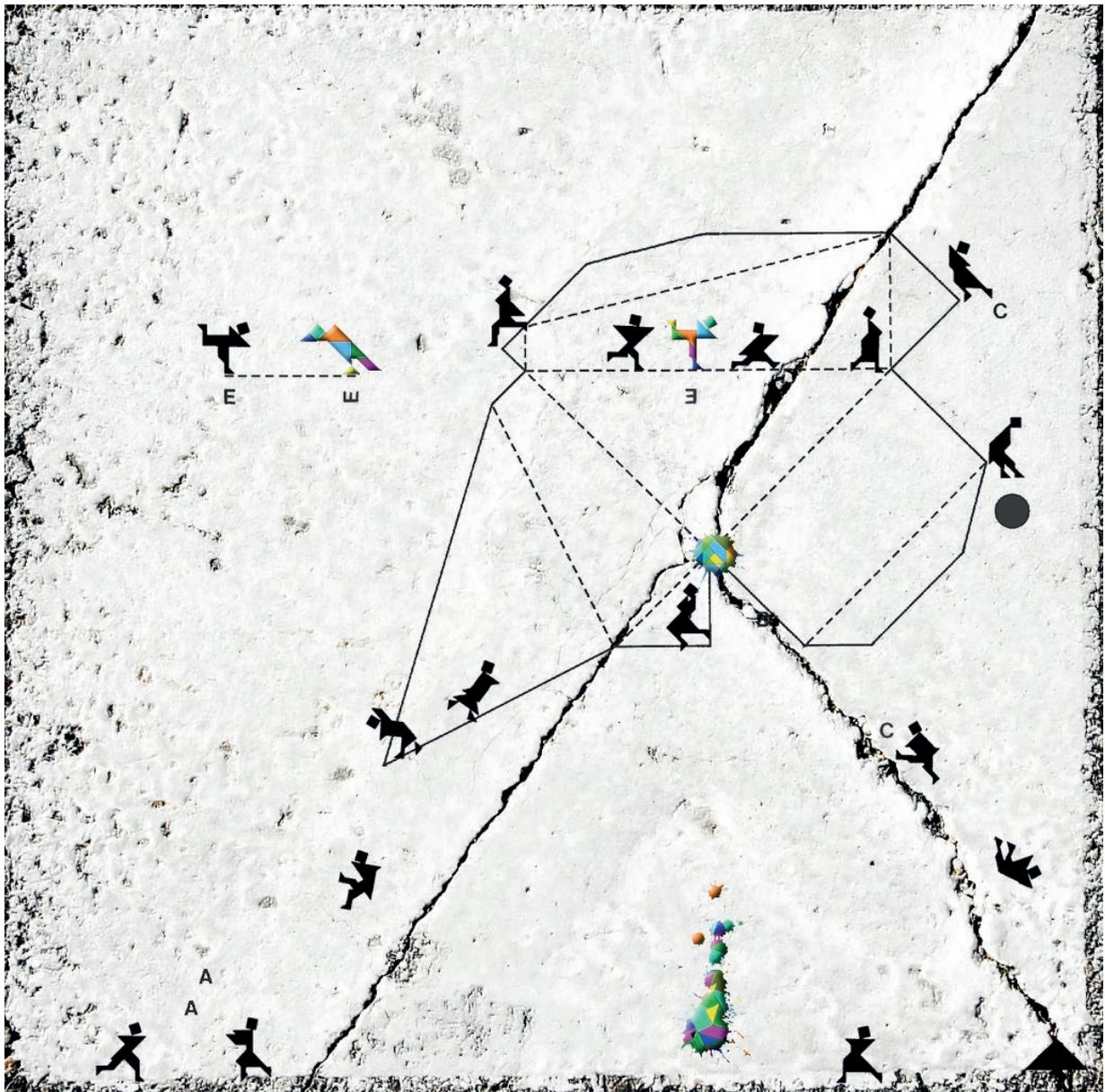


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EDITORIAL

POLITICS BY OTHER MEANS: SITTING AT AN ANGLE

Vicky Singleton

I understand the title of the recent 4S/EASST conference '*Science and Technology by Other Means: Exploring collectives, spaces, futures*' as a play on Bruno Latour's claim that 'science is politics by other means' (1988). The title draws our attention to the extent to which knowledge production and technological innovation is being seized by all sorts of citizens and activist collectives. The conference was crammed full of presentations, workshops and informal and formal discussions about science and technology being done and imagined in unexpected places, diverse collectives, multiple spaces and various possible futures. Latour's widely cited phrase captured a subtly differently sensibility that was especially crucial to early Science and Technology Studies (STS). It reflected and inspired a wealth of work that exposes and explores science and technology as a deeply political achievement of assembling non-human and human actors in ways that create a 'Centre' and its 'Others'.

Feminist Technoscience Studies (FTS) put more flesh on the bones of this work through attending to embodiment and situatedness in the processes of assembling, and to the differentially experienced effects, asking 'Cui Bono?' as questions of justice and to make other worlds possible (Star, 1995). F/STS is skilled in telling stories about the ways in which specific examples of science and technology build worlds. It attends to the multiple ways in which technoscience is embedded in the realities that we are coming to live with. Moreover, many of the stories at the conference participate in the collectives, spaces and possible futures they are engaged with in complex ways. In particular, researchers told stories that interrogate the objects enacted in technoscience as oozing essentialisms by way of critique, but also to participate in building more equitable worlds (Haraway, 1988). That is, the stories often explicitly consider what realities we would like to come to live with and how F/STS might contribute to their becoming. There is, it seems, a keen interest to explore the multiple ways in which F/STS is politics by 'other' means.

The walls of the conference, in Britain and in the US, parliamentary politics was extraordinarily visible and being done by very obvious means. That is, overtly and loudly by individual politicians proselytizing. I refer here to political debates around Brexit (British exit from the European Union) and the recent US presidency elections. These displays of politics have been full of stories that attempt to clearly define allies and enemies and they enact universals and polarisations. This is a deeply disturbing moment in which it seems urgent for our *European Association for Social Studies of Science and Technology (EASST)* to reflect upon how it should contribute to the making of the realities that are coming into being.

For me, some of the most inspiring theorising in F/STS is profoundly at odds with these recent events. This work appreciates the interdependency of human and non-human bodies and beings, in which connections and cuts are always in process, precarious and condensed to momentary stabilities. These insights challenge us to 'stay with the trouble', resist origin stories and remain curious and response-able. We need to tread care-fully so as not to flatten otherness but rather to seek ways of 'doing difference together' (Verran and Christie, 2011). It seems incredibly important right now to articulate the weights that are pulling against these sensibilities, inwards towards an illusion of the possibility of just and productive, stable simplifications. These weights are crafted from alluring ingredients - the possibility of durable solutions, obvious answers, so-called straight-talking and *common-sense*. This is evident in many spheres not only national government parliamentary politics. For example, Sheryl Sandberg's (COO of Facebook) 'Lean In' campaign urges working women to 'sit at the table', both literally and metaphorically, in order to achieve success. Her book and TED talk is described by Time Magazine (2014) as a hugely successful feminist mission (Sandberg, 2013;

see www.youtube.com/TED). At the same time some feminist academics are critical that it is an example of neo-liberal corporate feminism that appropriates feminist terms to achieve capitalist agendas and creates divisions (McRobbie, 2013). The 'Lean in' campaign is problematic but seductive. It is catchy 'politics by obvious means' that has gained huge support. I have an unsettling feeling that while I have been 'sitting at an angle' to truth-claims and definitive knowledge, exposing and challenging the practices of centring and simplification, leaning in, talking straight and making problems doable has gained widespread support .

