disciplinary level.

The epistemic complexity related to the multi-disciplinary situation is not, and probably cannot be, communicated. From an outside perspective scientific insights become fuzzy and not only permit but call for different equally legitimate interpretations. Thus, rather than strategic communication alone, it is the ambiguity of scientific results themselves that is reflected in contradictory media coverage. This is, to a certain degree, a necessary effect of multi-disciplinarity and can therefore also be expected in other prolific fields of scientific research where many disciplines are involved and/or emerge from.

But it also poses a problem for the intended governance of emerging technologies: not only do different interests and values competing for influence lead to strategic argumentation; rather, the very science base becomes elusive. As a consequence, governance is not only called to address welcome and not so welcome areas of application of a technology but has to indulge into definition work on what the technology essentially is about. Previous debates over contested technologies have extensively dwelled on such definition problems, yet

3.4.1: Regulating Emerging Technologies: Subpolitics in the Making

coming to terms with definitions rarely has been explicitly considered an appropriate task at the very heart of governance.

Calculating Life: Genetic Resources,
Political Topographies and the Re-Ordering of
National Nature in the Finnish Genetic Resources Programmes

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Developments over the past two decades have seen Finland ratify various international treaties for the sustainable use of renewable natural resources, amongst the most important are: the Convention on Biological Diversity (CBD) in 1994, International Undertaking on Plant Genetic Resources (IU) in 1983, Global Plan of Action (GPA) in 1996 followed by the International treaty on Plant Genetic Resources for Food and Agriculture (IT) in 2001. Each emphasize the importance of national programmes in promoting the protection and sustainable use of natural resources for future generations. The most recent iteration of these developments has witnessed the Finnish Ministry of Agriculture and Forestry beginning a number of programmes for genetic conservation: Plant Gene Resources in 2003 and Animal Resources in 2004.

This paper analyses the emergence of a novel object of governance - 'national genetic resources' - and its role in the work of Access and Benefit Sharing (ABS) group at the Finnish Ministry of Agriculture and Forestry. The expert members of the group had been nominated by the Minister of Agriculture and Forestry to work up a guideline of governance concerning the genetic resources amassed within national programmes. This 'centre of calculation' had to resolve several questions in the creation of their novel object of knowledge such as: what kind of entities are 'genetic resources'? Which institutions should be enrolled in their governance and management? What form and substance should these institutions take and embody? And, of course, who owns the national genetic resources?

This paper will argue how the network of international treaties and guidelines, such as the international 'soft law' Bonn guidelines, together with the national political principles between Ministries, such as the one of 'sectoral responsibility', exhibit agency in shaping the Finnish political regime for national genetic resources and its corporeal formation within the scientific work it oversees. Alongside of this, the creation and the governance of a novel object of knowledge in the form of genetic resources begs more fundamental questions about the possible re-inscription of the national ordering of nature, as the most pressing question in terms of legal inscriptions is: how many natures should there be in Finland?

The paper is based on empirical data gathered by participant observation in the ABS-group at the Ministry during 2005-6.

3.4.1: Regulating Emerging Technologies: Subpolitics in the Making

Exploring the Influence of International Sub-Political Sites on Nanotechnology Regulation in India

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The nanotechnology regulatory regime in India, in concomitance with the technology itself, is fast emerging and is marked by new discoveries and their applications across disciplinary fields. Although both are emerging, this dynamism is not a two-way phenomenon. The technological developments are ahead of the regulatory regime, with the latter reacting to the former. The reactive nature of the regime corresponds to a number of political, sub- political and apolitical factors, both national and international; which makes the regulation often disjointed and fragmented in nature. There has been a growing trend towards the acceptability of international forums/institutions as efficient and effective sites of regime creation. These sites are characteristically sub-political in nature in as much as they lack effective legitimacy and formal rule making power. The International Risk Governance Council (IRGC) and the International Standards Organization (ISO) are two such sites, identified in this paper.

This paper explores these two sites of regime creation through the theoretical construct of the Beckian notion of sub-politics. Both IRGC and ISO demonstrate characteristics of emerging international sub-political sites in the context of regulation of nanotechnology. Norms emanating from international sub-political sites have earlier had an influential role in domestic regime creation. Given that the Indian domestic regime for nanotechnology regulation is still at a nascent stage and essentially reactive in nature, the deliberations within these two sites could have considerable influence in its development and functioning. This per se is not problematic, however the concern arises in the context of the inherent structural limitations within these institutional sites coupled with technical and financial capacity deficits confronting developing countries like India, which severely limits and considerably delegitimizes the substantive norms originating from these institutions.

The paper has been divided into four parts. The first part provides a broad overview of the various international and national regulatory developments in nanotechnology. This illustrates the growing acceptability of internationalization and harmonization of regulation of technology more generally. The second part is a theoretical assessment of the two identified sites, i.e., ISO and IRGC to ascertain their sub-political nature. Herein the norm creating activities of these sites within the field of nanotechnology would also be discussed. The third part would trace the influence of international sub political sites on the Indian regulatory regime in other technology related sectors.

Based on this, the concluding part would explore the possibilities of influence of the two sites and its implications for the development of nanotechnology regulatory regime in India.

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Subpolitics of Ethics:
the Case-Study of European Group on Ethics' Opinion 20

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The field of bionics covers a wide area of research in biomedical engineering which aims at the designing and implementation of systems interfacing artificial devices with biological organisms. A growing branch of research in this area addresses the implementation of interfaces to the neural system in order to restore or enhance cognitive and sensory-motor functions. Emergent technologies in this field raise ethical questions concerning the acceptability of the psycho-physical alterations, provoked by the interaction of these devices with the main substrate of mental activity, and their impact on the users personal identity and autonomy. Ethical issues raised by the implantation of bionic devices in the human body are addressed by the European Group on Ethics in Science and New Technologies to the European Commission (EGE) in the Opinion 20 of 2005. The Opinion 20 aims at raising questions and producing awareness in public opinion and institutions with respect to ethical dilemmas carried out by emerging technologies in the field of ICT; this document also intends to provide a theoretical framework for the institutions to deal with these devices implanted in the human body. Although the Opinion has the character of the preparatory study, the Group explicitly aims at providing ethical and juridical principles as guidelines for responsible legislators.

The aim of my paper is to analyse this example of soft law text with respect to the emergent bionic application of Brain-machine Interfaces. After a short description of this technology, which aims at raising a first bunch of ethical issues coming up from the connections of devices to the human brain, some sections of the Opinion 20 will be discussed. The analysis will show that the normative claims of the Group are grounded on ethical and ontological assumptions that are not always explicit or justified. This is the case of the theoretical concepts of personal identity, autonomy and responsibility: with respect to these concepts the Opinion seems to refer to a classical conception of personal identity. However, this commitment is not clearly declared neither the reasons of the preference for this account upon the others are clarified. Such an analysis of ethical and ontological assumptions within this normative guideline text aims to investigate the legitimacy of these assumptions from a philosophical as well as political perspective. I will show that these theoretical premises are not self evident but controversial, therefore the normative conclusions concerning the ethical impact of emergent technologies in bionics and the regulation of their applications do not stand on a solid ground. On the basis of this case study, I will finally address the issue of the role and regulation of the power of ethical committees, which in the context of European politics present a soft normative role.

Making Sense of Urban Artefacts "in the Wild"

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Theories, concepts and methods are shaped in context. STS has (mainly) developed its toolbox through the study of scientific laboratories, engineers at work or R&D departments. This paper aims, first, at identifying a series of specificities of the urban world compared to such 'traditional' STS contexts and, second, at presenting some aspects of a recently completed case-study in which STS tools are combined with other ones.

In the first part I will argue that:

▷ actors and networks concerned with the making and re-making of cities are different and differently assembled than in the world of science and technology;

▷ urban transformations have for much longer been a public and openly political field of debate and action, with, for instance, its specific participative tradition ;

▷ when entering the urban world, as they have recently done, STS scholars encounter, on the one hand, a series of usually quite reflexive actors and, on the other, observers from other disciplines equipped with equally sophisticated tools.

Therefore, we cannot consider that urban change is, on the one hand, just a new field of explorations for STS similar say to nanotechs and nanoscience and, on the other, deprived of an external/deconstructivist/critical gaze (or whatever else STS can offer). It is thus important to clearly identify the added value of STS for the study of urban change and where a mutually enriching dialogue with other approaches can be developed.

In the second part of my talk I will show how I try to combine different tools for the study of urban transformations in Palermo, how the political shapes these transformations and how both producers (architects mainly) and users of recent artefacts make sense of their actions.

Looking at and 'Doing' Urban Design

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In debates about the so called 'aesthetization of the urban' those using these spaces are almost always constructed as passively responding to urban design stimuli. Only rarely has the focus of discussion shifted from the production of these extremely visualised spaces to a consideration of how people experience them in specific and situated encounters.

In this paper we discuss the interactions with and performances in two highly designed urban spaces: the shopping centre in Milton Keynes and Bedford's recently redeveloped town centre. Following Latour's (2004) suggestion to regard the body as an 'interface' we develop the concept of aesthetization of urban spaces as a complexly experienced visual

performance. This means that we understand vision as embedded in and perceived through a range of sensuous experiences.

In particular we are interested in distinguishing the various and differentiated ways in which individuals and their surroundings work together to produce a diversity of forms of looking, walking and interacting. In other words, we explore the fluid movements and textures that link the experiencing subject and the external world and thereby produce 'fields of visuality'. In these 'fields of visuality' different forms of looking and experiencing produce various intensities of interaction with the material environment We discuss how these interactions with designed urban spaces can be understood as an ongoing yet unstable achievement between a perceiving subject and participating object. In this context, we approach urban aesthetics as a set of folding and emergent relations (Bourriand 2002; Rose 2003) rather than a set of intrinsic aesthetic values.

Cities and Citizens as Curators and Urban Planners

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In 1999 the Dutch government introduced a policy in which cultural heritage no longer was understood as the exclusive domain of curators, but in which citizens would have a say in which artifacts should be made part of the collective memory of The Netherlands. This policy was translated into a dynamic "cultural biography" in which objects no longer dictated but served a story of cultural traces left by people in their environment. If cultural objects no longer fitted that story they could be erased from the collective memory. The city of Maastricht was one of the first local governments to implement this policy together with cultural heritage institutions and Maastricht University. Two leading Dutch experts, the anthropologist Gerard Rooijakkers and the historian of town planning and architecture Ed Taverne wrote a program using this concept of cultural biography - originally developed in the field of anthropology and archaeology - in the context of urban planning and the cultural heritage of the city. The City of Maastricht invited experts (urban planners, curators, architects, historians) and lay-experts ("citizens") to describe and to assess the qualities and identities of the historical city and its future urban development.

This paper offers a reflection on this new policy and asks a number of questions that are highly relevant to STS in urban development.

What does it mean for the role of the expert when an urban government initiates and subsidizes a radically new way of 'constructing' history and at the same time is the most powerful actor in the urban planning and cultural heritage of the city? Is the story of the expert such as the historian or urban planner more credible than the one of the citizen? What happens when there is a conflict of interests? Who edits and archives this shared cultural biography? Is the decision about which objects are relevant for the story of the city where the European Treaty was signed only a matter for the inhabitants of Maastricht or have national and international keepers of its collective memory a say in this? Expert views are challenged by "lay-experts" assembled in emergent networks oriented towards the (re-)making of the city through the production of alternative historical analyses and urban designs. At the same

time, this rethinking of knowledge can only be understood in its full complexity by relating it to the power of and strategic interventions by urban governments.

Urban Studies without Scale:
Localizing the Global through Singapore

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This chapter draws on fieldwork in Singapore to advance an approach to urban studies that is attentive to cities as assemblages. This idea is supported through a fieldwork-led discussion of the millennial (1999-2002) managed restructuring of Singapore's legal services. Through this specific study it is demonstrated how the restructuring of economic globalization through Singapore cannot be accurately explained through a scalar approach to globalisation that would seek to understand Singapore as a site of intersecting scalar processes. The current vogue in urban research to envision 'the city' as occupying a middle ground between the global and the national (global-city-national) in order to cement a certain role for the state (the national) in shaping urban (local) affairs is empirically challenged through a description of how the city-state of Singapore actually functions as an actor-network and not as a site where different 'scalar processes' somehow meet and compete. Overall, the chapter's case study about Singapore's role in economic globalization demonstrates that when no extrinsic explanation (an a priori framework, a blueprint or context, such as a scale) is imposed on the actors to try to explain the events in which they are involved different findings emerge to those that are currently accepted. Indeed, through being attentive to how actors define situations and networks (or work-nets) in their terms, using their own dimensions and touchstones (rather than those of the social scientist), it is clear that scalar processes do not exist and consequently should not be invoked to try to explain, for example, how Singapore is participating in the global economy.

Urban Ontologies: Decentring the Object of Urban Studies

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The basic aim of this presentation is to discuss some of the challenges that theories, concepts and perspectives developed in the STS field pose for research in urban studies. My presentation starts by arguing that the obduracy of conceptions of the city in the field of urban studies is striking. In an nutshell, the city has been understood as a spatial formation (from Burgess 1925; to Soja 1989), as an economic unit (Sassen 1994 and back to; Weber 1986), and as a cultural formation (from Simmel 1950; to Zukin 1996). These are complementary perspectives that converge in the assumption that cities constitute singular, bounded entities. I argue that this fundamental ontology of the city as a unit has not been systematically challenged and that STS-perspectives combined with relational philosophies

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can help to do this.

The main challenge is in my view to grasp and reflect upon 'urban ontologies' in the plural form, engaging the idea of a multiple enactment of the city in sociotechnical networks, virtual assemblages and hybrid collectives. In this context, what STS-perspectives have to offer is a solid theoretical ground to explore the claim for a radically relational and symmetrical understanding of the city: challenging distinctions between global and local, close and far, inside and outside, notions of place, propinquity and boundedness, radically rethinking the basis of urban power and knowledge and the notion of urban regimes, and such. More precisely, three theoretical moves can be made by importing these relational perspectives into the urban studies. First, the city is not simply 'outthereness', but a performative product, i.e. a form of 'in-hereness' (Law 2004). Second, urban reality is not just socially constructed, but enacted into being by bodies, materialities, technologies, objects, and humans. Third, urban ontologies are plural, not singular. They collide with each other, overlap, interfere, and form thereby a multiplicity that has to be managed, coordinated or held apart (Mol 2002).

The core part would focus on three kinds of challenges for urban research, which involve new research questions, new subject matters, and new vocabularies. Firstly, the expansion of the urban ecology from human to non-human accounts; a challenge that has been worked out the most in the STS context by many authors reassessing the role of sociotechnical infrastructures and urban natures of the networked city (Graham and Marvin 2001; Hommels 2005). Secondly, it is possible and necessary to take a closer look at the multiple virtual assemblages and hybrid collectives, holding together these expanded urban ecologies and enacting the city in multiple ways. Thirdly, thinking in terms of multicausality and heterogeneous chains of actors acting and assembling together poses important questions for the analysis of urban politics, particularly in terms of agency and scale.

I conclude by stressing the potential of the notion of 'urban ontologies' for integrating these different strands of research and discussion into a common agenda for urban research.

From RA to STS and Back Again? On Theory, Incommensurability and Translation.

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In the field of urban studies, the regulation approach (RA) occupies an important position. Although its macro-economic orientation was originally developed in the context of the analysis of Fordism within national spaces, the last fifteen to twenty years have seen important regulationist work published on sub-national as well as supra-national scales and spaces. The main attraction of the RA is its understanding of the capitalist economy (seen through the lens of accumulation) as a socially and historically grounded phenomenon in need of regulation. This regulation is achieved through a large number of rules, social norms, institutions, laws and policies. Adopting an evolutionary understanding of socio-spatial change, the RA argues that one can observe and analyze historical eras characterized by dominant patterns of production and consumption.

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According to most regulation theorists, the period after World War II until the early 1970s can be usefully identified as Fordist, but the crisis of Fordism in the 1970s has led to a search for new forms of accumulation and regulation and the provisional emergence of a post-Fordist accumulation regime operating on multiple and interrelated scalar spaces. The acknowledgement of the emergent nature of this new regime has led to a greater openness to meso-level research among regulationists and an increased theoretical pluralism with writers now combining the regulation approach with research on flexible specialization and regional/urban spaces of production, global or world cities, governance theories, and Foucauldian-inspired work on governmentality (to merely name the most important strands).