It is the above disconcertment that promotes me to ask; should our Association 'lean in' and engage in increasingly obvious political activities, and what would this mean? Or, perhaps our Association has a more important role to play in 'sitting at an angle'. What are the ways in which F/STS does politics? The 4S/EASST conference showcased multiple ways of doing F/STS and the EASST Review wants to facilitate different modes of writing and presenting the work of the European F/STS community. For me, sitting at an angle is my favoured positioning because I consider it to be itself an interference, not only an intervention. It is critical of looking inwards, of centring, as well as of what is on the table. Moreover, I sense that sitting at an angle facilitates 'politics multiple' – by various means including allegory, quietism and ambivalence. As I learned from reading Star, when we ask *cui bono?* it is in order to imagine what other worlds are possible as well as to expose what has been hidden or denied (Bowker et al., 2016). This is more difficult to do if we are leaning in. I invite us to explore what 'leaning in' or 'sitting at an angle' might mean as we imagine the future role of EASST.

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STS MULTIPLE

Pa.S.T.I.S.

PADOVA SCIENCE, TECHNOLOGY & INNOVATION STUDIES

Questa sezione presenta la storia e i principali ambiti di ricerca dell'unità di ricerca PaSTIS (Padova Science Technology & Innovation Studies), istituita nel 2008 per unificare la ricerca di alcuni professori, ricercatori post-doc e dottorandi nell'area degli studi sociali della scienza, della tecnologia e dei media all'interno del Dipartimento di Sociologia presso l'Università di Padova. La storia di PaSTIS è interessante non solo perché racconta l'attività di una specifica unità di ricerca STS, ma anche perché permette di leggere l'evoluzione dell'approccio STS in Italia, un paese che è stato fino a poco tempo alla periferia della geografia europea degli Science & Technologies Studies. Nei testi vengono inoltre presentati alcuni dei principali progetti di PaSTIS. Uno è il progetto TIPS, che si basa sull'idea di utilizzare i quotidiani on-line come fonte per analizzare il modo in cui la scienza e la tecnologia sono rappresentate nella sfera pubblica, al fine di studiare il ruolo della tecnoscienza nella società, la sua rilevanza e l'evoluzione. La piattaforma TIPS sta monitorando gli otto più importanti quotidiani italiani e, in un arco temporale che va dal 2010 ad oggi, sono stati raccolti circa 1,2 milioni di articoli. Altri progetti di PaSTIS riguardano invece lo studio dei processi di 'infrasrutturazione'. Uno dei principali progetti dedicati a questo tema ha riguardato lo sviluppo delle reti wireless comunitarie (WCN), ovvero l'attività di costruzione di reti di comunicazione locali realizzate da gruppi di attivisti, hackers e cittadini. Un altro progetto di ricerca di PaSTIS è stato dedicato all'analisi delle pratiche di progettazione e sviluppo in campo informatico e, in particolare, l'analisi della realizzazione di due specifici dispositivi tecnici informatici di una delle più importanti compagnie informatiche italiane. Gli articoli presentati mettono in luce, oltre alle attività di PaSTIS, anche le circostanze che hanno contribuito a sviluppare e sostenere l'unità di ricerca e, in particolare, lo sviluppo di un più ampio movimento di STS in Italia.

THE PADOVA UNIVERSITY PASTIS UNIT AND THE INFRASTRUCTURING OF STS RESEARCH IN ITALY

Paolo Magaudda, Federico Neresini

THE EMERGENCE OF PASTIS WAS A BOTTOM-UP PROCESS, A SORT OF ALCHEMIC BLEND, THE CONTINGENT PRODUCT OF A WORK OF 'HETEROGENEOUS ENGINEERING' WHICH WAS THE RESPONSE TO A SITUATION: THE ITALIAN UNIVERSITY SYSTEM. ONE OF THE POSITIVE CIRCUMSTANCES THAT HELPED TO DEVELOP AND SUSTAIN PASTIS HAS BEEN THE GROWING OF A WIDER STS MOVEMENT IN ITALY, MAKING OUR LOCAL UNIT AN INTERSECTION IN A WIDER PROCESS OF 'CO-EVOLUTION' INVOLVING AN ENTIRE NATIONAL ACADEMIC COMMUNITY.

The PaSTIS (Padova Science Technology & Innovation Studies) research unit was set up in 2008 as an attempt to unify and catalyze the research of a number of professors, post-doctoral researchers and PhD students in the social studies fields of science, technology and communication within the Department of Sociology at Padova University (<http://www.pastis-research.eu>). PaSTIS's emergence is interesting not only in that it tells the story of a specific STS-focused research unit but also because it offers a glimpse into the path taken by the STS perspective in a country like Italy which was until recently at the periphery of the main European STS geography.

It is not far from the truth to say that PaSTIS is today the most important research center expressly devoted to STS research in Italy, although there are also other universities in the country with a STS milieu such as the University of Trento, where the last 6th STS Italia conference was held in late November 2016. Although not exclusively Science & Technology Studies focused – but also interested in other approaches to the study of culture and communication – PaSTIS today encompasses around 15 scholars mostly with a sociology background including full and associate professors, several post-doctoral researchers and a turnover of PhD students and research assistants. During its almost ten years of existence, the research unit has also hosted around ten foreign visiting scholars from Europe, the US and South America. This highlights the fact that PaSTIS is also a place where STS scholars from other countries can spend a period of research finding a collective and stimulating environment: we would be happy to receive further visiting proposals in the near future.

The chief topics addressed over the years by PaSTIS with its research and initiatives include a number of areas: the study of public communication in science and technology and analysis of media and public discourses relating to science, technology and the innovation (on this subject see the section on the TIPS project by Giardullo and Lorenzet here); analysis of information infrastructures and media technologies and devices (see the section by Crabu and Mongili); the study of scientific practices and laboratory work, especially in relation to the biomedical domain and the field of nanotechnology; research on media practices, with specific focus on the process of digitalization, the use of social networks, the emergence of new forms of sexuality over the Internet and the processes of consumption of cultural content. A pivotal point bringing together the work of PaSTIS's members is essentially the idea that social and cultural processes today can be understood by looking at the way scientific processes, technological artefacts and infrastructures innervate contemporary social experience and are thus the core of the re-configuration of the whole current set of practices, routines, values, meanings, emotions and the overall texture of everyday social organization.



Fig. 1: The PaSTIS people (almost all the members, with some guests)

However, more interesting than a plain description of PaSTIS's activities is an examination of the distinctive conditions of the research unit's development which has not been a top-down process sustained by ministerial or university inputs. Rather, the emergence of PaSTIS was actually a bottom-up process, a sort of alchemic blend, the contingent product of a work of 'heterogeneous engineering' which was the response to a situation, the Italian university system, in which research units are not official entities and – especially in the social sciences and humanities fields – still quite few and far between. Many university departments across the country have no research units whatsoever and still prioritise the idea of self-sufficient independent scholars working on their own specific academic interests. At the same time, the experience has been that the setting up of research units has been seen by many as an institutional innovation stirring up traditional power assets and localist logics. This is a distinctive feature of the Italian academic system as compared to other countries and it speaks volumes about the fact that doing STS today (and by extension, social studies as a whole) requires diverse efforts, tools and strategies in diverse countries in order to produce a fruitful alignment of research, theory and local institutional frameworks. The institutional rigidities and weaknesses of the Italian academic system (one which has, over the last decade, also experienced a shortage of new tenure-track positions, a lack of internal mobility, a massive diaspora of Italian scholars and, therefore, has one of the highest average age of professors – in 2013 the average age of assistant professors was 46!) was for us the stimulus to adapt, re-invent and localize the idea of 'research unit' seeing it as a crucial strategy in the search to develop new opportunities to deal with the troubles typical of our national academic system.

One of the positive circumstances that helped to develop and sustain PaSTIS has been the growing of a wider STS movement in Italy, making our local unit an intersection in a wider process of 'co-evolution' involving an entire national academic community. On one hand, our research unit has clearly been sustained by the broader Italy-wide STS movement which was given institutional form as a national STS society, STS Italia, in 2005 and also sponsored the creation of the 'Tecnoscienza: Italian Journal of Science & Technology Studies' journal in 2010.

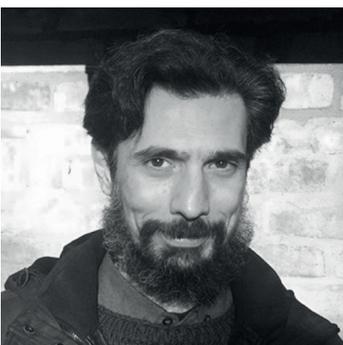
Whilst even before the mid-2000s in Italy there were at least a few scholars linked to STS these were just individuals with no chance of giving a collective dimension to their work and thus having a stronger impact on the study of science and technology in the country. There are many accounts of the way PaSTIS co-evolved within the broader national STS community and, at the same time, also became one of the drivers of STS development in Italy: for example, in 2012, PaSTIS co-organized the 4th STS Italia Conference in Rovigo on ‘Emerging technologies’ and in 2015 the 3th STS Italia Summer School on ‘Biomedical research’. Several STS Italia workshops have been hosted in Padua: focusing on creativity in 2009, on interdisciplinarity in 2013 and on biomedicine in 2014. A number of PaSTIS scholars played a crucial role in establishing and editing the *Tecnoscienza* journal and energised efforts to build up the main STS Italia initiatives organized elsewhere in Italy.

Hence, if PaSTIS has been an instrumental device in the process of STS community infrastructuring in Italy, our research unit is, at the same time, an emerging outcome of the broader establishment of a STS community in Italy, thus confirming once again that science, like culture and art, is a truly collective activity which involves not only, in our case, PaSTIS’s current members, but also a wider group of people as well as artefacts and infrastructures. PaSTIS, STS Italia and *Tecnoscienza* can thus all be understood as a creative - and to some degree ‘resisting’ - reaction to the limits, rigidities and constraints of our national academic system whose scholars need to open up their work to an increasingly integrated, competitive and fast-developing global scientific community.



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TECHNO-SCIENTIFIC ISSUES IN THE PUBLIC SPHERE (TIPS)

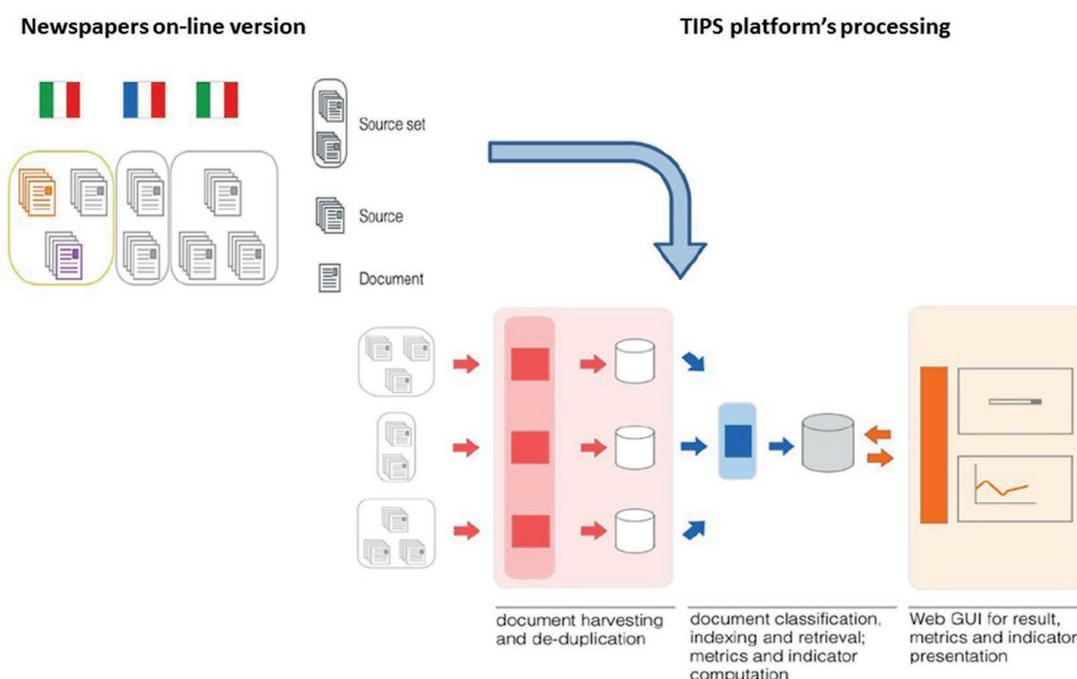
Paolo Giardullo, Andrea Lorenzet

THE TIPS PROJECT IS BASED ON MASS MEDIA AND ONLINE NEWSPAPERS AS A SOURCE FOR ANALYSING THE REPRESENTATIONS OF SCIENCE AND TECHNOLOGY IN THE PUBLIC SPHERE MAPPING ITS RELEVANCE AND EVOLUTION. IT MONITORS THE EIGHT MOST IMPORTANT ITALIAN NEWSPAPERS, IN A TIME SPAN RANGING FROM 2010 TO YESTERDAY. IN 2014 THE TIPS PLATFORM ALSO BEGAN COLLECTING TWO UK, TWO US, ONE INDIAN AND SEVEN FRENCH NEWSPAPERS. TIPS CALCULATES AD-HOC 'TECHNO-SCIENCE INDICATORS' BASED ON MORE THAN 2.6 MILLIONS OF DOCUMENTS: IT COMPUTES 'SALIENCE', 'PROMINENCE' AND 'PRESENCE' OF TECHNO-SCIENCE. TIPS ALSO PROVIDES A 'RISK INDICATOR', OPERATIONALISING RISK AS AN ONTOLOGICAL ANALYTICAL DIMENSION OF PUBLIC TECHNO-SCIENCE DISCOURSE.

The TIPS project is based on the idea of using mass media and online newspapers, in particular, as a source for analysing the way science and technology is represented in the public sphere in order to study the role of techno-science in society, its relevance and evolution. To fulfil these aims, TIPS is grounded on a purpose built ICT infrastructure. Its design includes a dedicated platform capable of collecting, sorting and automatically analysing the text of newspaper articles in their digital format. These texts are then indexed and stored in a database for research analysis¹.

¹ For an overview of the platform, see the PaSTIS web site (currently at the bottom of the home page).