As part of these debates, this paper investigates the possibility of a theoretical move from the RA to STS and back again. In particular this last movement (the 'back again') is shown to be problematic for a variety of reasons. The outline of the paper will be as follows. First, I briefly discuss the main characteristics of the RA, focusing in particular on the concepts 'accumulation regime' and 'mode of regulation'. Second, I address the ways in which the crisis of Fordism has led to a search for improved theoretical models among regulationists and how this has opened up the RA to meso-level research that is sensitive to the constructed and precarious nature of socio-spatial formations. Third, I investigate possible connections between the RA and STS by highlighting the role STS can play in analyzing - in an empirically 'grounded' manner - the theoretical blind spots of the RA as well as the limits to capital accumulation and regulation in particular socio-spatial environments. In these instances, RA and STS can be understood as mutually enriching in the study of city-making. In the fourth section, however, I will argue that this limits the role of STS in theory development due to the ontological prioritization of the RA. Although these limitations can be relatively easily ignored on the meso-level, they point to fundamental questions of incommensurability and theory translation on higher levels of abstraction.

Tentative (Id)Entities: Genetic Testing and its Modes of Ordering

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This paper aims at exploring the co-production of biomedical entities and identities in the process of genetic testing for hereditary breast and ovarian cancer in the Austrian socio-political context. Drawing on in-depths interviews with women and men who have undergone genetic testing, we will elaborate three context specific modes of ordering that participate in the forming and performing of what we will label "tentative (id)entities".

We will first examine the distinct processes of enrolling individuals through enacting individuals as biomedical entities in the medical pedigree. This process of reconstructing and rewriting family history and family relations represents an obligatory passage point for entering genetic testing procedures in Austria. It performs a "family at genetic risk", a version of family that is not constructed through social bonds and collective memories, but through genetic kinship and a shared familial risk. Only by being enrolled and identified as a member of such an at-risk family, admission to genetic testing is possible.

Second, we will investigate how individuals, after having undergone testing, reinterpret these biomedical versions of themselves and their familial relations addressing issues of responsibility and information. We will argue that in the Austrian contexts, processes of reinterpreting the assigned (id)entities are strongly entangled with a specific prevailing perception of genetic testing as being not a clearly delimited technology. Rather it is perceived as a network of human and non-human actors such as doctors, psychologists, advanced preventive and surgical technologies, group meetings, etc. which co-produce certain orders.

Third, we explore how these successive ordering efforts are related to normative discourses on the medical system at large and health in general in Austria. Here we observe negotiations, frictions, ruptures but also continuities between personal and more collective modes of ordering.

Bringing together these three levels, we will finally argue that when it comes to the question of identities performed in genetic testing, the different modes of ordering do not lead to stable identities. Rather they remain tentative in character, as they are continuously revisited and revised, as well as negotiated and experimented with in different social and societal contexts.

Sexuality, Medical Technologies, and Heterogeneous Conservatisms in the United States: Comparing Gardasil and Plan B

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In recent years, much attention has focused on the impact of the political culture in the United States (and in particular, conservative cultural currents) in shaping public and state

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responses to scientific initiatives. We seek to deepen understanding of these tendencies through a comparison of controversies involving two different medical technologies: Gardasil, a vaccine to prevent cervical cancer and other conditions caused by infection with human papillomavirus (HPV); and "Plan B," a form of emergency contraception marketed for over-the-counter sale. In both cases, scientific, regulatory, and policy debates about the implications of the technology reflected cultural preoccupations with adolescent female sexuality. However, the outcomes of debate were markedly different. In the case of "Plan B," opposition on moral grounds substantially delayed access to the technology; but in the case of Gardasil, conservative concerns about the promotion of sexual promiscuity among young people proved to have limited effects on regulatory approval. On the basis of interviews with scientists, policymakers, and representatives of both liberal and conservative advocacy groups, along with archival research, we trace differences between these cases. We identify factors that help explain whether sexuality-related medical technologies are embraced, tolerated, or rejected by conservatives both inside and outside of government in the United States.

The Multilateral Initiative on Malaria
- the Effects of Africa on Actor-Network-Theory

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Today S&T is repeatedly presented as a the number one vehicle for Africa's journey on the road to development and prosperity, and more resources than ever is being pored into African research. Despite of this the meaning of African localities to S&T is practically unexplored within STS. This study tries to modify this and focuses therefore on what the absence of Africa may mean to STS-knowledge production, specifically looking at the relevancy of ANT for a study of actors and events within malaria research. The specific ANT-model used for this tryout was "the Circulatory System of Scientific Facts", presented in Pandora's Hope (Latour 1999; 98 f). ANT methodological roles, the model and related concepts were used to map out and analyse events within the international research alliance "the Multilateral Initiative on Malaria" (MIM). The MIM (formulated around the question "How can [malaria] research help in improving the health situation in Africa?") harbours the idea that science is lacking knowledge on what malaria is in malaria endemic areas (i.e. research questions relevant to temporary visitors in endemic areas along with "academic perspectives" has been privileged over solving problems relevant to the public and malaria control programs in endemic areas). Science on malaria has therefore (the MIM-argument goes) to be carried out by African based scientists, in ("genuine") cooperation with research colleagues in the North and with people within African ministries of health, health care workers and malaria control programs. However, as the state of science in Africa leave much to be desired for, the work within MIM has had to focus a great deal on research capacity building, incl. supplying research reagents, setting up internet connections, etc. The result of this study, shows that the ANT-model and concepts in many ways met well with the empirical (MIM) image of relationality of actor action/ interaction, and the methodological rule of following the actors and their negotiations (inside and outside of the laboratory) showed to be useful. But, the study also revealed some of the shortcomings of the model and its concepts, i.e. an inability to deal with scientist's multiple identities and the fact that the system of scientific facts is sometimes subordinate to the logic of other systems. Moreover: the study

showed clear status hierarchies and large differences in size and assets between the actors of the circulatory system of malaria facts, and depending on what society actors were acting (or based) in, they overlap and/or differ in status and linkages to other actors (and loops). Finally, the ANT focus on effects and the models triage to the stabilisation of facts showed to take choices made in the scientific community for granted: only actors successful enough to produce observable effects, only facts that already made it into the laboratory, could be included in the study, while those unsuccessful in pre-laboratory negotiations had to be left. Questions that remain to be answered are what the sources of these theoretical/methodological flaws or inabilities, are and how they can be corrected or complemented?

Immodest Witnesses - Body Assemblies and Biomedical Research Politics

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This paper investigates the representational practices involved in biomedical research politics through the case of the first EU financed Patient Conference on 'Stem Cells and Patients' that took place in Brussels in December 2005. At this event the UK presidency of the EU together with the Sixth Frame Work-program and an European network of patient organizations for neurological disorders invited patients and their organizations throughout the EU to 'make their views known' on stem cell research and EU research policy on the issue. In the paper I will investigate 'the representational machinery' of the event. Using Latour's questions to assemblies, I will ask, "1) How do they manage to bring in the relevant parties? 2) How do they manage to bring in the relevant issues? 3) What change does it make in the way people make up their mind to be attached to things?" (Latour, 2005, p. 34). I will argue that this 'representational machinery' performs the authenticity of suffering and hopeful bodies as particularly privileged representational positions in relation to the issues of research politics. What takes form through the event is 'a body assembly', wherein the representation of matters of (embodied) concern is forming alliances with the representations of matters of fact. Taking up Haraway's concept of the modest witness as the bearer of testimony of matters of fact (Haraway, 1997), I will argue that rather than challenging the 'modest witness' of science - that is the experts - the patients as 'immodest witnesses' - that is bearers of testimonies of matter, of a suffering body and of hope - become increasingly important spokespersons for science. This science is not just to be understood as a particular way of knowing, but more so as a particular way of imagining. Matters - or even trials - of concern might thus both be that which arise when matters of facts fail, as Latour suggests, while at the same time being ways through which the scientific imagining prevails or is strengthen (Good, 2001).

The paper will end by looking at the emergence of such 'immodest witnesses' in other contexts of research politics, and by discussing the possibility of a turn toward an embodied and affective representation of science and citizenship in the shaping of transnational biomedical research politics.

3.4.3: Heterogeneous (Id)Entities and Biomedical Technologies: Exploring Socio-Political Meanings

Constructing Science Stories / Drawing Boundaries: Biomedicine as Seen by 'Ordinary People' (Transplantation and Genetic Testing)

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Public Understanding of Science and Technologies studies generally aim at deciphering the mechanisms of reception and uptake of science and technology. They look into the way science and technology are understood and interwoven in the everyday life of various categories of people and/or the way such people will put to use these scientific elements and technologies in the context of their everyday life (as patients, as affected persons, etc.). One of the major clarification established by Science Technology Society studies shows that people are not ignorant in matters of science and technologies: the point is not that they "wrongly" understand, they do understand in a context and they combine this techno-scientific knowledge with other forms of knowledge.

In our paper, we start off from such hypothesis and focus our interest on the way people draw boundaries between what seems acceptable to them, or not, in the scope of two medical technologies: transplantation and genetic testing. We focus more precisely on one of the resources they draw from, namely partial stories, fiction, which allow them not only to give meanings to the biotechnologies they are confronted to, but also to give body to some abstract scientific and technological knowledge. Therefore, such fictional context allows them to "settle" within a story in which they have a role to play.

Material used in the scope of this study comes from five focus groups which we organised in France and which dealt with transplantation and genetic testing in the scope of a European project entitled Challenges of biomedicine - Socio-cultural contexts, European governance, bioethics (6th framework program). These focus groups were built around scenarios offered to several groups of people, some being "not affected" and others being "affected" by one of the two medical technologies. We have indentified, in the wording we transcribed, a whole array of references which do not belong to people's direct living experience. Sometimes, they come directly from books or televised fiction and, more often, they come to us indirectly and appear to be imaginary compositions built up around real events or "archetypical" characters, making sense for all participants in a group.

How are these fictional stories mobilised to justify the limits of what is acceptable or unacceptable in the application or development of biomedical technologies? This somewhat more "imaginary" aspect of the receiving and meaning-giving processes should not be neglected: as such fictional stories do not rest on concrete proofs, accommodating some distance from reality, they allow people to share their fears and hopes which often would remain untold, as such fears and hopes appear, to them, not to be legitimate.

Hybridizing Science and Fiction

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In the field of nanoscience and nanotechnology images play an important role. Visualizations of the nanoscale are produced through the use of different imaging techniques, which make it possible to study the nanoscale, and are used to show results of research that has been carried out. Through a process of circulation within and beyond the domain of science, these images can be placed in different frames, which may result in the communication of different messages that foreground future possibilities, expectations and visions about what can be achieved through nanotechnological developments. These visions are stories of the future and in that sense fictional. The reproduction of images in different frames implies a hybridization of science and fiction, which could stimulate and/or hamper public understanding of nanoscience and nanotechnology in specific ways. The fictional aspect is, however, not only foregrounded when images leave the domain of science. There has been critique from within science itself that scientific images become too fictional and are no longer realistic portrayals of science (Ottino, 2004). Based on this critique it has been suggested that there should be aesthetic rules that need to be followed in the production of images that portray relevant scientific information.

How can these aesthetic rules be formulated from within the domain of nanoscience? One of the key issues is that the nanoscale cannot be seen. Different imaging techniques are used that function according to the same principle; it is a matter of 'feeling'. To be able to visualize the nanoscale expectations about what can be seen, and expectations about what the right tools are to produce visibility, are needed. By following these rules about how to produce scientific visualizations a hybridization takes place, which is contained for peer-reviewed publications; nice pictures do not result in the publication of articles. But, nice images can be used to attract attention to the scientific content that is presented. This implies that images have a dual purpose, i.e. to present a scientific content and to attract attention, which applies for all images, wherever circulated.

It is hard in practice to keep scientific images 'scientific' and exclude all fictional characteristics. In so doing, a hybridization of science and fiction should be accepted; within the domain of science, where rules for these hybrids exists, and outside science, where the purpose of images should be assessed rather than its representation of a scientific content.

Image Travels in Nanoscience: Facts Revealed and Packaged

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The practice of imaging in the emerging field of nanoscience relies on different forms of microscopy, such as scanning tunnelling microscopy, atomic force microscopy, and electron microscopy. They operate at the level of atoms and attain atomic resolution. As revealing techniques, they make accessible atomic structures for investigation and manipulation. This

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technology simultaneously produces facts of different kind. At this early stage in the development of the nanosciences, the revealing process is typically interpreted as a proof of existence: the fact being that the specific visualized atomic structure exists and is the result of a certain experimental proceeding. These facts appear as packaged in a certain form - visual images - that makes them ready to travel. Thus, like modern manufacturing technologies, the revealed atomic structures leave the production process boxed and ready to ship to users. Users consist, above all, of the fellow scientists who have an interest to open up the packaged fact for further exploration. Within and across the scientific field, the visual images do not travel easily on their own. They require labels and instructions for use, an accompanying explanatory or contextual text. But perhaps most unusually, they are hardly to be found travelling without the companionship of related images. The travelling companions are essential epistemic elements in the way that the scientific culture of nanoscience produces facts in such a way as to ensure that they will travel well. The paper will analyze how these different images reinforce, comment, and supplement one another, and how, as a result, facts are revealed.

The Nature of Evidence and Scientific Objects in Biomedicine - Ethnographical Study of Type 1 Diabetes (T1D) Laboratory Research

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My research site is Finland's Type 1 Diabetes Prediction and Prevention Project (DIPP), which was founded in 1994. Today, it is one of the largest biobanks in Finland and its informational databases provide a substantial amount of data to study T1D. T1D is one of the most common insulin-dependent chronic diseases in children and it is becoming more common worldwide. Biobank is a large population-based resource of our genetical human nature. In a sense, it provides information about our national and unique cultural heritage and diseases. Because of that, it has major instrumental value in providing answers and "high hopes" to solve big national health problems. Biobanks can have major implications for future research and policy strategies as well as for the healthcare systems in general. When studying blood samples, many expertises are needed and different bio-informatical research methods have to be applied for finding the molecular markers of diabetes. Blood tissues have a long way to travel before they are "translated" into a research object or scientific knowledge.

In this paper, I am interested in how scientific objects and models of diabetes are constructed by scientific experts during the biomedical research process. Researchers in the biomedical lab are trying to identify new molecular markers that characterize the development of diabetes-associated autoimmunity and its progression towards overt clinical T1D. In this type of collaborative laboratory work, evidence of scientific objects is created. The question is what kinds evidential artefacts are constructed for a multifactoral phenotype of diabetes and how they are created. In biomedical research these different artefacts show a vision of research and create new kinds of medical ontologies. Medical ontology means different kinds of disease models and their uses in medical practices. Model, thus creates a future vision of new social activities and practical treatments, that may be used by various social communities in their diabetes care and prevention work.

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Scientometrics and Sociometrics Analysis of the Discovery of Nanotubes within the Field of Fullerenes

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Developments in science at the cognitive level and the social level do not necessarily co-evolve. Mediation in terms of texts (e.g., research articles) may lead to different dynamics on either side. In a detailed case-study of the bifurcation between research in nanotubes and fullerenes, we were able to reconstruct the development at the field level as a discontinuous one for one set and a continuous one for the other. A Kuhnian-type of revolution has occurred in 1991 with the discovery of nanotubes within the field of fullerenes. The older part of the field has been left behind by the research front. The two fields have further developed at a different pace: "nanotubes" have gained momentum, while the field of "fullerenes" has remained a more stable producer of new knowledge claims.

In this follow-up study, I extend the scientometric analysis with a sociometric one to assess the reflection of the intellectual organization in prevailing organizational formats. Are the patterns of coauthorship relations also divergent or are "old-boys networks" still able to reach over the divide between these two cognitively related research areas? Did the bifurcation lead to the establishment of two research communities and, if so, with how much delay? My results throw light on the relation between interactions in social networks among researchers and the (self-) organization of cognitive developments within and among these networks.

With the set of documents retrieved from the ISI Web of Science for titles with nanotubes or fullerenes on their title, it will be tested if the bifurcation that is evident in the textual dimension is reflected in the social organization represented by co-authorships. The algorithmic visualization of sequential historical connections between authors will help to perceive a differentiation of a scientific community corresponding to the bifurcation point faced at the specialty level. Will different social configurations correspond to different cognitive situations of research in the area? Will periods of institutional foundation be represented as weak links between the authors? The emerging order at the field level is constructed, reconstructed, and retained by the communities of researchers.