Fig. 1: TIPS platform's processing workflow: from newspapers to data and indicators



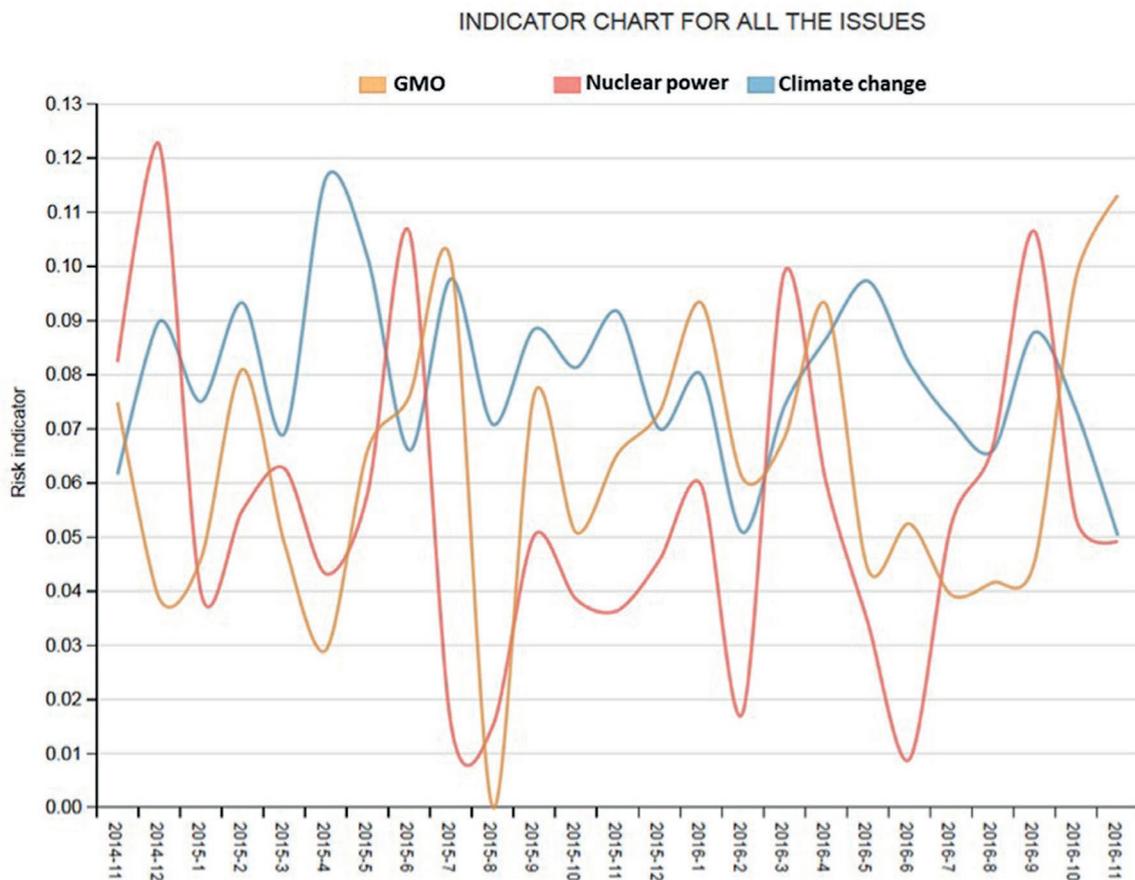


Fig. 2: TIPS risk indicator trends for three specific issues in the last 24 months

The TIPS platform is currently monitoring the eight most important Italian newspapers and, in a time span ranging from 2010 to yesterday, approximately 1.2 million articles have been collected. In 2014 the TIPS platform also began collecting two UK, two US, one Indian and seven French newspapers thus adding a further 1.4 million articles to its database. By means of 'classifiers' specifically developed by the TIPS research group, the platform determines whether the content of each article pertains to the science and technology domain. Then each article stored in the database is 'tagged' so that it is available for further analysis with an even greater focus on specific research questions.

The TIPS platform also calculates *ad-hoc* techno-science presence indicators and metrics within the main Italian daily newspapers: its 'saliency' (i.e. the relative weight of techno-science in all the published articles in a given time span), 'prominence' (i.e. its presence on the home page) and its 'presence' outside newspaper sections specifically devoted to science and technology. The platform also provides a 'risk indicator', a measure expressly developed to operationalise risk as an ontological analytical dimension of public techno-science related discourse (figure 2).

So far, the research on techno-science in the media has generated a great deal of work on quite a wide range of issues including, of the most significant, climate change, genetically modified organisms, cloning, stem-cells, digital innovation and health risks. A majority of these analyses has focused largely on a limited portion of news, i.e. those specifically regarding a given issue, even if, alternatively, there have been also studies based on samples designed to map the presence of techno-science as a whole and thus to study its representation as well as to outline the perspectives of the social actors involved.

By contrast, TIPS was designed to take a non-specific topic-oriented approach. Rather than focusing on a restricted set of research topics, the objective is to follow techno-science coverage as a whole over time, enabling researchers to examine specific topics of interest. Accordingly, one of the most important methodological novelties generated by the TIPS project regards its infrastructure. The latter was designed to collect and analyse newspaper articles on a daily basis allowing researchers to analyse whole sets of online newspaper articles and texts.

The TIPS project roots its epistemological assumptions in recovering STS key-concepts. As techno-science resumes all the elements interwoven in processes of science and technology production and circulation (Latour 1987, pp. 174-175), TIPS assumes it as main concept to orient its monitoring activities. Indeed, from an empirical point of view, considering techno-science as an epistemic category enables researchers to avoid the need for univocal definitions (Shapin 2008, p. 3), keep their minds open to those processes and be flexible enough to intercept emerging trends about what are not yet 'scientific facts'. The approach chosen by TIPS – i.e. considering the news as a whole using automated content analysis, comparing the features of specific issues against those of other issues or against media coverage as a whole – offers a perspective which embodies these key STS assumptions. However, this 'operational openness' has to be balanced with robust classification criteria. Indeed, in so far as TIPS aims to monitor techno-scientific issues, it first needs to establish clear criteria with which to identify techno-scientific content in a newspaper article. STS concepts, such as science as situated activity, the agency of non-human actors (artefacts, research tools, infrastructure etc.) definitely contributed to setting up useful demarcation elements as a reference for building up the classifiers, the indicators and the metrics used by TIPS.

Early outcomes of the project have been presented in international venues such as workshops in Stellenbosch (South Africa), Salvador de Bahia (Brazil) and Istanbul (Turkey), besides STS Italia and International Sociological Association conferences. In these, indicators and indexes as well as research outcomes were discussed showing techno-science salience trends and selected issue coverage. The relationship between media coverage and public opinion has been also explored, as in the case of recently published work on the nuclear power controversy which compares TIPS risk indicators from newspapers with public opinion perceived risk data (Neresini and Lorenzet 2016).

The operationalization of STS concepts into a media monitoring project is a first step in the hybridization between different, even related, scientific debates. The entire research group, however is a hybrid. Within TIPS this partnership has moved it in the direction of genuine interdisciplinary project organization involving scholars with sociology, linguistics, social psychology, statistics and ICT backgrounds. As Evans and Aceves (2016) have recently argued "machine learning is enabling the translation of text into social data" and this is the perspective TIPS is exploring further. This interdisciplinary cooperation is taking technical aspects about how properly to clean and interrogate data, for instance, further by making machine learning features such as 'topic modelling' (Blei 2012), 'Named Entity Recognition (NER)', and 'part of speech (POS) tagging' available for analysis. This interdisciplinary environment has proved to be ideal for tailoring and validating classification tools in the custom development of TIPS infrastructure. Machine Learning tools such as the Support Vector Machine (Cristianini and Shawe-Taylor 2000), for instance, have been crucial to positively testing the trustworthiness of the TIPS thesaurus-based classification scoring system. Interdisciplinary cooperation has further web-data automated monitoring development potential.