3.4.6: Participation in Health Care, III: Differences in Citizenship

Emergent Democracies:
Australian Consumer Health Organisations, the Internet, ICTs, and Participatory Policy and Service Design

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ICT and the internet particularly continues to be portrayed as radically transformative of citizenship and democracy. Decentralised and distributed systems for the production of information, and the ease and speed of its distribution have been seen by some as forces of democratisation. Citizens will participate directly in the design of government policy and services. This hyperbolic technological optimism has been applied to the arena of health citizenship. ICTs have been hailed as democratising the relationship between health care systems and their consumers; more informed patients will participate as equals in their individual treatment decision-making, and perhaps more importantly in the transformation of medical services. However, while ICTs have been envisaged as transforming knowledge and information flows in health, there has been little work done on the consumption of ICTs in third sector citizen health organisations. How are ICTs transforming health partcipation, citizenship and democracy? This paper explores the contradictions and complexities faced by a range of health consumer/citizenship organisations in Canberra, a small Australian city of 300,000 people, as they grapple with increasingly ICT mediated participatory processes with governments and health service providers. The impetus for this work comes from previous moments in social studies of technology, including work on 'the consumption junction' and from feminist technology studies that recognised the importance not only of following the scientists, engineers technology designers in the lab, but of following the redesign of heterogeneous socio-technical systems or actor networks as they continued to be translated in everyday use. Can the internet provide new ways for activist, advocacy and support organisations to conceive their nature and purpose? Should ICTs be translated to provide new forms of civil society and political mobilisation? This paper explores the internet and ICTs at the interface between government, health consumers living with chronic illness and their organisations.

Reviewing Biological Citizenship

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both by the colossal popularity of this subject and its ambiguous character which seems to challenge any attempts to capture its essence. The academic attempts to characterize health activism seem to inevitably resolve into different extensions of citizenship claims. Despite all the efforts to define and characterize how 'citizenship' actually is proclaimed through science is far from being consensual. One of the widely-read and reviewed arguments made in this regard is 'biological citizenship' which was initially put out by Petryna (2000) and reviewed by Rose and Novas (2001). Even though the term 'biological citizenship' managed to attain a 'super-star status', it strangely does not seem to provide an authoritative and uncontroversial analysis. It rather forms a common cluster of presuppositions and proposals that construct

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boundaries between science and citizenship that has dominated the recent debates in sociology and STS.

In this regard, what intrigues me most is the possibility of combining 'civil society' theory as a new perspective to delineate the boundaries between science and public participation (and for citizenship-for that manner). Hence what I would like to do in this paper is three-folds. First I would like to sketch what constitutes the biological citizenship by discussing its basic assumptions. Secondly, I would like to highlight some of the main problems, such as identity and materiality that are immanent to this conception. I will try to show how these blind spots, erasures and contradictions are not accidental to but signifiers of the dominant understanding around 'somaticisation' and particular focus on organisational mobilisation. Finally, I will try to show how a wider theory on civil society can be used to contextualise the political and social dimensions of public participation in science.

The proposed new perspective will attempt to bring issues of representation and participation in question, as well as challenging the normative considerations that are usually overlooked and ignored. Hence the property of social interactions that makes up the 'citizens' will not be incidentally mentioned but recognized as a formative principle by which we understand and assess the participation. Such a framework promises to improve our understanding of public participation in science in its ideological value, precise relation to democracy and its applicability over cultures and history.

Socio-Technical Agencements and the Materiality of Citizenship: the Case of the Heat Waves in France and Portugal in 2003

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The main objective of the paper is to analyse the political work that is done, from the local to the transnational levels, to normalize extreme events or permanent hazardous situations. This is a political question that interlinks with the problem of the relation between States, private and public interests and the framing of democracy. It is proposed that the theorizing of 'extremes' rests on an ecology of fear or a culture of fear that do not allow for a progressive composition of one common world. The aim is to highlight the complex issue of public participation and the relationship of citizens with scientific knowledge, and how citizens do or do not mobilize around certain problems and how in their daily lives they deal with the political and moral dilemmas that confront them around permanent hazardous situations.

A comparative analysis of the social, political and symbolic impact of the heat waves of 2003 in Portugal (2 000 deaths) and in France (14 000 deaths) will be used as the background for a more general reflection on the role and omnipresence of the national States and international institutions in the regulation of extreme events and permanent hazardous situations, and how these pose a specific challenge to the notions of democracy, citizenship and the public sphere.

The main argument in the paper is that the existence of knowledge and technical dispositives is not enough if the adequate agencements are not consecrated in institutional and legal designs that oblige to incorporate and encompass all citizens in the polity, in an ethics of

care (we are all vulnerable).

With the heat waves that affected Europe in 2003, we are faced with the production of a new epidemic that associates both heat and the elderly and weave them into the social fabric with a myriad of institutions, attachments and agencements that force States to intervene in order to prevent, manage and reduce its health, political and symbolic impacts. Through the definition of a new epidemic by the international health institutions, we have access to certain ways of making politics, of defining citizenship issues and of containing possible overflowing and the contestation of the State's own legitimacy.

The paper is based on the critical analysis of documentary and media data on the eat waves of 2003, and relates to the STS literature that deals with the configuration of socio-technical agencements. For this paper aims to understand, in a comparative way, the networked and distributed material and social technologies, embedded in protocols, social practices and materialities, that pertain to heat waves as a public health issue. It is argued that the existence of protocols is not enough to prevent deaths from heat waves, and based on Callon's notion of performation, reinforces the notion that it is "collectives that innovate".

Civic Groups Forum on National Health Insurance Reform in Taiwan: Evaluation of an Innovative Participatory Method

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While many democratic societies have long had problems of participation explosion of organized citizens, new participatory methods such as consensus conference ignore organized participants entirely. In this paper, we proposed a method called "civic groups forum" to overcome this gap and provided empirical evidence of its application to National Health Insurance (NHI) reform in Taiwan. This method stresses two features. One feature is that its design consists of deliberative discussions and large-size participants. These two components were seldom put together in the formalized deliberative participatory methods. The other feature is that the invited participants are representatives of civic groups. This forum is designed to strengthen the participatory system in democratic societies, especially in those in which emerging civic groups (out-groups) found it difficult to compete with long-term dominant groups (in-groups) in public engagement. The purpose of this study is to introduce the forum and empirically evaluate its effects on representation, deliberation, empowerment and effectuality.

Since the early 1980s lay participation has become a major concern of STS research on new scientific governance. Promoters argue that, rather than being passive receivers of policy experts' knowledge, lay citizens have the wisdom and perspectives to provide informative and useful contributions for policy-making and technological assessment in instrumental, normative, as well as epistemological dimensions. However, we emphasize that, compared with individual citizens, group representatives have advantages as deliberative participants in terms of competence and accountability. This is because they have stronger motivation to be fully engaged in the concerned issues and have more resources to gain the needed knowledge base for meaningful participation.

political discourse, and how it was used in the defence of their own interests by different actors.

The use of expert knowledge has played a central role during the whole process, both as a source of legitimacy to governmental decisions, as well as a resource to populations in favour of their claims. It is also very interesting to map the different forms of collective action, as well as to understand how they evolved from more institutional forms into more violent and radical ones, sometimes in a short period of time.

We believe that this work, more than giving answers, raises interesting questions about the role of citizens and their participation in the definition of health policies, and the meanings and scope of the different forms of participation that were used during the controversy.

The Internet as an Arena of Contention: the Case of Abortion in Portugal

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Abortion has been, and is, an object of public controversy in several countries.

In Portugal, the discussion around abortion achieved its peak moments through the occurrence of two referenda on the subject, one in 1998 and the other in 2007. In both, the Portuguese were asked to answer the following question: "Do you agree with the decriminalization of abortion, if practiced by option of the woman in the first 10 weeks, in a legally authorized health establishment?"

Specifically concerning the last referendum, a wide controversy was brought about, in which the Internet took part, both mirroring and extending the discussion, while participating in the creation of multiple spaces of contention. YouTube, amongst others, was one of the privileged arenas where some of this discussion took place.

Based on the analysis of some of the most relevant videos available in YouTube concerning abortion, and also of the comments they deserved by the Internautes who watched them, this paper tries to map the actors involved, the several positions taken and the relations established between them, as well as the arguments mobilized during the discussion.

Thus, this work aims at understanding the role played by the Internet while participating in the co-construction of the controversy around abortion in Portugal, questioning at the same time its effects on the broadening of the established spaces of participation and contention.

3.4.6: Participation in Health Care, III: Differences in Citizenship

narrative lines of their arguments. While Government stressed technical arguments with the main goal of improving the quality of health services, populations introduced the questions of identity, constitutional health rights, social justice and equality, and non democratic political decisions.

Along the period under analysis judicial instances showed to be a privileged arena for the interactions between the disagreeing parts. Surprisingly, the private health sector was never present, being the most significant absence noticed.

3.4.7:　Public Involvement in Urban Affairs

Acting with Marginalised and Excluded Communities to Create Dialogues on S&T for Urban Sustainability

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This paper will provide an overview of the innovative participatory foresight methodology, and outcomes, developed by the Citizen Science for Sustainability (SuScit) Project (www.suscit.org.uk).

Funded by the UK Engineering and Physical Sciences Research Council's (EPSRC) Sustainable Urban Environment (SUE) programme
(www.epsrc.ac.uk/ResearchFunding/Programmes/EEC/Activities/SUE/default.htm),
the SuScit project comprises a structured programme of action research and networking activities designed to promote engagement, dialogue and collaboration. It aims to build links between scientists and engineers, local sustainability practitioners and citizens from low income and marginalized communities. Essentially the project has developed an innovative 'bottom-up' foresight process to give local communities and practitioners a greater say in future EPSRC funded urban sustainability research.

Why focus on marginalised communities? Research shows that environmental inequality and injustice are significant problems within the UK, afflicting many of our most deprived communities and socially excluded groups (Lucas et al, 2004). We know that it is often those most disadvantaged in our society who live in our most degraded local areas; are exposed to the greatest risks; have the worst access to environmental goods and services, such as good quality housing, energy efficiency measures, green space, recycling, and environmental information; and experience the poorest health and quality of life. These communities are also the least likely to be engaged in dialogues about how science and technology can help to address these problems.

The SuScit project is working in partnership with local residents and community organisations in the Mildmay area of Islington in North London, using a range of participatory techniques, including drama and video. Between March and July 2008, three People's Panels (young people, older people, women and single parents), will engage in a structured programme of dialogue with a sustainability Practitioners Panel and a Researchers Panel to look at how research can help to improve the quality of life for people living in Mildmay and similar areas. This action research element of the project comprises 5 key phases: i) Engaging local communities and recruiting participants; ii) Exploring narratives and perceptions of urban sustainability; iii) Sharing local knowledge and experience; iv) Visioning sustainable communities; v) Developing a community led agenda for urban sustainability research.

This paper will make a novel contribute to the STS literatures on S&T foresight, moving public engagement upstream and reflexive governance for sustainability.

Acting with Democratization of Technology:
Taking Part in a Regional Playback Project

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There is a huge high-rise apartment complex of 10000 houses, called Takashimadaira-danchi, in the north-western part of Tokyo, which is currently confronted with serious challenges, such as advancing age, deterioration of buildings & facilities that are getting disagreeable to life style, and increasing vacant rooms & stores. Adjoining this area, there is a university that shares similar problems, mainly resulted from decreasing child population, and is struggling to continue to exist among many other universities in Japan. Besides Japanese universities, today, are required to contribute toward the revitalization of their local areas. The university sets up the Takashimadaira Revitalization Committee composed of the residents of the area and the university people with the view to organizing collaboration systems to solve the problems in both sides and then to play back the area. The committee sets forth the following objectives: living together and sharing culture with multi-generations continuously; living together with nature; and creating revitalized urban public space. The committee plans to implement several projects aimed at those objectives.

In this paper I take one of the projects attempting to involve many residents, especially elderly citizens who tend to stay indoors, in recycling activities in which they collect waste plastic caps, design the new products, process them from plastic material, and sell the new goods to the local market. This project steps forward in cooperation with various people, knowledge and technologies, whose resources are abundant with in this area where it is surrounded by more than two thousands small and medium-sized industrial factories. I, as a member of the committee describe how the residents get involved in the project, and participate with various people from the university, industrial factories, and other social groups in innovative dialogs concerning the project. It explores how the design of the project is modified and developed through the people's innovative communications, and consequently how people's broad interests and democratic views are put in the technologies. I argue that there is some possibility of democratizing technology in the place where ordinary people take part in the new type of public dialogs mentioned above.

Preparing for a Rainy Day:
Configuring Climate Science for Future Society

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Norwegian climate research have shown that one should expect climate change like increased temperatures, increased precipitation, increased wind and storm activity and more extreme weather in parts of the country, which in turn could influence the probability of landslide and rock falls (RegClim 2005) - changes that may obviously post serious challenges regarding critical social function and structures in the Norwegian society. This paper addresses the problem of how effects of climate change are being interpreted and

perceived by the relevant audiences. In order to be capable of adapting to future climate changes it will be of crucial importance to know more about communication processes concerning climate change, existing and emerging practices to transform scientific knowledge into action, and how this may be improved. To provide such knowledge is a proper challenge to STS, since one needs particular insights into the social processes of communicating and translating research.

In this paper I explore what kind of measures that may be needed in order to achieve a greater impact of climate research on policymaking and practical decisions in the future. This is done by studying climate adaptation strategies in different strategically important sectors of society. The paper analyse data from climate change management in three important sectors or industries: (1) the physical planning and building sector, (2) the energy industry (excluding oil and gas), and (3) the insurance industry. This is based on an empirical study of four Norwegian urban municipalities: Tromsø, Trondheim, Bergen and Kristiansand, cities with considerable geographical varied diversification.

Micropolitics in Urban Planning?
Exploring the Role of Community-Based Research.

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Community-based research initiatives in urban planning may be considered as an intent to contribute to a democratization of this discipline. In this view, universities are assigned a role of building up relations with civil society organizations in order to approximate the practice of urban planning to the complexities of real life. But how can we understand democratization in this context? As an alternative to the idea of participatory or deliberative democracy, the idea of technical democracy or democratization of technology offered by actor-network theory and critical theory of technology (as has been developed by Andrew Feenberg) may provide an adequate approach to this question.

In this paper, we present a case study of a community-based research initiative at the Technical University of Denmark on urban planning in a Copenhagen district. On the basis of semi-structured interviews with the involved parties and document analysis, we analyze if and how the process contributed to some kind of democratization of urban planning. In this sense, we explore the different scripts present in the process of co-shaping of an urban planning reality in the district.

The analysis of those scripts with respect to their incorporated values enables us to describe the emerging meaning of urban planning and its relation to the above posed question.

The analyzed initiative consisted in a collaboration facilitated by the Science Shop of the Technical University of Denmark between students of civil engineering and a house owner organization of a Copenhagen district. The collaboration comprised two projects done by two groups of students as part of their studies and responded to the wish of the citizen group to contribute to a more participatory and integral urban planning in their district. This wish coincides with steps towards the implementation of local participation in urban planning by

3.4.7: Public Involvement in Urban Affairs

the Copenhagen administration.

With regard to the impacts of the process, incipient material and relational changes are visible as well as learning processes. Nevertheless, we argue that the interest of the process can be better captured by considering its impact on the meaning of urban planning in the district, understood as the configuration of actor-networks involved in it. The community-based research can be thus understood as a form of micropolitics in terms of critical theory of technology. This allows arguing for a role of university as a support for this kind of micropolitics in order to promote democracy in technology.

3.4.8: Visions meet Expectations: Differences, Similarities and Relevance for STS, III

Aligning Past, Present, and Future in Semiconductor Manufacturing

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In the field of semiconductor manufacturing technology, visions and expectations have been closely related for the last 40 years. Moore's Law has been the guiding vision for the industry for nearly as long and it can be argued, that the vision has actually turned into a self fulfilling prophecy driving the rapid innovation cycles in this industry. However, the promises of Moore's Law have to be converted into high volume manufacturing of computer chips by continually enhancing the established production technology and by managing the expectations towards it. In the paper, I will look at the interrelation of visions and expectations connected to the introduction of a novel semiconductor manufacturing technology. Lithography is the method by which the minute structures are 'printed' onto the silicon chips. For the last four decades, the same basic principles have been employed in order to create integrated circuits (ICs): the presently used, so called 'optical lithography'. However, there is increasing concern in the semiconductor industry that it will reach its technological and economic limits in the near future. Therefore, an industry wide quest for identifying the best technology for Next Generation Lithography (NGL) was initiated in the mid 1990s. In a globally coordinated effort, the industry set out to evaluate competing technologies and to consensually single out the one and only option for future semiconductor manufacturing. Since lithography is essentially a system technology, with many complex interrelated elements that need to be mutually adjusted for the technology to work, the task is a rather complex and complicated, first, for technical reasons alone, but also because a sufficient level of support has to be created and maintained within the industry. Understandably, all the actors, including IC manufacturers, system integrators, component and material suppliers as well as university laboratories have high stakes in the development and selection of NGL technologies and are quite precautious not to "bet on the wrong horse". In this process, visions are associated with technological expectations and both are consolidated with respect to the present needs and past experience. I will especially focus on the role of the International Technology Roadmap for Semiconductors (ITRS) as most prominent example for aligning the expectations of the NGL technologies with the demands of Moore's Law. Also, I will compare it to the relevance of other foresight methods in relation to the actual R&D activities of the actors in the field. The paper is based on over 40 interviews with industry experts and a very careful reading of the trade press, which were conducted within the project "Path-Creating Networks: Innovating Next Generation Lithography in Germany and the U.S." (2004-2009).

PROTEE and the Management of Radical Innovation Projects: Learning from a Field Trial of Genetically Modified Trees

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PROTEE is an actor-network theory-informed approach to the real-time management of radical innovation projects. Funded by the European Commission, it was developed by a

consortium of industrial and academic partners, led by Bruno Latour, through experimentation with, and 'lessons' learnt from, the management of innovation projects in the transport sector (Duret et al. 1999; McNally and Woolgar 1999; Laredo 1999). PROTEE was designed to address the following paradox: for most projects, although the proposal looked very promising, the promises made and sustained in the project's reports and evaluations not only failed to be realised, there is nothing in the paperwork that predicts or accounts for this disappointing outcome. According to PROTEE, the reason why most project descriptions are not informative is that they exhibit certain characteristic 'pathologies' for which PROTEE is a 'socio-technical therapy' (McNally and Sondermann 1999). PROTEE's Indicators are designed to diagnose and treat these pathologies, transforming 'sweet' or 'smooth-talking' project descriptions into riskier re-descriptions. Moreover, these re-descriptions are not ends in themselves, but a reflexive resource to inform decisions regarding the management of the project, including when it should be terminated. Furthermore, the PROTEE process and the re-descriptions it produces are designed to maximise learning.

From 2004-2006 we used PROTEE in a collective experiment involving a scientific research Project that included the first field trial of genetically modified (GM) trees in Finland. The premise for the Project was increasing world demand for pulp, paper and timber products, the imminent commercialisation of GM trees, concern over possible harmful effects of such trees on ecosystems and human health, and limited availability of data on such risks. The Project's aims were to identify and evaluate potential risks of GM trees; and to restore popular confidence in biotechnological applications by undertaking research which addressed the environmental risks of GMOs. Through successive PROTEE dialogues the Project significantly re-described itself in ways which broadened from the purely technical to the inclusion of new significant actors, in particular actors from the social realm. It became clear, however, that the field trial itself alienated two key constituencies - the GM trees and the anti-GMO lobby. Eventually, the Project reached a point where it had neither attained certain goals and no more learning was taking place in respect of attaining them, and our collective experiment was ended.

Through our experiment we found that PROTEE: is applicable to projects outside of the transport sector; is a novel approach to upstream public engagement enacted at the level of the individual project; can be used to manage research projects with normative social goals in relation to sustainability. We also learned that funding research projects that promise to serve policy needs is not enough; it remains too risky for most scientists to articulate the reasons why their projects do not deliver - reasons they may have known right from the start. PROTEE itself needs a radical social innovation for its full potential to be realised.

The Role of Expectations and Promises of the Future in the Development of Target-Based Policies: the Case of the UK Air Quality Strategy

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Increasingly, policy-makers rely on visions of future technologies and progress in setting targets for environmental and health protection. This paper uses the theoretical perspective of expectations dynamics to examine the relationship between the policy-making process

3.4.8: Visions meet Expectations: Differences, Similarities and Relevance for STS, III

and the innovation and adoption of new technologies. This relationship was found to be mediated through expectations about technical change and adoption, new policies, and compliance with those in existence. The paper examines the case of UK Air Quality Strategy, which set ambient pollution targets for health protection and solutions for meeting them. In creating it, policy-makers made judgements between competing sets of expectations regarding what was technically, socially and economically feasible. This study focuses on expectations within the policy process made about technical change to improve emissions from road transport, the largest source of pollution (for example, in transport method, fuels, engine technologies, and end-of-pipe technologies).

Starting with challenging targets set in 1997, subsequent revisions of the Air Quality Strategy set pollution reduction targets on what was believed to be feasible without any extra policy measures, and expectations of very limited technical change and adoption. This study asks whether analysis of the dynamics of expectations can provide insights into how and why this situation came about. Through document analysis and interviews with actors in the policy process, it finds that statements of expectation were made by both policy-makers and stakeholders in the policy-making process to encourage others to action and to curtail the success of alternatives, as in the innovation process.

Expectations may be taken up by other actors, but often not in the way intended by their authors; for example, they can be interpreted to be certainties rather than one possible option of many. Differences in the medium of expectations, as well as the speaker and the content are found to be important in the issue of what makes an expectation 'credible'. For example, in the policy process especially, the use of computer-generated models of the future attracted more acceptance as a credible vision of the future than would have been possible with simple statements of expectation. This paper extends the use of dynamics of expectation theory through its application to policy-making, and provides an assessment of the benefits and limitations of doing so.

Prototyping Health Care Users

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In this paper I explore the multiplicity of users and temporalities that are enacted during the development of an interactive health and fitness prototype. Drawing on extensive ethnographic fieldwork conducted within the organizational setting of a multinational semiconductor manufacturer I follow the development of a device the function of which was to give feedback on and encourage the management of daily exercise. Here, I approach the prototype health technology as a prospective assemblage that emerges out of the heterogeneous practices of user-centered designers and associated innovation actors with whom an assorted cast of users, both human and non-human, act to mediate an array of prospective technosocial health contexts, practices and bodies. In doing so I argue that the prototype, as encountered in the field, resists interpretation as, on the one hand, a cogent script of future use or on the other hand an artifact that determines and is determined by a singular course of technological development that configures a singular future. Instead, and drawing on work within STS that deals with ambiguity, ambivalence and vagueness, I will argue that the very multiplicity of technologies, users and temporalities constitutive of the

dynamics of technological innovation, one should trace the development of expectations and how they shape activities, resources and actors.

In the paper we will further develop these three interpretations of the relationship between expectations and (technological) innovation systems. We will also use two empirical studies, one on stationary fuel cells and one on biogas to explore the three propositions and their explanatory power. In doing so, we will specify the role and the relative importance of expectations in innovation and technology development and we relate two strands of literature that have not been confronted so far.

On the basis of these insights, we expect to be able to specify the concept of expectations, to qualify the claims of the technological innovation systems approach and to contribute to a better understanding of innovation processes in general.

Escaping the Iron Cage of Bioenergy? The Sociotechnical Promises and Expectations of "Third Generation" Algal Biofuels

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This paper examines the promises and expectations ushered by the emerging field of microalgal biofuels against a historical context of successive failures to consolidate sustainable bioenergy alternatives.

For over 40 years, industrial societies have tried to reduce their dependence on fossil fuels by developing renewable fuels derived from biomass. During this time biofuel technologies improved significantly; their proponents however, often raised expectations that could not be fulfilled, and encountered a great deal of controversy. The much publicised "food versus fuel" debates for instance, tainted the green credentials of biofuels and eroded their public support. Despite these problems, the promises of energy security, carbon mitigation and rural development helped biofuels acquire a quasi-permanent aura of feasibility and desirability; this perhaps, resulted in unreasonable demands on a technology that threatens to compete for resources (e.g. water, land, fertilisers, biomass) needed to feed an increasing global population.

Against this backdrop, a "third generation" of biofuels derived from microalgae promises to provide renewable energy without compromising food supplies or encroaching on ecologically valuable land. These expectations of sustainability rest on the assumption that microalgae can be grown in vast quantities using photobioreactors or open ponds located in non-arable land, brackish or residual water; thus avoiding many of the problems encountered by "first" and "second" generation biofuels.

3.4.8: Visions meet Expectations: Differences, Similarities and Relevance for STS, III

growth and direction of innovation processes it is at least equally useful to trace and explain the vicissitudes of expectations as it is to postulate and fill in (technological) innovation systems and their properties.

The proposed paper aims at identifying common ground in the STS literature on expectation dynamics and the literature on innovation systems. We want to clarify potential relationships between key concepts in both strands of literature and to sketch the analytical consequences when interpreting this relationship in different ways. We conclude that this endeavor is a useful complement to both realms of research and helps to connect two perspectives that have been somehow isolated before.

realm of forensics and ethnic ancestry testing. This paper explores how MALD bridges these multiple worlds, creating a seamless scientific apparatus across disparate fields.

I examine the consequences of genomicists' conceptualization of human difference in terms of ancestral populations and admixture. My analysis draws on interviews with leading genomicists and an ethnographic study of the laboratories, conferences, and institutional settings in which MALD is produced and circulated. I argue that MALD naturalizes race even as its practitioners espouse anti-racist and anti-essentialist commitments. The very apparatus of admixture mapping presupposes and reinscribes the population categories whose biological reality is putatively in question.

By tracing the apparatus of MALD across clinical, forensic, and consumer domains, I show how the technology stabilizes particular definitions of race and human variation. This has significant implications for how we understand the co-production of scientific knowledge and social categories in the genomic age.

The Uses of Uncertainty: HIV and the Question of Evidence

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This paper addresses the ways in which uncertainty is mobilized in the context of HIV research and treatment. Drawing on long-term ethnographic fieldwork, I examine how clinicians, researchers, and patients negotiate the many uncertainties that characterize contemporary HIV medicine.

3.4.9: Innovation and Expertise

service fields of genetic genealogy and forensic DNA profiling. Here, private companies use MALD to tell clients where their ancestors likely came from or to advise law enforcement on what physical features to look for in a suspect. Using Foucault's concept of apparatus, I show how different domains of knowledge production - medicine, forensics, government, pharmacology, genetic genealogy, and the media - interact to promote the application of particular ideas and practices. I draw from original research interviews with MALD inventors and developers and an array of academic and industrial documentation to construct a historical view of these recent events.

The paper will be structured into six segments. The first segment presents the pre-genomic origins of MALD. Here, I briefly introduce the taxonomical foundations of MALD and its overall theoretical relevance for the field of genetics. The second segment addresses MALD's invention in the late 1980s to early 1990s and its technological development in the late 1990s. Linking the various MALD labs into a network of co-authors and co-producers, I set the stage for further historical analysis of MALD in medicine, forensics, genealogy, and pharmacology. The third segment homes in on medical applications of MALD. Specifically, I look at two main uses and their ramifications for race. I present interview data to show the nuances of racial ideas underpinning MALD research and development in the medical context. The fourth segment takes up MALD's forensic application. I illuminate the dialectical evolution of MALD and forensic genetics (invented the same year), focusing on the context of funding and industrial interests in the US and UK. The fifth segment shifts from a cumulative presentation of knowledge producing domains to a Castellsian "space of flows" analysis of ideas and their legitimization. By following a MALD-based company through its forensic, genealogical, and pharmacological guises, I show how successes in one domain feed back into others. Patent protection and NIH funding are but two examples. Finally, the sixth segment focuses on MALD's interface with the public through the popularization of genetic genealogy. I argue that MALDs inroads into the public sphere are currently creating a tightening of the institutional assemblage of knowledge producing domains. I conclude by discussing the arrival of personal genomics and its significance for MALD and racial knowledge production.

While this research is a heavily grounded history of one specific technology, it stands to tell us much about the structure of scientific co-production in general. The apparatus I detail depicts the emergence of a nexus of careers, successful institutions, and legitimized ideas integral to the evolving relationship between science and society.

From Genetic Risk to Genomic Uncertainties: Creating Healthy Futures through Nutrigenomic Science

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As genetic science is displaced by post-genome sciences, there is a concomitant shift from the idea of a 'genetic disease' to the idea that genomic information plays a part in many diseases. Such genomic information is, however, understood to be only one factor in the development of sickness, for post-genome sciences take a holistic approach to human functioning, understanding disease as a product of interactions between genomic and environmental variables. As such, post-genome sciences break distinctively with any notion

of genetic determinism, and introduce the notion that we can make choices about the environmental variables that affect the functioning of our genomes, and hence take control of our future corporeal well-being.

Taking as a case study the development of the discipline of 'nutrigenomics', the post-genome science which investigates interactions between genes and the nutritional environment, I employ material from scientific articles, interviews with nutrigenomic scientists and publicity matter from companies commercialising nutrigenomics to show how nutrigenomic science is positioned as a resource for contemporary preventative medicine. Here, I argue, the concept of uncertainty is of central importance to post-genomic science. While the concept of genetic risk is associated largely with preparation for probable futures in which disease is present, if not in that particular individual then in actual or potential family members, the concept of uncertainty allows for the creation of possible futures, including futures free from sickness through (for nutrigenomics) utilisation of information revealed by genomic analysis to make prudent decisions on diet and lifestyle to maximise the chances of future good health. The Gene, here, is situated not in the context of the family, but in the context of the cell, and is constituted as one element that contributes to the cellular balance of the individual. The promise of nutrigenomics is that personalised diets, tailored to the individual's unique genomic make-up, will allow the attainment of optimal metabolic functioning.

My analysis employs a synthesis between STS approaches and insights from the governmentality literature to show how the particular formulation that nutrigenomic science is taking speaks to a wider political rationality concerned with empowering individuals to act as entrepreneurs of themselves, maximising their health capital through self-management of their vital capacities, as formulated in UK Government public health policies and enacted in contemporary preventative medical practices in Britain. This approach allows for an examination of the way that science acts synergistically with healthcare policy and practice.

Governing Seed Flows: Intellectual Property and the Problem/Promise of Genetic Leaks

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In this paper I explore the way in which patents on plant genetic resources operate in agricultural environments. I argue that at a fundamental level intellectual property (IP) functions through the regulation of flows and stoppages of intangible or informational resources. It is this regulation that both 'justifies' the patent system and allows it to produce discrete objects of property out of what would otherwise be open and freely exchangeable public resources.

In the application of the patent system to agricultural plant genetic resources, however, important problems arise as a result of the fact that plants and the systems within which people exchange, store, and process their seed, are fundamentally open to genetic mixing and commingling. These are 'leaky' systems in which flows cannot be regulated and contained in the ways that are necessary for the creation of discrete objects of property.

3.4.9: Innovation and Expertise

In this paper I utilise Mary Douglas' work on "Purity and Danger" to explore what this leakiness might reveal about IP in agricultural domains. In particular, I focus on the way in which the possibility of genetic leaks was dealt with in two influential rulings by the Supreme Court of Canada: Harvard College v Canada (2002 SCC 76) and Monsanto Canada Inc. v Schmeiser (2004 SCC 34).

Ultimately, I argue that these leaks undermine some of the key distinctions on which the patent system is based: namely, that between the public and the private, and between intangible and tangible resources. In the final section of the paper I argue that this leakiness produces both important problems and vital promises for people involved in struggles for more equitable and liveable agricultures.

3.4.11: Engaging with Converging Technologies, III: The Practice of Convergence

Fixing the Social:
a Comparison of Two Nanotechnology Laboratory Ethnographies

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In the last decade governments and funding agencies across the world have emphasized to the need to better integrate "soft" and "hard" sciences so as to bring society and the general publics into scientific practice and discourse. This is especially true in the case of new and emerging technosciences, and nanotechnology is often showcased as a primary site for such collaborations. However, although much has been published regarding the normative aspects of such initiatives, little has been said on how they have worked in practice.

Drawing on ethnographic data generated by two social scientists working in two nanotechnology laboratories located in the US and UK over the course of the past three years, this paper analyses one such effort that called for creating spaces for social scientists in the laboratory in the hope that such collaborations would foster dialogue, and would, in turn, produce better informed science. It analyses and compares their experiences by focusing on the institutional context for the two projects and the ways in which these two collaborations worked in practice. Our goal is to not only to provide a critically constructive understanding of the potential of such collaborations, but also to address issues of cross-cultural differences, and to contribute to the development of more reflexive cultures of research in nanotechnology.