Indeed, the research team is presently working on a variety of topics related to technical aspects of content analysis by means of text mining. A further future development is investigating the potential for including the 'corpus linguistics' approach (Biber et al. 1998) as a possible feature for cross-linguistic and longitudinal analysis.

The TIPS team is therefore actively dedicated to exploring how the so-called 'data science' epistemological discontinuity (Kitchin 2014) may bring a better understanding of techno-science in the public sphere. Future developments generated

by this epistemic potential will relate to both cross-country and source comparison. For the former, automated text classifiers for English and French are already in the pipeline. The latter, which will enlarge the analytical spectrum to social networks and blogs, is at an advanced level as TIPS is presently collecting approximately a thousand blog posts per day.

The ever increasing volume of data available for the purposes of virtually analysing any topic whatsoever, not only those linked to techno-science, is a stimulating challenge that still requires multiple skills and in-depth cross-fertilization between concepts, theoretical models and approaches ranging across various disciplines.

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MATERIALITY, POLITICS AND INFRASTRUCTURING WORK

Stefano Crabu and Alessandro Mongili

THE STUDY OF INFRASTRUCTURES IN TERMS OF “INFRASTRUCTURING” AND “INFRASTRUCTURING WORK” REPRESENT A STARTING POINT FOR AN IN-DEPTH DISENTANGLEMENT OF THE MULTIDIMENSIONAL PROCESS OF TECHNOSCIENTIFIC INNOVATION AND SOCIETAL CHANGE. THE PROJECT ON WIRELESS COMMUNITY NETWORK LED US TO CONCEPTUALIZE BOTTOM-UP INFRASTRUCTURES AS THE EMERGING OUTCOME BY A HETEROGENEOUS PROCESS IN WHICH THE MUTUAL ENGAGEMENT OF MEDIA ACTIVISTS, HACKERS AND SCIENTISTS TURNS A POLITICAL PROJECT INTO AN INNOVATIVE DIGITAL INFRASTRUCTURE MODEL. IN PERFORMING OUR INVESTIGATION ON DESIGN AND DEVELOPMENT IN COMPUTING, WE ARGUED THAT INFRASTRUCTURING IS A FIELD OF HETEROGENEOUS ACTIVITIES AND CHALLENGES EXTANT RELATIONS, WORK POSITIONS, SKILLS AND HIERARCHIES.

Nowadays, social scientists frequently consider infrastructure analysis as a starting point for an in-depth disentanglement of the multidimensional process of technoscientific innovation and societal change with a particular focus on the social and material ecologies in which human behavior is embedded (Gillespie *et al.* 2014). Since the mid '90, interest in infrastructure has profoundly permeated social theory attracting growing attention from sociologists, anthropologists and ethnographers working in the multidisciplinary STS field. Conceptually speaking, infrastructure can be considered sophisticated *socio-material entities* emerging by means of the management of a “series of tensions (between local and global, today's requirements and tomorrow's users, research and development; between project and originating practices, implementation and maintenance/repair, individual and community; but also identities and practices, planned and emergent course of action)” for the purposes of ordering everyday life (Mongili and Pellegrino, 2014, p. xvii).

Connecting to this broad field of inquiry, over recent years PaSTIS has developed a solid interest in the study of *infrastructuring*, a dimension through which infrastructures are generated and performed in practice. More precisely, PaSTIS has carried out a constellation of research, academic events and editorial projects aimed at capturing and exploring design and shaping, use, maintenance and repair activities related to infrastructure and infrastructuring work (Denis *et al.* 2015; Balbi *et al.* 2016). In so doing, we have cultivated an analytical perspective oriented to scrutinizing infrastructure as ongoing and open-ended processes grounded around an ecology of cognitive, material, and symbolic resources enacted by means of situated practices (Crabu 2014).

THE REBELLIOUS SIDE OF INFRASTRUCTURING WORK

One of the main research projects dedicated to the issue of *infrastructuring work* has related to *Wireless Community Networks* (WCNs) construction and consolidation processes. Conducted in partnership with the University of Trento, this project focused on these grassroots and joint working infrastructures, generally built-up at local level by media-activists, hackers and 'nerds' on the basis of explicit political as well as civic beliefs oriented to opposing the neoliberal and hierarchical

Fig. 1: The work of setting-up a WCN's antenna on a roof.

Courtesy of Ninux.org.



governance of the commercial Internet. In this sense, WCNs imply heterogeneous work in which technical practices require constantly alignment with symbolic, political and organizational activities. From this point of view, WCNs constitute an exemplary environment with which to investigate processes of heterogeneous 'infrastructuring' (Star and Bowker 2002) at the local level in the field of digital media technologies (Parks and Starosielski 2015).

Technically, WCN is a decentralized infrastructure consisting of interconnecting antennas usually set up on the roofs of participants' homes or on those of informal groups or volunteer organizations. These decentralized networks are fully independent from the Internet, although in a few countries they were popularized as a less expensive alternative to commercial ISP connections. WCNs are mostly self-built as volunteers adapt existing software, hack hardware, set up coordination rules, and materially install antennas. In this sense WCNs are rooted in a radical critique of contemporary governance of the Internet raising awareness on a relevant issue pertaining to the reconfigurations of power relationships between citizens and governments and also regarding distribution asymmetries relating to the growing pervasiveness of digitally-mediated communication (Crabu *et al.* 2015). In other words, WCNs represent alternative approaches counteracting the pervasive practices associated with the centralized control of digital communications and therefore shaping more autonomous and self-governed digital interaction spaces.

This research was based on a qualitative case study on the Ninux.org project, the main Italian WCN. The empirical data was gathered via in-depth interviews, documentary analysis and ethnographic observation of online and offline interaction aiming to investigate how Ninux.org members' identities and motivations, as well as material artifacts, play a role in shaping and sustaining infrastructuring work in unconventional innovation contexts such as "squatted community centers" or do-it-yourself environments.

This research work will focus in particular on the cultural, political, and technological issues rooted in the Ninux.org project highlighting the way these different aspects are strictly interwoven and can hardly be understood as separate



Fig. 2: A meeting of Ninux's coders Courtesy of Ninux.org.

dimensions. We thus unraveled the intricacies of the mutual relationship between the various actors involved in the project emphasizing that the WCN is an emerging outcome from the cooperation of members involved in a process of mutual-learning and sharing of academic expertise and political outlooks. Indeed, contemporary innovation in infrastructures is increasingly characterized by a close relationship between experts and lay people. Taking into account this crucial aspect, we have shown that the shaping of grassroots infrastructures implies a processual and in-the-making work of creation and maintenance developed outside predictable and conventional innovation settings (Crabu *et al.* 2016).

Overall, on the basis of this research project we have been able to argue that bottom-up infrastructures, or more specifically 'inverse infrastructures' (Egyedi and Mehos 2012), are the result of an heterogeneous innovation process in which technical, political, material and cultural aspects interact recursively with each other and in which the mutual engagement of media activists and scientists is crucial in turning a political project into an innovative digital infrastructure model.

INFRASTRUCTURING IN COMPUTING DESIGN AND DEVELOPMENT

Another research project related to infrastructures carried out by PaSTIS has regarded design and development practices in computing. Drawing on seminal work by Gregory Bateson, Leigh Star (2010, 610) used to say that users and designers, especially in computing, are bound together by a "double bind". In the digital environment, it is extremely hard to distinguish design from development in practice. Although the design-mode in computing is a strategic re-ordering, designers limit themselves in practice to assembling elements that already exist, only rarely introducing new ones. Many developers verify or produce interoperability among the elements which are driven to converge in a new device. Their job thus consists of prolonged use of tools, libraries, databases and materials at hand. This use is often inextricably intertwined with their main activity. Sometimes developers act as designers, changing the original project or writing pieces of software for the purposes of integrating the heterogeneous elements better (Mongili 2014).