This paper contributes to STS literature on studies of scientific practice, and more specifically, laboratory studies. However, our objective is also to engage in a critical discussion of research methods appropriate to the challenges of contemporary policy initiatives that promote the role of social science in the "responsible development of emerging technologies", as well as reflecting on our obligations and responsibilities as STS scholars.

Following 'Flaws' : Notes on Image Artifacts and the Enactment of Visibility Inside a Nano Lab

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An increasing number of visual depictions related to nanotechnology now circulate in mainstream science magazines and on the Internet. These range from stylized images of minute objects taken with sophisticated instruments such as scanning electron microscopes (SEM), to sci-fi computer graphic art portraying futuristic nano robots performing medical functions inside the human body. Falling under a general rubric of 'nano art', the ubiquity of this type of imagery demands attention not only to the images themselves, but also to the question of how an invisible object becomes knowable through its visual construction. In this paper, I will attend to this issue by providing a narrative account of my ethnographic field work inside a UK nanoscience lab. In particular, I will discuss the experience of observing

technicians who characterize and image novel semi-conductor materials using highly complex microscopes. Central to this discussion will be the notion of artifacts, unwanted features or mistakes during the imaging process which take the form of 'junk', 'contamination', and 'noise'. Drawing from key ideas in STS about translation, I discuss the importance of following imaging defects, and how it is both the inclusion and exclusion of these artifacts which make knowledge production and the enactment of visibility possible in this space.

Governing Basic Research? Notes from a Nano Ethnography.

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It is claimed that the emerging field of nanotechnology presents a unique opportunity for social scientists and members of the public to engage 'upstream' in the process of science and technology development. The rationale behind this is to help guide the development of nanotechnology in socially robust and sustainable directions, so as to avoid the type of social and ethical backlash that followed attempts to commercialize genetically modified organisms. In the first instance, this raises questions about how this theoretical ideal of inter- and transdisciplinary interaction can be structured in practice, the extent to which it can be effective in achieving its aims, as well as the validity of the aims themselves. Additionally, however, there are questions about the extent to which these proposed types of interactions, as an approach to governance, apply to basic nanoscience research. While this type of research is not directly oriented towards technology development, its potential to contribute to the generation of new devices should not be discounted. Does this mean that public engagement and broad social questioning and debate should be extended as far upstream as basic nanoscience research? How would this operate in practice? To what extent does this make sense? This presentation will discuss these questions using notes from an ethnographic study currently underway in a nanoscience laboratory. The laboratory at the centre of the study claims that it is doing basic nanoscience research and is focused on developing modeling methodology for the prediction and optimization of novel nano-scaled structures, as well as for gaining new understandings of basic processes of biocatalysis and quantum matter. This presentation will give early impressions from the work underway in this laboratory and raise questions about the practice and purpose of broad-based engagement as a mode of nanotechnology governance.

The Direction of Nanomaterial Innovation

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A feature of both scholarly and policy debate on the governance of nanotechnology is increasing attention to the role of human agency in the unfolding directions of technological futures. This is reflected, for example, in academic interest in how public engagement

3.4.11: Engaging with Converging Technologies, III: The Practice of Convergence

activities can be moved 'upstream' in the innovation process, and with official interest in whether, and how, socially legitimate and environmentally beneficial nanotechnology applications might be actively encouraged - alongside the more traditional regulatory concerns with minimising the adverse physical impacts of nanotechnology innovation.

In this paper we report on pilot research into the nature of innovation systems for one type of nanotechnology, namely nanomaterials, and the scope for its purposeful direction. Based on evolutionary assumptions about technology innovation and use, we first describe and examine the links between two kinds of networks within nanomaterial innovation systems: a bibiliometric-disciplinary mapping of scientific publications, and academic and industrial patents, and a socio-scientific mapping of the flows of knowledge, finance, products and technology, and the main scientific and socio-economic drivers of those flows.

On the basis of that mapping we sketch some of the driving forces underlying the direction of current nanomaterial innovation and we identify potential points of policy intervention within those systems. That empirical analysis is then linked to an assessment of potential regulatory mechanisms and governance strategies available to policy-makers. We describe how recent scholarship on precautionary regulatory appraisal and transition management highlights a suite of potentially useful policy mechanisms by which innovation could be purposefully directed and we describe where such mechanisms might be applied within the current nonmaterial innovation system.

3.4.12: Food, Agriculture and Development

Machines, Practices and Collectivity: the Co-Construction of Agricultural Machinery and Social Groups in Thailand

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A considerable proportion of the agricultural implements used in Thailand today have been developed by local manufacturers since World War II. They manufacture a variety of machines, including two-wheel tractors, pumps, threshers, plows, and combine harvesters. Most of the manufacturers are small and medium-size enterprises, and the machines are designed by mechanics who have been trained as apprentices or have acquired the skills by themselves.

This presentation looks at the co-construction of agricultural machinery and groups of mechanics in Thailand. The argument of the presentation is twofold. First, I will introduce the development of agricultural implements as a form of negotiation between social groups following the well-known SCOT model. Then I will explore how these social groups are formed in Thailand. By focusing on technical practice, I emphasize how sociality among mechanics is generated from the relationships between people and artifacts.

Agricultural machinery in Thailand originates from the importation of implements after World War II. Most of the imported machines, however, were not well-adapted to the local environment, and required modifications and constant repair. Soon after foreign implements had been introduced into Thailand, Chinese mechanics and Thai farmers began learning how to design machines in the process of repairing and remodeling them. The development of the original machines is a result of this mixed process. Repairing, thus, has played a significant role in technical development. On such occasions, mechanics and farmers discuss the causes of mechanical problems and jointly translate farmers' concerns about the problems and their knowledge of the agricultural environment into design improvements.

Technological development through negotiation between social groups is a well-known process described by the SCOT model. However, the social groups are not self-evident in this case. Many repairers in rural areas have learned their skills by themselves. Because there were no significant occupations or social groups as precursors to mechanics in rural Thailand before the 1960s, these mechanics were isolated individuals at the outset. The social relations which bound the group together were formed in the process of technical development.

I analyze the shaping of relations among mechanics by focusing on technical practice and its efficacy. By using the term 'efficacy' I refer to the perceptible changes in artifacts and circumstances brought about by technical actions such as machine assembly or engine repair. The quality of these actions becomes apparent when the machines are put to use in the field. Customers and mechanics use these effects as indexes of a technician's professional competence. In so doing they compare, relate and affirm their technical actions and themselves. Following Barry Barnes' suggestion that what makes practice collective is that we can compare actions as good or bad, I argue that, for technical actions, tangible efficacy is the standard for such comparisons, as well as the occupational and other social classifications based thereon.

3.4.12: Food, Agriculture and Development

An Analysis of Science Citations of US Patents

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Science linkage, which is an average number of science papers cited in patents, has been commonly used as an indicator of how much they depend upon science knowledge, although problems have been pointed out on such usage of science citations by patents (e.g., Meyer, 2000). This study aims at further understanding of science linkage.

For the purpose I constructed an US patent database from USPTO data and analyzed several characteristics of science citations by patents, which have been issued since 1995 till 2005. Patents were categorized into 27 industrial fields by using IPC sub classes, and cited papers were labeled by journal titles. For labeling them, journals listed on JCR (Journal Citation Report) and their predecessors were only used. The journals were grouped into 172 JCR science categories. Due to the limited coverage of JCR journals and other technical problems, 90% of papers cited were attributed to JCR journals.

Preliminary analysis shows: (1) Patents in pharmaceutical, food, chemical, nonferrous metal, IT equipments, precision technology industries are among highly science-citing fields, and (2) in those fields, citing rates, average numbers of science citations, and other indicators have changed wildly and irregularly. For example, the ratio of pharmaceutical patents to cite JCR papers to all pharmaceutical patents was 64.3% in 1995 and those in 1996-2001 were around 24%. Moreover the ratios in 2002 and 2003 jumped to 72.5% and 74.4% respectively, but those in 2004 and 2005 went down to 24% again. Similar fluctuations can be observed in other highly science-citing fields, so the order of fields according to the ratios is fairly stable. It can be hardly assumed that science dependency of fields like pharmaceutical industry has changed year by year, thus less conventional characterization of science linkage may be required.

Reflection on the Postphenomenology of Online News Sources

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"Humans are what they are, on the basis of the ways in which they can manifest themselves in reality and reality is what it is, on the beasis of the way it can be experienced by human beings." (PP. Verbeek)

Google News readers self organize to limit the choicesof he information available to them through a plethora of technology. The online reality limits choices becaause the user chooses to limit his/her reality. This process seems contrary to the reason one might choose to go to an online news site in the first place, to gain information adn to become more aware of world concerns. Google's self-proclaimed "novel approach to news" creates comprehensive, continuous and cumulative news opportunities on the web for the user to browse this powerful brand. This inquiry works toward opening a space for philosophical reflection on the socio-situated multstability of online news, and "new media" object that combines database sstrucutre and virtual space/cyberspace exploration (Manovich).

This paper explores the "pragmatic-existential (human side)" perspective and then the "hermeneutic perspective (reality as it is present to humans)" to larn more about the variability of the online user experience. Activity theory (Kaptelinin and Nardi), constructivism (von Glasserfeld), and post structuralism (Derrida, Barthes) join with postphenomenology (Crease, Ihde, Verbeek)with a focus on teh reflexive multistability of online news sites and the way the "user" is always directed at and present in the online world.

Instructive Media Research:
a Rationale for Attempting to Change the Mass Media

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This paper presents central problems in the theory of science relating to media studies. Media studies is a relatively new discipline, which shares inspirations from several traditions of sociology and humanist thought, ranging from Paul Lazersfeld and the Columbia School to French poststructuralism. The so-called 'medium theory' of the Totonto School, which includes Harold Innes and Marshall McLuhan, has a contested prominence in the discipline. This paper discusses the constitution of research objects and participants in media studies, and particularly relates to the influence of methodological choices. The 'acting with' or interventionist approach is not very prominent in the discipline and I consider this a great pity. At present 'nw media' is at the heart of innovation in the discipline, but mostly as a topic of post-factum studies.

This article recommends experimental research methods in media studies. It presents a research strategy that is meant to push things toward political reform of the mass media, while still being legitimate in methodological terms. The paper starts from the claim that

3.4.13: Postphenomenological Research, II

researchers have an unavoidable influence on the society in which they live. I first discuss the typical channels of influence in media research, and then three research traditions are presented: administrative, critical, and interventionist research. After this context has been established, two incompatible strategies for handling the unavoidable influence of research are presented:that of "ethical neutrality" (Max Weber) and the "construction of good" (John Dewey). As suggested, the paper promotes an 'acting with' or interventionist approach. The final section presents a six point rationale for the improvement of mass media:

1. Follow your intuitions;
2. formulate a ching-orientation and operationlize it;
3. make empirical studies according to the operationalizations;
4. evaluate the change-orientation according to empirical results and reformulate as necessary;
5. give and receive advice about change;
6. establish and run a media outlet.

Environmental Regulation: Acting with Architecture

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As one of the main practicioners and thinkers in the postmodern ecology debate, the architect, Sim van der Ryn, has set up a number of principles to govern future architecture and to help create a sustainable world (van der Ryn, 1996). These principles aim at giving a more definite shape to a new agenda of modern architecture than has increased in force since the 1960's. Using Don Ihde's postphenomenological toolbox, this presentation strives towards describing the implications and metaphysical foundation of van der Ryn's approach to architecture. It is my thesis that Ihde's concept of the "technosphere" can help us better understand the ecological agenda in architecture and to assess its goals. According to van der Ryn's third and fifty principles of ecological design, "Design with Nature" and "Make Nature Visible", architecture should "regenerate rather than deplete" and combat "de-natured environments" (1996) It is my thesis that van der Ryn's vision of a regenerated and natauralised environment in fact amouns to a specific stylized technosphere. While opposing modern technology, it in fact favours postmodern technologies and a harmonious domesticated nature.

Through Ihde's postphenomenological discourse, I will take a step further and study how postmodern technologies, i.e., van der Ryn's actual architecture, tries to regenerate the environment as a way of 'enhancing' certain traits of nature, while 'reducing' others (Ihde, 2006). This approach will finally lead me to critically assess the supposed equilibrium of the human and nature inheerent in van der Ryn's idea of postmodern architecture.

3.4.13: Postphenomenological Research, II

Acting with Neutrons:
a Postphenomenology of the Nuclear Physics Lab

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In this paper I will give a postphenomenological account of my former life as a nuclear physicist. Starting from a naïve realistic description of my PhD-research in neutron physics (e.g. Goeminne et al., 2000), I will try to convey a feel for what it 'is' to be involved in an experimental physics endeavor and give an account of how experimental science 'works'. Following Verbeek's interpretation of postphenomenology (Verbeek, 2007), I will develop a view on how, in experimental physics, both objectivity and subjectivity co-constitute each other in the process that discriminates them. When a revolutionary experiment stabilizes, both subjectivity i.e. the paradigm that governs the experimental praxis, and its accompanying objectivity i.e. the reproducibility of the experiment, are institutionalized. Objectivity is thus not something external, something to be found 'out there'; it is constituted in the genesis of a paradigm and crystallizes out at the point of stability. From then on a new member of this particular paradigmatic science should first adopt this paradigm before he can 'see' its accompanying objects just as I had to adopt the experimental neutron physics paradigm before I could 'see' neutrons and alpha-particles in the nuclear physics lab. Saying that subjectivity is constitutive for objectivity does however not imply a scientific relativism so often inferred in social constructivism discourse. In its one-sided social-contextual approach of scientific practice, social constructivism does not allow for a reciprocal, critical analysis of the social constitutive elements of science ('sociological reductionism'; Latour, 1999). Once the dissociation of subjectivity and objectivity has been (conceptually) established, any effort to thematize the subjective embeddedness of objectivity comes too late. Any a posteriori conceptualization of subjective perspectives or social contexts can only be thought of as a threatening of the objectivity at stake, and gives rise to relativism. In the view I will develop here, objectivity and subjectivity do not have to appear as contradicting each other but are intrinsically coupled in a relation of co-constitution.

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Gendered Embodiment in Postphenomenology

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Visual hermeneutics are, from a postphenomenological perspective, not a subjective reading of external representations, but a lived embodied experience forming perceptions of material

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worlds. The question I shall discuss in this paper is how motile gendered bodies embody experience in the material world of science. Don Ihde has introduced the analytical distinction between 'body one' (the sensuous body) and 'body two" (the cultural body). Embodied perpections of material artefacts are not easily studied empirically. Yet, I shall discuss if and how embodimentmay be generered in a postphenomenological perspective from male and female physicists reflecting on percptions of photographs of scientific artefacts. The empirical material will be discussed in relation to work gathered from physics institutes in five European countries in a project with the acronym, 'UPGEM"-Understanding puzzles in the gendered European map. The empirical material can, when combined, can be argued to support a thesis of gendered embodiment, though not necessarily one of a gendered visual hermeneutics.

3.4.16: Gender Relations and Feminist Approaches

Gendered Organisational Cultures and Networks in Engineering Research: EU-Project PROMETEA

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The issue of the paper is the European Commission Project PROMETEA "Empowering Women Engineers in Industrial and Academic Research" (website: www.prometa.info) (2005-2007). Aim is to give an overview about state of the art, hypotheses, methodology and results of work package four, dealing with effects of gendered organisational cultures on careers in engineering research.

Different research and theoretical fields will be presented for understanding gendered career of women engineers: Gender studies, gender in academia, critical men' studies, studies on feminist technology, organisational studies and studies on gendered career and profession.

The question was in what ways and to what amount social structures and cultures of engineering research organisations are traditionally male oriented dominated by hegemonic masculinity and men's networks. The qualitative methodological design included interviewing women engineers and doing focus discussion groups with men and women engineers separately.

Qualitative data on gendered organisational cultures and networks in academic and industrial settings of engineering and technological research have been gathered through semi-structured interviews with women and focus groups with men and women separately. Focus group discussion was the privileged method to get known the more tacit elements (Godfroy-Genin and Sagebiel 2007; Sagebiel 2005a). For analysis of data for this paper, national reports on basis of the national findings for work package four in each partner country were taken together with summaries of interviews and focus groups.

Results (Sagebiel 2008) focus first on genderedness of organisational cultures, analysed by gendered division of labour, gender stereotypes and gender awareness. Second, networks will be described from the perception of women and men engineers in research. Genderedness of networks are analysed by definition, functions, processes, activities and evaluation and women's integration or exclusion in different engineering research organisations (industrial, academic and governmental). Characterisation and function of men's networks will be presented in the perception of women and men engineers in research. They will be described and analysed in a comparative perspective of different cases (industrial, academic and governmental) as well as different partner countries. By this way norms and values of gendered organisational cultures will be characterized as they influence especially careers of women engineers.

As conclusion a dilemma of women engineers in research between reification and tabooing of gender differences is posted which reduces chances for changing genderedness of organisational cultures in engineering research.

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3.4.16: Gender Relations and Feminist Approaches

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Women in Science, Medicine and Technology in the Transition

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The proposed paper addresses the problem of women's involvement in science and technology and evaluation of gender relations in science from socialism to transition in Armenia.

I would postulate the need to answer following questions relevant to the issue.

▷ How we can demonstrate women's contribution to the science and technology?

▷ How we can fight for gender "glass ceiling"?

▷ How to enlist younger generation in scientific work and researches?

The paper consists of three parts: in the first part I intend to make a short overview on "women liberation" with respect to their involvement in science the in former Soviet Union and particularly in Soviet Armenia. I will also examine the current situation of women scientists from Armenian perspectives. While post-communist transformation processes seem to promise a positive potential of democratization, they also generate new problems for research and especially generate hardships for female researchers.

In the second part I will elucidate the issue of "special professional organizations" in Soviet period created by communist party and for communist propaganda, which weren't professional organizations in the western interpretation, they weren't independent associations created by a group of professionals on voluntary basis.

In the third part I will talk about Role Model of Women scholars in soviet and post-soviet society and refer to case studies of three generation of women scholars. I will present the results of our two projects: "Armenian Women Scholars of the 20th Century: A Biographical Encyclopedia" and "Drafting the Roster of Women Professionals in Armenia". I will speak in more details about the results of series of Round tables "Women in Science and Humanity in Civil Society".

Conclusion:
The research showed that Armenian women have made significant contribution into the scientific and technological development. Figures clearly affirm high professional activity of women, meanwhile women made only 17,2% from total number of doctors of sciences working in the Academy, only 5,8 % women constituted the proportion of Members of Academy. By this once more can be confirmed the existence of gender "glass ceiling" of professional promotion that is not easy to overcome for women.

Scientific Heroes for the Twentieth-Century:
the Modest Witness and the Spectre of Feminism

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Shapin and Schaffer's (1985) figure of the modest witness has been an important and sometimes controversial (Haraway 1996) reference point for social studies of scientific research and of human actors within science. The castings of this figure animate both academic and popular accounts of scientific research and of the lives of scientists. Unravelling the myths circulating around and through this figure is a formidable challenge for critical science studies research.

This presentation will analyse specific stories of achievement in the bio-sciences and of scientific heroism in a set of popular texts that were widely circulated in the late twentieth century: James Watson, The Double Helix (1968), Ann Sayre, Rosalind Franklin & DNA (1975), June Goodfield, An Imagined World: a story of scientific discovery (1981), and Evelyn Fox Keller, A Feeling for the Organism: the life and work of Barbara McClintock (1983). This critical review will sketch some features of the recast, twentieth-century modest witness and show how this figure was conjured in relation to the haunting figure of the feminist. I will trace how 'modesty' becomes a transformable and problematic trope in the gender politics of late twentieth-century biosciences and scientific biography. Finally, I will briefly explore two very different forms of revisionist accounts, dealing with the scientific actors celebrated in these texts: in some science studies research (e.g. Latour and Woolgar 1986; Latour 1987) and in more recent biographies of these figures (Comfort 2001 and Maddox 2002).

My general concern in this presentation is with the stories that have been told about acting in and with science - in both popular and in academic texts. The core empirical project is a detailed case-study of a cluster of popular accounts of scientific research. Through this, the presentation will elaborate and extend critical feminist perspectives on the modest witness as a figure and heuristic tool in science studies (begun by Haraway (1996)). By showing how feminism haunts these celebrated stories of scientific achievement, I will explore aspects of the gender politics of the twentieth-century biosciences. Moreover, through this case-study I hope also to problematise some lacunae in recent science studies: the relative neglect of both feminist scholarship and popular biographies of scientists.

Serbian Women in Science and Technology

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The sitation in Serbia is charachterized by the chronic lack of sex disaggregated statistics in general and in research sector in particular, that would provide systematic evidence of gender imbalances for which policy intervention might be necessary. Therefore, our team has undertaken a tremendous job of collecting and disaggregating statistical data in Serbian research sector, especially in its engineering subset. Apart from the acquisition of data and

their qualitative analysis, we have also performed a qualitative analysis of the main factors shaping the proportion of female members of the Serbian scientific body. We have identified seven major cultural and socio-political factor that influence the female researchers in general and in engineering area in particular, and even dared to suggest some measures that could improve the current state-of-the-art.

The meltdown of female research body from 46.4% among junior positions to the 28.44% among the highhest posts, clearly shows the existance of the glass ceiling, that has its roots partially in natural causes of female career disruptions (pregnancy, maternity leaves, etc.) and partially in the mentality of Balkan men, where it is assumed that all the household activities are women's duties, and that they should sacrifice they careers for the sake of their families, since the highest ranked positions both in industry and academia are meant for men, anyway. In this paper we have tried to give an insight into the most frequent obstacles for female reserachers in engineering area in Serbia, based on the interviews, polls, and other types od reserach undertaken as a part of Prometea project, and make a comparative analysis of the situation of Serbian female engineers and their counterparts in the EU countries. It is interesting to note that many of the industrially developed EU15 countries are comparatively underdeveloped as far as the inclusion of women into the engineering subjects is concerned, while the developing or transition economy countries, like Serbia, are doing considerably better at least regarding the overall gender proportion. As for the proportion of those who get to the highest position, the situation is unfortuantely far less favorable.

Women's and gender issues remain mostly at the bottom of policy agendas in Serbia, because it is widely accepted that there are more urgent matters to deal with (Kosovo, Hague, poor economic situation, accession to EU, corruption, etc.). However, a quick and therefore rather superficial analysis reveals, that proactive measures are necessary to improve current gender balance, to promote women as actors and protagonists in both policy development and implementation. Obviously, this is particularly needed in the male dominated area of engineering. Therefore, we have tried to suggest several rather specific initiatives to strengthen women's capacity to participate in research in engineering field in a meaningful fashion, to improve the capacity of both academia and industrial sector to deal with gender differences and to reduce gender inequalities.

Can the Internet Bridge Social Inequality?

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The ability of science and technology to reduce inequalities is a traditional claim from its practitioners and policy makers. In the ICT field, some efforts have been made to bridge the digital divide. Computers connected to the internet were located in schools, museums, community centres and free or low cost internet cafes in order to ensure at least a partial universality of access to the internet. In Portugal, a recent political measure devised a way to give free laptops and 3G internet connections to underprivileged pupils enrolled in secondary education as well as adults enrolled in educational and occupational training programs.

Is this an effective way to reduce inequality concerning access to technology? Is access to this technology the only problem waiting for resolution? What exactly is done with the

3.4.16: Gender Relations and Feminist Approaches

technology people have access to? What do internet users do with the internet?

This paper, based on an ongoing post-doctoral research project, tries to answer these questions, focusing chiefly on the identification of different profiles of internet users. These profiles are identified through different sets of activities that users perform with the internet. The number and diversity of activities performed, as well as the type, exclusiveness and intensity of internet use have a close association with age, educational, occupational and income levels, as well as the location, frequency and motivations for internet use. Through this work, a deeper understanding of the diverse uses of the internet done by sociologically significant sets of users (as well as its potential for social empowerment) is achieved.

3.4.17: How Can the Environment be Made Governable? What is the Role of Scientific, Economic and Political Tools and Evidence? Experimentation, Translation, Representation and (In)Decision.

Does Truth Flow like Water? : The Role of Social Networks in the Flow of Scientific Knowledge in an Environmental Governance Dispute.

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Located in the arid southwestern United States, Arizona's communities face unique challenges in securing water for their rapidly growing populations. Five of the fastest growing areas in Arizona are under state mandate to reduce and eventually end their reliance on groundwater (aquifer) withdrawals. The Prescott area, which has high population growth, is one such region. Several actors in the region favor a proposed pipeline to supplement local water supplies. Dubbed the Big Chino Water Project, the pipeline would pump groundwater from a basin not under state groundwater regulation. Numerous civil society groups and downstream actors, including a major water supplier for the Phoenix metropolitan area, oppose the project based on feared environmental impacts and an expectation that upstream groundwater pumping will reduce surface flows downstream on the Verde River. Arguments based largely on differing visions for the future are played out in scientific terms. This protracted political debate in scientific clothing derailed an attempted political collaboration, and will likely be settled through lawsuits to adjudicate scientific claims.

Actors in this environmental governance dispute use multiple tactics; science, politics, and economics are all strongly intertwined, although science is often the language of choice. We use social network analysis, surveys, and interview data to disentangle these multiple forms of truth claims. By combining these various methods, we are able to investigate how scientific information flows through social networks, and thereby better understand the roles of different forms of knowledge and values in this environmental governance dispute. The long-term ability of the local communities to supply water to meet competing needs will depend on the nature of surface-water/groundwater interactions, climate variability, interstate politics, and other factors. In determining short-term policy and water access, however, the flow of knowledge through local networks of power will likely have a greater impact.

Governing the Road Environment through Climate Knowledge?

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Actor-network theory could help us think about how the use of climate knowledge can move upwards and sideward from local authorities, local knowledge and expertise. An analytical focus on translations means to look at the construction, or lack of the construction, of actor-networks. This may enable us to discuss how centres of actor-networks are (to be) equipped in order to be able to strategically enrol objects and actors that they need to appropriate climate change knowledge in the decision making processes

3.4.17: How Can the Environment be Made Governable? What is the Role of Scientific, Economic and Political Tools and Evidence? Experimentation, Translation, Representation and (In)Decision.

In this paper we will investigate how important groups of actors linked to the Norwegian road system translate climate knowledge in order to prepare the road infrastructure for future consequences related to climate change. A main assumption is that the understanding of climate changes among the main stakeholders of the road system is mediated through the occurrence of extreme weather rather than through information from climate research and related scientific knowledge. The paper explores the consequences of such mediation. The paper further investigates attempts to governing the environment in the road sector through the construction of political tools, i.e. systems of emergency and national transport plans.

Accounting for Carbon

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Cap-and-trade programmes have become central elements in the limiting of greenhouse gas (GHG) emissions, most notably the European Union Emissions Trading Scheme (EUETS). Facilities emitting GHG are allocated allowances and if they emit more then they must buy additional credits and if they emit less they can sell these unused allowances. Progressively the total allocation of credits is reduced to reduce total GHG emissions. The policy implication is that a market for greenhouse gas emissions is created, but one organisational implication is that the emissions of every facility falling within the scheme must be monitored.

The verification of emissions within the EUTS draws heavily on experience with existing management systems: facilities maintain procedures to monitor emissions; they then annually declare their emissions, with their declaration audited by an accredited external assessor. For the EUETS to meet its policy objectives, it is not only necessary that there is a system providing verifiable accounts of emissions across thousands of facilities, but also that the imposition of the trading scheme influences operational decisions.

This paper describes two ethnographic case studies carried out as part of an exploratory project to investigate the organisational implications of emissions trading. The two studies were undertaken from a social shaping of technology perspective, seeking to investigate the interplay between the various actors involved in the implementation of emissions monitoring and verification, including technical, accounting and operations specialists in the organisations and external actors in regulatory and verification bodies. The case study organisations are a manufacturing facility and a hospital.

In each case there was little evidence that EUETS was influencing operational practices. It was found that the procedures for monitoring emissions were framed from three distinct perspectives. First, it was viewed as a management system imposed on the organisation, with requirements for recording and traceability, drawing on each organisation's experience with quality assurance systems. Second, it was viewed as being a technical issue, impacting on the installation and calibration of meters on processes. Third, it was seen as an accounting issue, providing management with operational data on process emissions. The relative importance of these views within the social networks studied influenced not only the systems that emerged, but also the locus of responsibility for emissions monitoring and how central it was to operational decisions.

3.4.17: How Can the Environment be Made Governable? What is the Role of Scientific, Economic and Political Tools and Evidence? Experimentation, Translation, Representation and (In)Decision.

It was found in both cases that the stringency of reporting requirements and the low price of allowances led the locus of responsibility to be located in the engineering functions. The precise monitoring of emissions to meet the requirements of EUETS also existed in parallel with management accounting systems monitoring energy costs, with less precision than required for emissions monitoring but more closely linked to operational decision making.

Meyer & Rowan identified the decoupling effects of externally imposed systems of audit : interpreting emissions monitoring as a technical issue and as a requirement imposed on the organisation to meet regulatory requirements led to a decoupling between the EUETS and operational practices of the organisation.

Can Carbon be Made Governable?
Product Labeling between Politization and Economization.

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This paper will investigate one of the way in which "carbon" has become an "issue" (Marres & Latour), and investigate the constitution of a "collective", or association, which raises both politization and economization problems.

The recent "Grenelle de l'environnement" and some French initiatives (like the company Casino after Tesco in the UK) exemplify the increasing political, scientifically and economical involvement in carbon product labeling. Labeling products seems indeed to be the fashion, but carbon labeling is perceived as one of the most significant of all, in that it's aimed at transforming producer's practices and preparing consumers-citizens for lifestyle changes that are thought to be required.

Behind consensual discourses, what about the agencements which correspond to this (or these) specific "issues"? How can we manage to identify the different trajectories through which this agencement is "politi-sized", "economi-sized" and "scientifi-sized"? This case appears particularly interesting because carbon product labeling entangles measures and metrologies, standardization of labels, environmental and business agencies, political authorities, firms, products, consumer-citizen's way of life, climate change, stock exchange, and so on.

The carbon product labeling is then a relevant focus to examine the "X-ization" processes (Callon) of a controversial agencement, implying heterogeneous tools and concerns which give different sizes to the "issue". As a result, we would like to question such innovations as attempts at making the environment governable, and in the same time to interrogate how they perform and frame the notion of environmental "governance". To do so, it seems necessary to raise this question: to what extend do such devices - and the surrounding agencements - contribute to shape "environmental governance", and to what extend do they also close - or abort - the politics of environment?

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The Experts' Role in Choosing Future Landscapes for Climate Change Adaptation in the Dutch Meuse

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Setting priorities for land use planning is partly a battle fought at national policy level. Whatever the outcomes of a national debate, the complexities of multiple land use demands need to be solved in specific projects where real interests are at stake. The project Integrated Assessment Meuse set out to find a politically acceptable proposal for a package of flood measures which was supported by local and regional actors. The role of landscape experts and expertise in the negotiations was particularly interesting. While the rigid, quantitative flood management objective imposed by the national administration could be tested with a hydraulic model, the project participants agreed that the choice of measures should fulfil the objective to increase landscape quality in the future. The implementation of this objective required the expertise of landscape experts, who were brought in to develop a detailed description of landscape quality in the Meuse valley that would be suitable for this participatory selection process.

The concept of landscape quality has now been used in The Netherlands for some 10 years, allowing consensus on its application to develop amongst landscape experts. The general description now includes, at least in the rhetoric, both reductionist and holistic elements. This is a compromise between the purely reductionist or holistic alternatives that were proposed initially. In the description, landscape quality takes the multiple land use objectives laid down in local, regional and national policies into account, but it also appeals to esthetical imagination to sketch an ideal picture of the landscape. Both aspects need the application of judgement. Landscape quality can therefore act as a boundary object in spatial planning: because it is open for negotiation, it has potential to include local and regional priorities and preferences; because the definition includes multi-interpretable images, there is great potential for visionary workshops to develop common views. However, in this project the landscape quality assessment framework was defined mostly by landscape experts, using their own preferences and persuasive texts and images formulated in professional jargon and thereby fencing off their expertise from questioning by others. In spite of this, nor the expert-driven method or the results were contested by the participants because in this particular setting it did not limit the choice of flood management measures.