In order to explore this designer-developer tangle in depth we carried out ethnographic research into an Italian company working in telecommunications, Internet connections and other digital services. We studied their design and development practices in computing and more specifically monitored the development of an application for video surveillance connected with a social network owned by the same company. In particular, we observed testing activities which were articulated in two main information specific tools, two defect tracking systems (DTS), softphones, a protocol suite (SIP), a camera and so on.

Testing practices move forward as contingencies emerge. The ability of specific actors to exploit unanticipated gaps in previewed practices can be crucial to progress following and accompanying testing, development and design aiming at interoperability (at least at demo level) between a camera, a social network architecture and SIP protocol. To achieve this, developers looked for a camera and developed patches on extant codes, achieving OS level. They also intervened within the DTS which we have considered information infrastructure here, playing around with their different versions, obliging them to include the SIP Protocol as a part of their routine monitoring, interpreting their reports and learning the classifications they operate with. Not infrequently they interpreted and tried to change the threshold proposed by the DTS.

In accordance with Leigh Star and many other scholars, we can consider any information artifact, which relates a human activity and forms a whole with it, as an information infrastructure thus emphasizing the relational aspect of this definition. Every information artifact can converge toward a specific activity, becoming an information infrastructure but not every artifact is necessarily an infrastructure. This convergence is relatively unstable and obliges humans to take care of the infrastructure nesting their activity as a normal routine. Therefore, the 'infrastructuring' process challenges the invisibility of these infrastructures, their taken-for-grantedness. And a multiplicity of actors intervenes continually to alter elements and fix them.

By focusing on designing and developing, any new device can be conceptualized as the emerging outcome of hybrid practices, aimed to manage adverse contingencies and any sort of tensions. Infrastructures intersect any activities but are also extremely fragile. Infrastructures contain relations, especially through the data culture that they express, which is based on forms of classification containing forms of hegemony. This is another crucial issue: infrastructuring is a field of heterogeneous activity at the very center of technological cooperative circulation and at the crossroads of contemporary innovation processes.

On the basis of this theoretical and empirical reflection, issues related to infrastructures and their design and development now represent a consolidated pillar around which PaSTIS's research work is organized.

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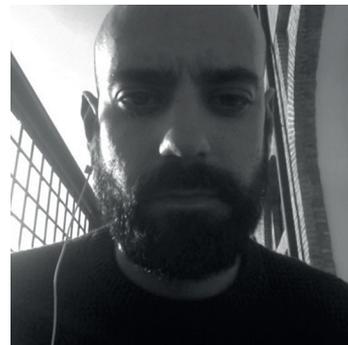
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CHERISH, NOT PERISH

December 16, 2016

Somatosphere: a medical anthropology website

By Eugene Raikhel

[Somatosphere](#) is an online forum focused on medical anthropology, as well as the humanities and social sciences of health and medicine more broadly. The site aims to raise critical questions, debate and commentary about contemporary and historical matters of science, healing, illness, and the body. One of our key goals is not only to publish engaging essays, reviews, and new research in medical anthropology and social science, but to incorporate the flexibility and networking capabilities of digital media, generating new and rich links in and among ideas and across disciplinary boundaries. While there are a number of such disciplinary links and boundaries that we have actively worked around over the years, the relationship between medical anthropology and science and technology studies (STS) is among the most significant for us.

The site was founded in mid-2008 by a small number of then-fledgling medical anthropologists, including Erin Koch, Anne Kelly, Stephanie Lloyd, Todd Meyers, Matthew Wolf-Meyers, and me. We were impressed with the success of general anthropology blogs such as [Savage Minds](#), and we all felt that medical anthropology needed a distinct space online. But it was also the case that most of us were inclined to a particular kind of medical anthropology: one that was closely engaged with questions of epistemology, history, and politics. For many of us neighboring disciplines and problem areas such as STS and the history of medicine were not only vital sources of inspiration, but domains in which we were interested in developing closer engagements and conversations. For some of us, working on the site also became a way of exploring both how medical anthropology was situated in a wider landscape of medical humanities and social sciences and thinking about what it could become.

Of course, by 2008 the relationship between anthropology and STS was well-established. Indeed, the relationship had been decades in development. Pioneers in feminist science studies included anthropologists like Emily Martin and Rayna Rapp, and anthropologists of biomedicine such as Allan Young and Margaret Lock were already engaging with science studies literatures in the early 1980s. If the 1990s had still seen the publication of works with titles like David Hess's "[If You're Thinking of Living in STS...A Guide for the Perplexed](#)" (1998) by the late 2000s many anthropologists were familiar with key STS scholars and texts. The broader project was no longer one of establishing connections but of asking new questions and developing new approaches on the basis of a medical anthropology which had one foot firmly set in the STS world. Indeed, new kinds of inter- and trans-disciplinary work was being proposed and carried out at the time, such as the [Critical Neuroscience](#) project, which drew partly on the tools of STS to enable both critique of and active engagement with the neurosciences. This kind of orientation

Somatosphere

Science, Medicine, and Anthropology

A collaborative website covering the intersections of medical anthropology, science and technology studies, cultural psychiatry, psychology and bioethics.