3.4.18: The Commodification of Academic Research

Contradictions and Disconvergence:
the Entrepreneurial Turn of the Research Unit for
Multilingual Language Technology

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The growing role of universities in the knowledge economy as well as technology transfer has increasingly been conceptualized in terms of the hybridization of public academic work and private business activity, one important aspect of which is the commodification of university research. What the diverse conceptualizations of this development have in common is the viewpoint that closer interaction between universities and industry has led them to become institutionally isomorphic with respect to one another (e.g., Gibbons et al. 1994; Etzkowitz et al. 2000; Kleinman and Vallas 2001, 2006). Moreover, it has been claimed that the aforementioned convergence tends to be asymmetric in the sense that "although the codes and practices circulate in both directions, industry ultimately appears to have an upper hand in this process" (Kleinman and Vallas 2001). Indeed, the commodification of university research requires measures that seem problematical from the perspective of the norms and practices of public academic research. A less studied problem is whether the commodification of public academic research really works in the way it is supposed to do from the commercial point of view.

I will study the difficulties and prospects of this kind of hybridization both from the perspective of the public academic research and private business activity by tracing a long-term trajectory of a research group and a couple of spin-off firms it gave rise to. The research group in question operated in the field of language technology at a traditional and comprehensive European university, the University of Helsinki, in Finland.

While much of the discussion on hybridization has taken place on a rather general level, my focus is on studying the challenges actors at the grass-roots level of the university department or spin-off firms encountered in their attempt to simultaneously engage in both activities. This attempt proved successful neither from the academic nor from the commercial point of view. The actors involved found it contradictory to the extent that each of them finally chose either the academia or the business. I will discuss the reasons for this failure of convergence and also argue why it seems questionable to expect academic spin-off firms to be outright commercial successes (as the present literature and science policies seem to assume).

My data covers documents over a time-span of nearly twenty years, including research proposals and reports, publications and external evaluations, financial statements and annual reports of the spin-off companies and 24 interviews conducted during the years 2000-04. The interviews were conducted with the research group members and the employees of the spin-off companies. My analysis is also informed by the field notes that I made during informal discussions with the actors involved.

3.4.18: The Commodification of Academic Research

Knowledge Transfer from Academia to Industry through Patenting and Licensing: Encouragement of Innovation or a Symptom of a Blind Pro-Patents Culture?

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In this paper, I address an aspect of the question of the actual vs. desirable socio-political organisation of academic science in modern societies - the patenting and licensing activities of universities.

Since the 1980s in the US and the 1990s in Europe, academic patenting and licensing activities have significantly increased. These activities are heavily encouraged by governments throughout the Western world and many regard them as vital to achieve commercial development of academic knowledge, via so-called 'knowledge transfer' from the academia to industry.

In view of the fact that this trend is having far-reaching consequences for the dissemination of and access to academic knowledge and the fruits resulting from it, the question arises whether the current 'push' towards academic patenting and licensing is indeed achieving the desired goals or whether it is rather a symptom of a pro-patent culture which is blind to actual and potential adverse effects.

Addressing these issues requires both an empirical analysis (how 'real' is the supposed link between academic patenting and transfer to industry?) and a normative assessment (which ethos underlies the abovementioned trend and to what extent does this ethos prevent its proponents from taking into account its paradoxical consequences?).

The paper will first review the massive rise of academic patenting and licensing. In particular, it will discuss the increasing number of so-called upstream patents and the high proportion of exclusive licenses granted under university patents. Furthermore, it will address the question of why policy-makers seem to ignore these problematic aspects of academic patenting and licensing. The paper closes with some comments on potential solutions.

A Deflated Mertonian Critique of Academic Patenting

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Since the 1980s the commercialization of academic science has strongly increased. To be sure, science at large has always included research primarily carried out for its economic benefit, especially since the second half of the nineteenth century. Yet, the large-scale commercialization of academic science is a more recent phenomenon. In the course of the past decade, this phenomenon has been explored and a variety of studies have become available. Assessments of the rise of entrepreneurial academia differ sharply. On the one hand, it is welcomed and sometimes even seen as a necessary step in the history of

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academic institutions (e.g., Gibbons et al. 1994; Etzkowitz 2004). On the other hand, the problematic consequences of commercialized academic science are also widely discussed and increasingly acknowledged (Shulman 1999; Bok 2003; Krimsky 2003; Healy 2006; Resnik 2007).

In response to these problems, universities, research institutes and science policy organizations have composed a variety of normative codes of good scientific conduct (Kourany 2007). Almost invariably, these codes are based on, or derived from, the social ethos of science formulated by Robert K. Merton in 1942. The aim of this paper is to find out to what extent a Mertonian ethos can still be useful in the present context of a strongly commercialized science. The discussion will be focused on the issue of the patenting of the results of academic research. Terminologically, I use 'university' to mean a wholly or largely publicly funded institution of higher education. 'Academic science' includes teaching and research at universities but also research and scholarship in independent, publicly funded institutions.

The plan of the paper is as follows. First, I briefly review Merton's account of the ethos of science. The next section deals with some STS criticisms of this account and it suggests a reinterpretation in terms of general Mertonian values and more specific scientific norms. I then discuss the important issue of the patenting of the results of academic science and I demonstrate the significance of 'deflated' Mertonian values and norms for this issue. My conclusion is that the recent practices of public universities stand unjustified. The final section addresses some questions regarding the scope and implications of this Mertonian critique of commercialized science.

A Life of its Own:
the Informational Gene Concept and Intellectual Property Rights

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In the age of the "entrepreneurial university" (Etzkowitz, 2003) and "technoscience" (Nordmann, 2006), academic scientists are increasingly under pressure to capitalize on their research findings. As a consequence, the theory and practice of intellectual property rights has come to play an important role in the day-to-day activities of life scientists, whether it be discussions with technology transfer liaison officers regarding the patentability of research results, license negotiations with patent holders for the use of patented research tools or decisions concerning the sharing of laboratory cultures with colleagues in light of pending patent applications.

STS acknowledges the importance of patenting in coming to grips with science (see Kleinman, 1998, and Myers, 1995, for two different approaches), but in this paper I will argue that philosophy of science too has an important contribution to make in this regard. The documents underlying (European) patent law make numerous references to such concepts as invention, discovery, naturalness, artificialness, gene and function. What exactly it is that is meant by these concepts is not always clear and the explanations that have been provided have been questioned from various perspectives. In the philosophy of science, however, these concepts have been at the centre of much study and debate, which makes this

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discipline a natural starting place for an investigation into the conceptual dimensions of patenting practices in the life sciences.

To demonstrate the potential of philosophy of science to illuminate the theory and practice of patenting, the paper will analyse the use of the information concept in describing genes in the context of patenting. According genes with informational content is rampant in the life sciences, yet at the same time controversial from the perspective of philosophy of biology (Griffiths, 2001; Maynard-Smith, 2000). In the context of patenting, however, the principally metaphorical use of the information concept acquires a life of its own and takes on new significance with potentially far-reaching consequences, as will be discussed in the paper.

Knowledge as a Public Good: from Robert Merton to 'Open Source'

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A crucial assumption in Robert Merton's sociology of science as well as in some neoclassical approaches to the economics of science is that knowledge constitutes a public good characterized by 'non-excludability' and 'non-rivalry'. It is against this background that Merton's norm of 'communism' makes sense and that generous government expenditure on fundamental research can be justified on economic grounds. The public-good nature of knowledge would not as such militate against the patenting of scientific findings. However, patents have a restrictive effect on the use of findings, which may become stifling when research outcomes are to be used as inputs for further research. Thus science as a cumulative and expanding commons flourishes best if unhindered by any intellectual property restrictions.

The above view has come under attack from STS scholars like Steve Fuller, Philip Mirowski, and Michel Callon. A common point of criticism is that the representation of knowledge as a public good exaggerates the accessibility of such knowledge and ignores the investments that have to be made in local settings to access and be able to process this knowledge. The concept of 'public good' has also been taken up and amended in some UN-sponsored projects on Global Public Goods. Acceptance of the allegedly non-public nature of knowledge may have consequences for the position to be taken towards the contemporary extension of intellectual property rights into 'upstream' areas that were once held to be beyond their reach. Several STS scholars have analyzed controversies about patenting in software development and in the life sciences that occurred as a result of this expansive trend, but only a few have been actively involved.

In this paper I want to assess the STS criticisms that have been made of the public-good character of knowledge and the conceptual refinements proposed by the UN-sponsored projects. I will judge the arguments on their logical merits, but also confront them with the issues that have come to the fore in controversies on patenting and in attempts to create forms of 'commons-based peer production' (Yochai Benkler) such as the Free and Open Source Software movement and 'open-source' initiatives in agricultural biotechnology (CAMBIA) and in synthetic biology (BioBricks Foundation). I will finally reflect on the actual and possible roles of STS analysts in such controversies and initiatives.

3.4.19: Mere Innovation: Postcolonial and Other Ruminations on Invention and Imitation

Sameness, Difference and Authorship:
Revisiting Bruno Latour's "Secondary Mechanism"

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Juá is a typical plant used for mouth hygiene in the Brazilian Northeast. Knowledge about the cleaning properties of Juá is embedded in popular knowledge very likely inherited from previous native inhabitants of the region, and now circulates on the internet. Juá powder is sold in small bags in popular markets. The peel of the Juá trunk is used for cleaning (brushing) the teeth. Small local companies use Juá as an ingredient to obtain products which perform, or so they claim, the same salubrious processes as those that Juá enacts in its natural state. These companies, however, announce their products with no claim of authorship over the knowledge that legitimates the use of their products. Much like earlier facts of modern sciences, popular knowledge circulates in the absence of authorship and legal limits to its use.

In the case of our study, Unilever posed a difference. Its product - the toothpaste Gessy Cristal - announces the cleaning properties of Juá as scientific facts proved in its laboratories, and professional scientists typically assume the role of the spokesmen of Juá. Knowledge about Juá, now different, named Ziziphus joazeiro Mart, is expressed in scientific articles, classified, and mapped. It ceases to belong to all and starts to come under the authority of entities (persons or institutions) who claim control and property over Juá and its "active molecules". Claims to property are enacted through the (so called secondary) mechanisms of reconnaissance and attribution of merit, which acquire obduracy in the materiality of article citation indexes, granting of patents, copyrights, etc. Authority thus constituted over the destiny of knowledge includes the right to decide what is a copy and what can be regarded as legitimate original inventions. Ziziphus joazeiro Mart, different from Juá, becomes an ingredient of products that may acquire certified quality, protection against "piracy" and even return, in a "higher level of reliability," to the population that knew it before it became different.

We wish to discuss what we think that nowadays is more properly described as acts of force rather than acts of reason in the attribution of merits and responsibilities in the construction of scientific facts. We consider authorship as (a network of heterogeneous) devices that frame knowledge to constitute authority and obedience. We invoke not only the relevance of the difference between the two processes, "to produce" and "to ensure authority" over differences, touched upon in Latour's Science in Action, but also the need for different and more inclusive translations of Latour's "secondary mechanism of attribution of responsibility.

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Political Representation in Practice:
Sameness and Difference in the Hungarian Parliament

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Politics, and related concepts such as citizenship, democracy and publics have gradually become central themes in STS research. By concentrating on specific sites and material practices of ordering, many science studies authors have challenged the universalist, humanist, discourse-centric assumptions of political theory. In one way or another, they have convincingly shown that politics is done as much in farms, labs, hospitals, car factories, or backyards as in symbolic political institutions. But how do these diverse sites and practices relate to conventional forms and technologies of political representation? This paper aims to contribute to ongoing discussions about materiality and politics by casting the STS gaze on the Hungarian Parliament. First, I will focus on the concept of 'sameness' and examine how a more-or-less standard European version of democratic politics is achieved in the parliamentary building - a hundred-year-old socio-technical assemblage inspired in part by the Palace of Westminster. More specifically, I will explore the ways in which multiple political systems like the Hungarian Kingdom, Imperial Britain or the European Union are materialised/made present in the same physical space. Second, based on my observations of the daily activities of a Member of the Hungarian Parliament, I intend to show that political representation is a rather dispersed practice, which often takes place outside the actual walls of the Houses of Parliament. I will discuss how the difference between parliamentary and non-parliamentary forms of politics is maintained as Mr P. and I move across TV studios, ministries, special committee meetings, party headquarters, and other locations.

Striking Likenesses to Difference

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A central problem for science and technology researchers interested in a critical scholarship of invention is to explicate the practices through which relevant actors identify technologies not 'merely' as imitations (however ingeniously) of previous artifacts, but as recognizably original. At the same time, postcolonial STS has shown that far from a universal value, the question of origins in the context of technoscientific production is a specifically situated and local preoccupation, identifying of actors invested in very particular forms of contemporary capitalist enterprise. For the latter, moreover, establishing the novelty of artifacts is not simply a task of classification, but rather a requirement of organizational and personal identification. Successful claims for the inventiveness of objects and persons are mutually constitutive as is, conversely, their failure.

This paper explores the possibilities for a 'mereing' of innovation by drawing from an archive of memories and documentary materials assembled during the author's tenure as a resident anthropologist at a technology research and development organization pseudonymed as Acme BlackBox Research Center (ABBRC) (see Newman 1998). The aim of the exercise is

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to see what insights we might gain by shifting questions of invention, creativity and the new from their status as unexamined 'goods', to constitutive moments in the reproduction of very specific and local modes of identification and action, in relation to familiar imaginaries of possibility and desirability. Within the micropolitics of invention it becomes evident that originals and copies are not different in kind so much as in location, and that just as translation invariably produces difference, invention requires imitation or likenesses to familiar forms.

At ABBRC the preoccupation with innovation included recurring, and always urgent, calls to 'reinvent research' - its methods and subjects - as well as its objects. Initiatives positioned as responsive to this agenda involved variously shifting the sign of innovation from its attachment to an original/idea/object, to its association with the labours of creative replication/realization/production. These labours involved, nonetheless, the repeated citation of the original/idea, as that which was being realized in situ. I conclude with reflections on the figure of ABBRC itself as a machine for innovation.

Orkney: Landscapes of Future Resistance

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Anyone Anywhere Anytime; Ubiquitous; Always On: this is how the future of information and telecommunications access is often discussed within high-tech industry. It is a story of technological progress marked out and measured by quantifiable increases in bandwidth, software versions, processor speeds, and revenue. It is a future where 'everybody in the world will have a mobile phone'. It is a future where landscapes are colonised by mobile phone antennae, optical fibre cables, satellite dishes, electricity pylons, and air-conditioned rooms filled with telecoms switching equipment; a profit making colonisation of people and place with the assumed moral authority of technological development. Yet the places where the high-tech industry imagines and makes this future, in its everyday practice, are not everywhere. Influential sites of future-making are located in certain places and not others: in Silicon Valley, in historic proximity to the defense industry, and within easy reach of global transport hubs such as London Heathrow. The future is situated, both in epistemology and geography. Future making is inseparable from the landscapes of its production. For example: ubiquitous telecommunications access is imagined in places with the densest proliferation of telecom networks, where mobile phone signal is already everywhere, where the landscape does not resist such infrastructure - has long been colonised by cell sites and optical fibre. Here, a future of pervasive telecommunications is merely a copy of what is, multiplied and replicated in other landscapes.

But what happens when landscapes kick back? How might the topography and temporality of the landscape resist a future copied from elsewhere? Drawing on Karen Barad's approach to intra-action, how could landscapes as sociomaterial phenomena intra-act with the futures imagined and made there? How does this engage with current debates in STS concerning the ontic effect of materials and place? Set in contrast to the mobile telecoms industry around London, this will be an ethnographic account of the landscapes of high-tech industry on Orkney, an island archipelago off the north coast of Scotland. This is a place with one of the world's densest proliferations of enduring technology: not the scaffold of radio antennae,

but the sandstone monoliths of Neolithic stone circles, chambered tombs, and standing stones. Here, the everyday practices of those working in the renewable energy industry, in web design, in virtual modeling, are made through, and with, a very particular place; a place whose island hills and seas resist wireless transmission and the mere replication of an Anyone Anywhere Anytime future.