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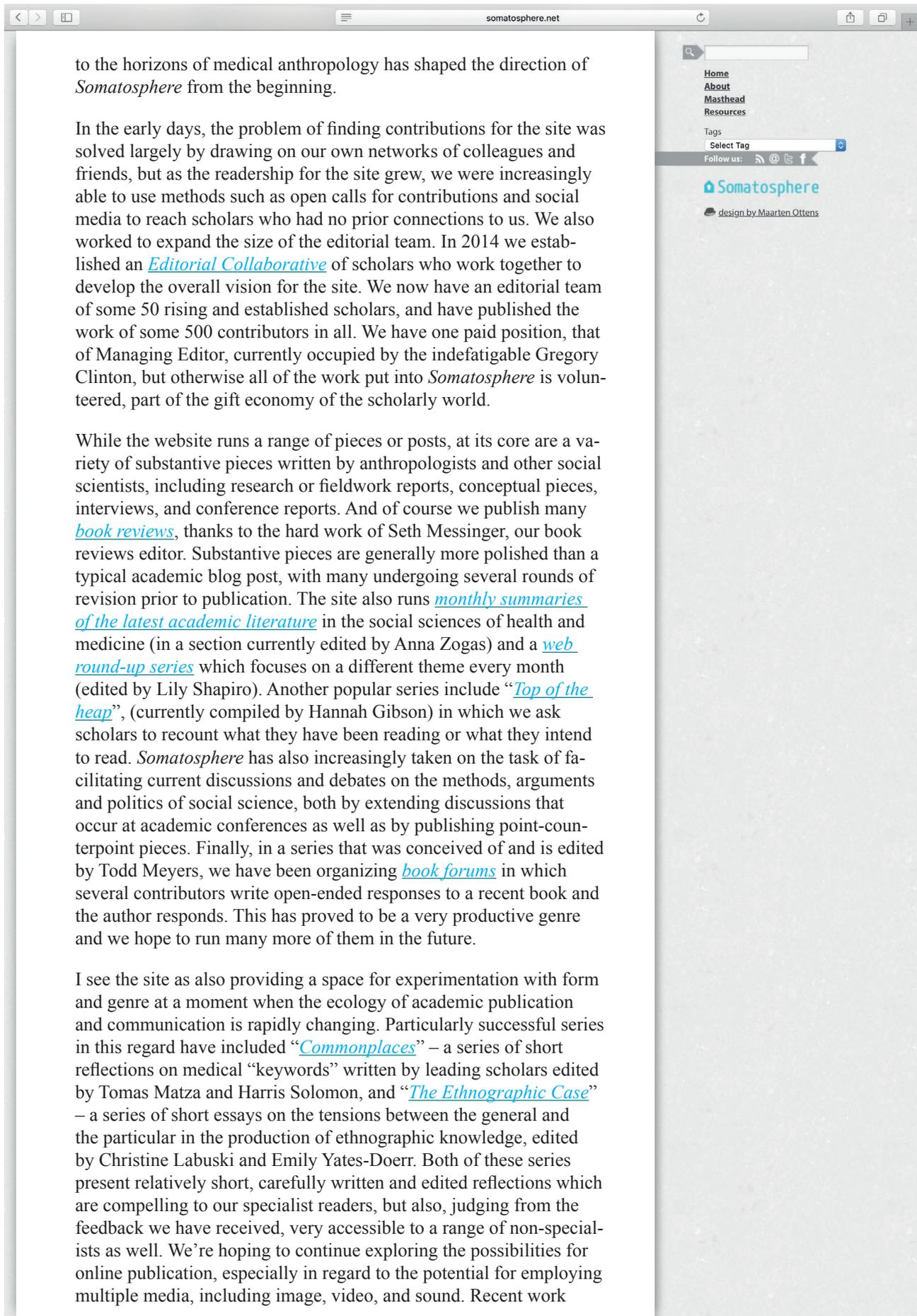
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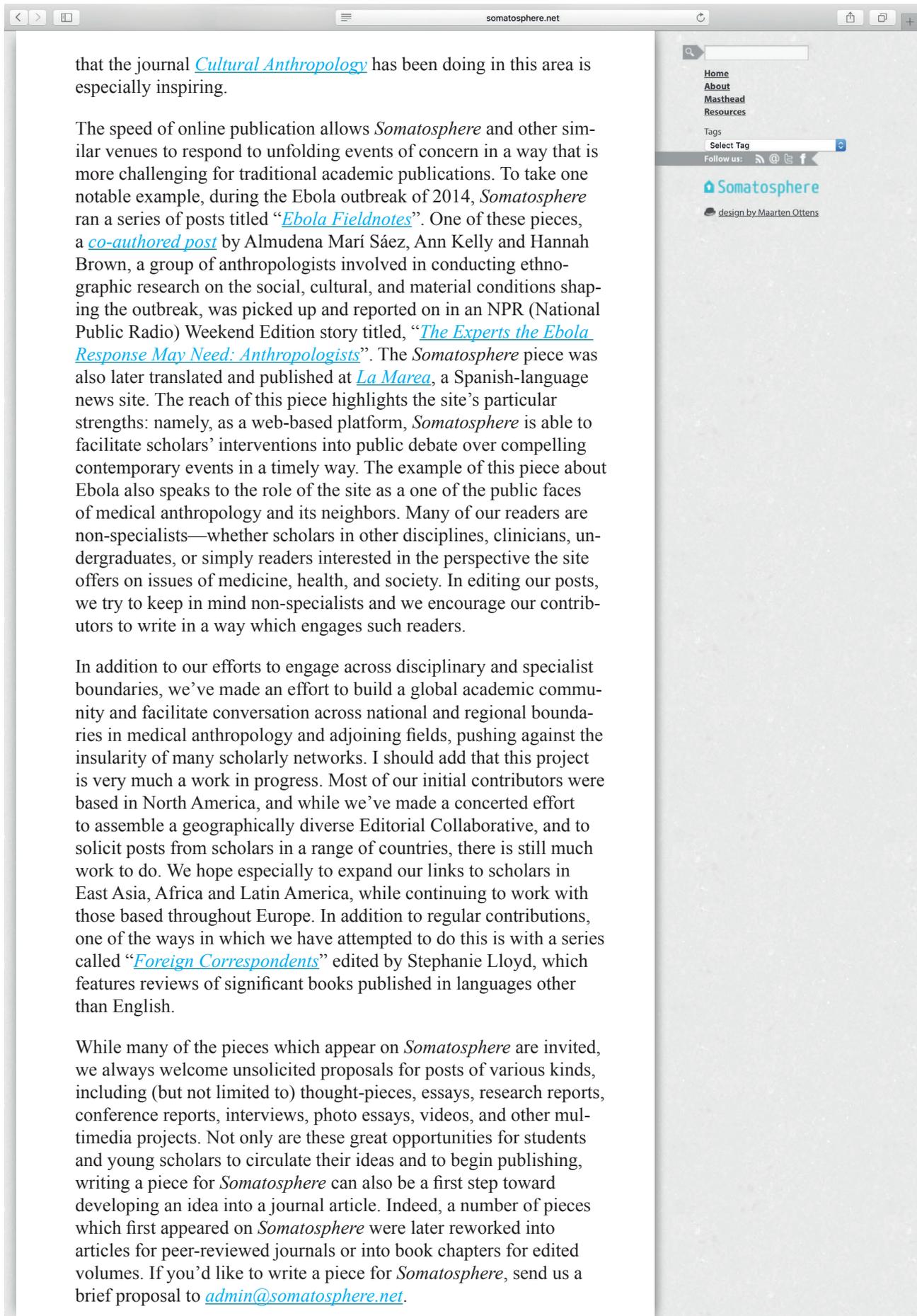


to the horizons of medical anthropology has shaped the direction of *Somatosphere* from the beginning.

In the early days, the problem of finding contributions for the site was solved largely by drawing on our own networks of colleagues and friends, but as the readership for the site grew, we were increasingly able to use methods such as open calls for contributions and social media to reach scholars who had no prior connections to us. We also worked to expand the size of the editorial team. In 2014 we established an [Editorial Collaborative](#) of scholars who work together to develop the overall vision for the site. We now have an editorial team of some 50 rising and established scholars, and have published the work of some 500 contributors in all. We have one paid position, that of Managing Editor, currently occupied by the indefatigable Gregory Clinton, but otherwise all of the work put into *Somatosphere* is volunteered, part of the gift economy of the scholarly world.

While the website runs a range of pieces or posts, at its core are a variety of substantive pieces written by anthropologists and other social scientists, including research or fieldwork reports, conceptual pieces, interviews, and conference reports. And of course we publish many [book reviews](#), thanks to the hard work of Seth Messinger, our book reviews editor. Substantive pieces are generally more polished than a typical academic blog post, with many undergoing several rounds of revision prior to publication. The site also runs [monthly summaries of the latest academic literature](#) in the social sciences of health and medicine (in a section currently edited by Anna Zogas) and a [web round-up series](#) which focuses on a different theme every month (edited by Lily Shapiro). Another popular series include “[Top of the heap](#)”, (currently compiled by Hannah Gibson) in which we ask scholars to recount what they have been reading or what they intend to read. *Somatosphere* has also increasingly taken on the task of facilitating current discussions and debates on the methods, arguments and politics of social science, both by extending discussions that occur at academic conferences as well as by publishing point-counterpoint pieces. Finally, in a series that was conceived of and is edited by Todd Meyers, we have been organizing [book forums](#) in which several contributors write open-ended responses to a recent book and the author responds. This has proved to be a very productive genre and we hope to run many more of them in the future.