The 'Right to Imitate' :
Generic Drugs and the Chemo-Politics of Similarity

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From Mexico's ubiquitous pharmacy chain Farmacias Similares to the rise of "biosimilar" drugs in Europe, the notion of the similar has recently, and perhaps counter intuitively, come to stand as a powerful mark of distinction in pharmaceutical marketing, research, and development. Drawing on research in Mexico, Argentina, and on recent histories of drug marketing and branding in the US and Europe, this paper seeks to highlight some of the historical, technical, and political specificities of "similarity" as a term that animates the domain of the pharmaceutical. In part, we must think about the recent resurgence of similars - a term that first came into use in mid-century US pharma regulation - in relation to the expansion of globalized intellectual property regimes in the mid 1990s. Since then, global pharmaceutical politics have come to revolve in large measure around struggles over developing countries' continued ability to produce and consume copied drugs. These struggles have, in many countries (including Mexico and Argentina) generated extraordinary contest over what shall count as "adequate" forms of same-ness, equivalence, and similarity, as well as corresponding notions of difference and distinctiveness. Attending to these highly charged ontological, semiotic, and regulatory battles over what shall count as a proper copy brings the similar into view as a site of postcolonial politics and contested sovereignties, in which "the same but different" resonates as a claim at multiple scales of political and material life. Yet such complex iterations of sameness, similarity, and difference are not solely the product of north-south struggles over drug access; they are, as the renewed attention to chemistry in STS has shown, central to the philosophy and rhetoric of chemistry itself, and to drug discovery and testing in particular. This paper thus looks to pharmaceuticals to think simultaneously about chemically-configured notions of similarity and difference, and their implication in politics "at large.

Diversity in Science, Culture, and Media - How Grassroots Communities Present New Possibilities for Design

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This paper will interrogate deterministic notions around technology design to present emergent possibilities for 'located accountability'. A set of case studies that interrogate

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balkanized notions of technology productions are presented in the context of field-based technocultural studies that span nomads in the Kyrgyz republic, the Zuni nation of New Mexico, and the South Asian diaspora of the Los Angeles region. These studies build on ethnographic data, participatory design strategies, and social network theory to make the argument that appropriation, re-use, and re-contextualization can emerge through databases, creative/indigenized tagging, which hold potential for a different type of 'information society'. In that regard, they speak to knowledge production that is pluralized, and not just black-boxed; enabling multiple ontologies that represent diverse cultural realities to become the bases by which digital systems are designed and deployed. This creates possibilities for diverse groups to create their own imitations of dominant discursive technologies. It is the imitation that enables local resistances, sovereignties, and 'contact zones' to occur, it is argued.

3.4.20: Tensions in Standardization, IV: Tensions between Companies and Standards

Reconciling Tensions in Standardization: a Review of Objectives, Approaches, Realities

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How does one manage a forum for standardization that, in theory, is designed to direct separate and independent interests toward a consensus and in reality allows, even encourages, diverse viewpoints to be shared along the way? How does one move from the concept of a robust process that enables approved documents to continue to evolve in order to reflect recent technology or market trends, yet avoids disrupting industry and business?

This paper will provide information about one such process for the development of consensus standards that are used worldwide. Empirical evidence which demonstrates the diversity of interests and the magnitude of debate that leads to a consensual position will be provided. Details of the underpinning philosophy, a summary of the diversity of participants in selected industrial sectors, an overview of the design of the consensus process, and a quantitative summary of the constantly-in-motion process and its deliverables will be included. A brief comparison will be made between two approaches to global standardization. One practice being a single track method which relies on a top-down philosophy, and the other a multiple path process which is based on a bottom-up methodology.

Standardization, regardless of what specific process it follows, would be pointless if the end results were not accepted and used. This presentation will also provide the quantitative results of a study conducted to determine the impact of standards on business. The study involved a random sampling of companies ranging in size from small- and mid-sized to Fortune 1000. Survey participants included corporate level executives as well as technical executives; two groups who work toward different objectives within an organization. One striving to manage costs, limit liability, and increase market access and the other working to enhance technology transfer, improve product quality and performance, and support new product development. The conclusions drawn from the study will be provided. The presentation will also include the views of study participants with regard to their respective organizations' investment in and acceptance of the dynamic process that delivers a well valued end product, namely standards.

The Effect of Implementation of ISO 9001 and 14001 towards Program Performance of Corporate Social Responsibility Using MHCi Model in PT. APAC Inti Corpora, Semarang, Indonesia

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PT. Apac Inti Corpora (PT. AIC) is widely known around the world and is the largest textile factory in Indonesia located in Semarang Regency. The product of the company consists of yarn, greige, denim and laundry service. Since 2000, PT. AIC has implemented the Social

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Responsibility program (ISO 26000) via SBHCD (Sustainable Basic Human Community Development). PT AIC has also implemented ISO 9001 and ISO 14001 as a quality assurance and for industrial waste management as a consequence of textile producing activities.

This paper analyzes the impact of ISO 9001 and ISO 14001 implementation towards the performance of CSR program. Based on the implementation of ISO 9001, ISO 14001 and ISO 26000, there are three main objectives on program application. First, to increase productivity and product quality so that gives direct impact to company profit. Second, to assure that the industrial waste has been managed carefully therefore will not have pollutions to the environment and surrounding neighborhood. Finally, to contribute to economic sustainability and for ethical consideration in order to enhance employee welfare, to develop local community and to ensure that no community negation towards the company existence. The objectives mentioned above, will works simultaneously; if the first and second objectives are fulfilled then automatically the goals of Social Responsibility program will also be achieved (the third objective).

MHCi Model is used to define role and contribution of ISO 9001 and ISO 14001 which is the Sosial Responsibility Basic; the principe, the process and the impact. Therefore, secondary survey and questioner distribution are done, based on quantitative and qualitative approach. This research investigates PT AIC as a single case study. The analyses describe and estimate the performance of the program implementation. The results indicate that the CSR performance indicator reach to point 6.938 out of 10, which decribes that several improvement should be enforced. This point is derived from the aids and assistance given to the employee, local community and surrounding neighborhood. It also reflect the delivery system of the aids and assistance, which is basically categorized to routine or not. The responsible activity from the owner of the company and the managerial policy also influence the performance of CSR. The result also recommends that the main element need to be fixed is the CSR impact.

Based on the description above, it is clear that ISO 9001 ables to increase the product quality and the ISO 14001 has neutralized the industrial waste though not effectively gives impact to the implementation of SBHCD program. This fact is resulted from the perception that Social Responsibility is useful only for short term and not necessarily for the long term investment.

Keywords : Social Responsibility, ISO 9001, ISO 14001, Performance

Research and Standardisation - Friends or Foes?

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Standards are a proven mechanism for technology transfer, fostering the diffusion and utilisation of innovations and of the ensuing technology. They are also an important aspect of various fields of policy, like innovation, trade and environmental policies, play a vital role in the European market by promoting competitiveness and interoperability of products and services, and serve to protect consumers, health, safety of citizens and employees, and the

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environment.

The development of new and improved standards requires high quality technical information. This creates a fundamental inter-dependency between the standardisation and research communities. Research can, and should, support the development of new and improved standards through the provision of objective technical information. Standards Setting Bodies (SSBs), in turn, need to effectively deploy this information.

Yet, are SSBs really interested in incorporating latest R&D results into their standards? And are companies prepared to provide such results for use in standards setting?

In an attempt to at least partially answer these questions, the paper will report some findings from a recent research project. It will look at companies' potential motivations for participating in standards setting, and at barriers encountered. It will also look at what SSBs could do to improve the information flow between them and corporate R&D departments.

3.4.22: The Politics and Economy of the Environment

The Politics of 'High Water'. The Pursuit of Objectivity in the Appraisal of the Flood Protection Scheme for Venice.

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This paper addressed the role of quantification in the appraisal of a large public sector project in Italy: the long-debated flood protection scheme for Venice. Infrastructure projects like the one analysed here are at once pervasive and gigantic, micro and macro. They are locally grounded and material while at the same time embodying distant and future-oriented visions of a certain territory and its economy. The numbers produced by techniques like cost-benefit analysis, impact assessments and other project appraisal tools are fundamental representations of the world based on which large-scale interventions can be made.

Such quantification is essential to the translation and enrolment of the "local" into a larger project of macro-intervention through different degrees of abstraction. What is more, numbers can be powerful tools for standardising and rationalising decisions in situations of conflict (Porter 1995). On the one hand, technological controversies unfold as conflicts over the accountability of technology, no longer understood only within the framework of representative democracy but encompassing a virtually large and differentiated (if vaguely defined) public of "stakeholders" virtually endowed with the authority to calculate. On the other hand, such controversies elicit the contentious processes whereby technology is discussed by the subjects of its approval and utilisation and progressively "objectified".

The appraisal of the flood protection scheme analysed here highlights such double and interrelated questioning of legitimate subjects and natural objects. At stake in the appraisal of the flood protection works in Venice was the construction of a unified administrative vision of the local territory and economy, of a space of quantification where comparisons and standard categories of equivalence could be developed (Desrosières 1998). However, a quantitative description of the city and its lagoon could not be agreed and the cost-benefit analysis and environmental assessment conducted on behalf of the national government was questioned in the name of the uniqueness and singularity of the city and its environment. On the one hand the impact of the project needed to be assessed by the national government so as to legitimise and enable a macro-social, nationally funded intervention. On the other, the city's administration, with its focus on daily maintenance and its more localised and differentiated "micro" actions, fiercely opposed the realism of the aggregate measures produced as part of the cost-benefit analysis of the project. The abstraction and standardisation allowed by numbers was resisted by appealing to an alternative, more local, "civic" and "experiential" reconstruction of the problem of flooding, which rejected the possibility to create comparability and treated the city as "the only model of itself".

This paper reconstructs the conflicting rationalisations which accompanied the appraisal of the project and the various appeals to objectivity and subjectivity whereby the realism of numbers, the authority to quantify and the power to act were questioned and pursued by different organisational actors as part of the same calculative effort. The case highlights the various ways in which the cognitive, administrative and ritual dimensions of quantification clash and overlap in contemporary "politics of nature" (Latour 2004).

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Marketization of Climate Change: Contesting the Performativity of Economics

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Drawing on the performativity approach to economics and markets developed by key STS and actor-network theory (ANT) writers (e.g. Callon, Knorr-Cetina, MacKenzie), this paper traces some empirical steps by which climate change governance has increasingly come to rely on markets and their associated technologies of calculative agency. With the establishment of the Kyoto Protocol in 1997, states, businesses, and consumers are increasingly framed in market calculative terms, making them reliant on new types of carbon inscription devices. In the climate assemblage, for instance, scientifically established national CO_2 accounts cast states as 'responsible' players in managing carbon-intensive economies, while businesses and consumers confront 'green' market choices via privately calculating 'carbon footprints' and 'offsetting' greenhouse gas (GHG) emissions from production or air transportation. Most notably, carbon markets, including the EU Emissions Trading Scheme (ETS) and the Clean Development Mechanism (CDM), have emerged as major socio-technical experiments in the large-scale marketization of climate change. Relying on imbroglios of natural sciences, economics, accountancy, and technologies, carbon markets slice up the atmosphere into standardized, measurable, and tradable units, creating a new hybrid object known as 'Certified Emissions Reductions' (CERs). At present, markets for CERs remain focused on the European Union, but similar devices are constantly spreading to other parts of the world, and visions of a future global carbon market condition much of current climate politics.

As conceptualized in the STS-ANT approach to economics, carbon markets are collective calculative devices brought about in large part by the performativity of economics. Specialized economic knowledge, together with accounting professionals, has helped conceptualize and actualize these new market constructions. Nevertheless, carbon markets only 'work', in the sense of becoming institutionalized, to the extent that they forge solid linkages between disparate social worlds, ranging across the sciences to politics, business, civil society, and, eventually, citizenship practices. Markets are deeply moral-political projects, requiring a constant 'boundary-work' between disparate groups; and these processes of contentious 'co-production' are arguably downplayed by the performativity approach. In this paper, the controversial nature of the gradual actualization of economic models is stressed, as experiments in 'carbo-nomics' are confronted with public concerns on environmental standards and social justice. In particular, the construction of carbon markets involves a re-actualization of historically deep-seated cleavages between economy and ecology, or, in knowledge-political terms, between economics and environmentalism. Carbon markets are thus new sites for what Bruno Latour (2004) calls 'the war of the eco-sciences'. Drawing on empirical studies into how NGOs respond to, and attempt to shape, carbon markets, leading up the Copenhagen UN climate conference in 2009, this paper explores the emergence of new environmentalist concerns and practices in and around 'carbo-nomics'. NGOs variously consume, engage, and confront this scientific expertise and its market devices. Empirically, the WWF-sponsored 'Gold Standard' CDM certification scheme serves as starting point for exploring the socio-technical environmentalist practices co-constructing carbon markets.

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Getting to Grips with Water: How the UK Insurance Market Knows about Floods and How the Public has to Deal With It.

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It has been argued that mathematical models can be seen as performing the economy they were otherwise thought to represent (see for example Callon 1998, MacKenzie & Millo 2003). But how are such knowledge claims hardwired into public debate and how might they become controversial? In the case of insurance markets the objects established through the intervention of models, namely various forms of risks (earthquake, disease, theft, fire, flood, hurricane, terrorism etc.), are usually already matters of public concern. The policy and planning efforts engaged in their prevention and mitigation are frequently subject to public scrutiny, as is the science used to inform such efforts. This presentation will dissect the provision of flood insurance for UK homeowners - the technologies deployed to render it intelligible and the political ecology in which it sits - as an entangled and invariably deflected version of Bruno Latour's circulating references (1999). The purpose is to demonstrate how the knowledge claims of the insurance market are a) those of a market (black-boxing specific assumptions and prerogatives) and are b) made public through a variety of interfaces, primarily the visual grounding of a probability (risk) to a mapped space. I draw on a fieldwork carried out in 2007/2008 for my Ph.D. funded as part of the 'Understanding Environmental Knowledge Controversies' project (knowledge-controversies.ouce.ox.ac.uk) under the interdisciplinary Rural Economy and Land Use programme (www.relu.ac.uk). While the larger project has focussed broadly on hydrological models and deployed an experimental approach to their engagement with the public my focus has been the peculiar British arrangement of making flood insurance available through the private market (i.e. not, as in most other European countries, a responsibility of the state). The terms on which this is made possible is set in the tri-annual Statement of Principles between the Association of British Insurers and the Department of the Environment, Food and Rural Affairs. Here it is specified what kind of protection the government should be delivering in return for the commitment of the industry to keep offering flood insurance for UK homeowners. Both sides of the table draw heavily on the expertise of scientists, modellers and consulting engineers, but within their respective constituencies the entanglement with and intervention of other communities of practice (mortgage lenders, planners, brokers, re-insurers, government agencies etc.) can be hard to discern. Throughout 2008 I will be working around three ethnographic sites where these engage- and entanglements are somehow played out: The revision of the Statement of Principles, the production of scenario based risk assessment software and the brokerage and underwriting of new home insurance policies.

Do We Need Nature? The New Economy of Post Nature.

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When the global environmental crisis was first announced by an obscure group of ecologists in the 1960s and '70s, it was based on the logical claim that infinite economic growth was

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physically impossible within a finite biosphere. Those who denied the existence of environmental crisis (then the mainstream position) asserted the permanent and unlimited 'nature' of economic growth. There were, it was said, no fundamental limits to economic expansion that could not be overcome by technology. Since 2006, global warming is no longer plausibly deniable, and thus the global eco-crisis is now central to mainstream political discourse. Despite this belated recognition, the 'limits to growth' position is thoroughly marginalised: infinite growth remains the basic aim of applied political economy.

The proposed paper will argue that the convergence of molecular biology, nanoscale engineering and information technology represents a fulfilment of the prophecies of a coming 'post'-industrial or 'information society', first made by conservative futurists in the 1970s as a direct counter to environmentalist claims of impending crisis.

As such, it is timely to consider how these novel and converging technologies are being articulated within neoliberal theories of 'economic growth' and 'development', as the nano/bio/informatic convergence is being hailed in some quarters as a general form of technological salvation from the intensification of global environmental degradation and ecological risk, as it is establishing a global 'market for directed evolution' (Goldstein, 2004). Exemplary here is the official emergence of a new 'bioeconomy' (European Commission, 2005; US Energy Policy Act 2005).

The paper will reflect on how this convergence will further confound the existing ontological estrangement between the twin sciences of economics and ecology, through analysis of the proposed role of nanobioengineering in projects such as 'bioremediation' and the 'geoengineering' of the climate. Orthodox narratives of infinite economic growth have been stabilised by incorporating the promissory rhetoric of the new 'life corporations': nano/info/biotechnology is presented as a means of maintaining continuous economic growth amid deepening global ecological degradation. Mainstream approaches to 'sustainable growth' and 'ecological modernisation' seem to demand the radical modernisation of the biosphere itself.

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