I see the site as also providing a space for experimentation with form and genre at a moment when the ecology of academic publication and communication is rapidly changing. Particularly successful series in this regard have included “[Commonplaces](#)” – a series of short reflections on medical “keywords” written by leading scholars edited by Tomas Matza and Harris Solomon, and “[The Ethnographic Case](#)” – a series of short essays on the tensions between the general and the particular in the production of ethnographic knowledge, edited by Christine Labuski and Emily Yates-Doerr. Both of these series present relatively short, carefully written and edited reflections which are compelling to our specialist readers, but also, judging from the feedback we have received, very accessible to a range of non-specialists as well. We’re hoping to continue exploring the possibilities for online publication, especially in regard to the potential for employing multiple media, including image, video, and sound. Recent work



that the journal [Cultural Anthropology](#) has been doing in this area is especially inspiring.

The speed of online publication allows *Somatosphere* and other similar venues to respond to unfolding events of concern in a way that is more challenging for traditional academic publications. To take one notable example, during the Ebola outbreak of 2014, *Somatosphere* ran a series of posts titled “[Ebola Fieldnotes](#)”. One of these pieces, a [co-authored post](#) by Almudena Mari Sáez, Ann Kelly and Hannah Brown, a group of anthropologists involved in conducting ethnographic research on the social, cultural, and material conditions shaping the outbreak, was picked up and reported on in an NPR (National Public Radio) Weekend Edition story titled, “[The Experts the Ebola Response May Need: Anthropologists](#)”. The *Somatosphere* piece was also later translated and published at [La Marea](#), a Spanish-language news site. The reach of this piece highlights the site’s particular strengths: namely, as a web-based platform, *Somatosphere* is able to facilitate scholars’ interventions into public debate over compelling contemporary events in a timely way. The example of this piece about Ebola also speaks to the role of the site as a one of the public faces of medical anthropology and its neighbors. Many of our readers are non-specialists—whether scholars in other disciplines, clinicians, undergraduates, or simply readers interested in the perspective the site offers on issues of medicine, health, and society. In editing our posts, we try to keep in mind non-specialists and we encourage our contributors to write in a way which engages such readers.

In addition to our efforts to engage across disciplinary and specialist boundaries, we’ve made an effort to build a global academic community and facilitate conversation across national and regional boundaries in medical anthropology and adjoining fields, pushing against the insularity of many scholarly networks. I should add that this project is very much a work in progress. Most of our initial contributors were based in North America, and while we’ve made a concerted effort to assemble a geographically diverse Editorial Collaborative, and to solicit posts from scholars in a range of countries, there is still much work to do. We hope especially to expand our links to scholars in East Asia, Africa and Latin America, while continuing to work with those based throughout Europe. In addition to regular contributions, one of the ways in which we have attempted to do this is with a series called “[Foreign Correspondents](#)” edited by Stephanie Lloyd, which features reviews of significant books published in languages other than English.

While many of the pieces which appear on *Somatosphere* are invited, we always welcome unsolicited proposals for posts of various kinds, including (but not limited to) thought-pieces, essays, research reports, conference reports, interviews, photo essays, videos, and other multimedia projects. Not only are these great opportunities for students and young scholars to circulate their ideas and to begin publishing, writing a piece for *Somatosphere* can also be a first step toward developing an idea into a journal article. Indeed, a number of pieces which first appeared on *Somatosphere* were later reworked into articles for peer-reviewed journals or into book chapters for edited volumes. If you’d like to write a piece for *Somatosphere*, send us a brief proposal to admin@somatosphere.net.

STS EVENTS

'TAKEN OVER BY GAIA'

A COLLECTIVE CONVERSATION WITH BRUNO LATOUR

IUP_JI@MCTS

Prior to its opening, a research collective, IUP_JI@MCTS, met with Bruno Latour to discuss his recent Gedankenausstellung, *Reset Modernity*. Granted access to the gallery still being installed, we had attempted to follow the exhibition's closely prescribed procedures in a setting perhaps closer studio, workshop or even construction site - one former engineer among us noting the impressive range of construction tools littering the floors - than to the contemplative environment of a conventional museum. When we later met to talk with Latour we had to confess we'd found it harder to follow the procedures than the catalogue accompanying the exhibition seemed to suggest it would be. Perhaps we had been distracted by the harried curators and exhibition designers running around us and shouting to each other. Or perhaps we had reset modernity (!) but the realisation had yet to sink in. When would we know? What if our resets were like those of our smartphones that simply 'restore default factory settings'? The following extracts are taken from the conversation between the TU Munich researchers and Latour in which we pressed him to elaborate some of these problems. In well-humoured exchanges, Latour explained how he - and the project of resetting modernity - has been "taken over by Gaia". The following extracts are taken from a longer transcript that moved between planetary-scale problems, issues of social design and discussion of public experiments.

Fig. 1: IUP_JI@MCTS in conversation with Bruno Latour at ZKM.





Fig. 2: Tools for Resetting Modernity

IUP_JI@MCTS: In the catalogue we find various references to your project An Inquiry into Modes of Existence (AIME). This project is, at least in the way you present it the book of that title and in the exhibition's catalogue, a highly systematic project. But when we go to the gallery we are presented with displays that appear, in their assembly, more like the work of free association. Clearly Reset Modernity is not simply putting the Modes of Existence system on display, or if it is then the modes appear surprisingly difficult to detect. Could you explain how this exhibition relates to your aims and method of the Modes of Existence project?

BL: Well, my AIME project itself is a descendant of the STS program I started from, because my essential loyalties are to the STS field I started with. There is no way you can begin to handle what could be called ontological pluralism without first having resituated knowledge production... so for me STS was the only way and it still is! If you talk with people who are not STS there is not much you can say, because they imagine knowledge to be everywhere unsituated. Now, the AIME project is an excessively long and elaborated, and in some way, systematic, enquiry on the modern. The horizon of the project is what I call Gaia. Currently, we have a political situation in which we have to deal with an ecological mutation in which politics becomes extremely difficult to pursue. I'm interested in multiplying the medium to deal with this question of Gaia. So, I did a theatre play last year, a big simulation with my students in Paris of the Climate Conference last year as well and this time we do an exhibition. I'm doing this is because, well, first, because I find it funny to change the medium, and also because every time you have a different medium you strengthen and deepen the consequence of what might otherwise appear a somewhat abstract argument. We wanted with the curators, my friends there, to multiply the entry points into the AIME project: so we had the book, we had the site, we had the encounters. We were from the beginning interested in trying to see if this project can be understood and make people sensitive to the argument through an exhibition. It just so happened that the exhibition does not explicitly mention AIME at all except in the catalogue, but even there it's only in the political and, religious part. AIME too has been taken over by Gaia, basically [laughter].



IUP_JI@MCTS: Reset Modernity is presented as a Gedankenausstellung - a thought exhibition - and you and your colleagues are credited as its curators. But curators have rarely been credited as great thinkers: they are credited as technicians, administrators, sometimes even as artists but rarely as thinkers. Who is doing the thinking and the research in this exhibition?

Fig. 3: Curating in action

BL: I have absolutely no principal answer to that. Bricolage is my rule and the only systematic thing I do is AIME; the rest is complete bricolage. Why Gedankenausstellung? Firstly, it's chic because it's a German word and a very long German word [laughter]. This is third exhibition I've done with Peter Weibel and there's no other place in the world where this would be possible. In relation to the classical thought experiments from Kepler to Einstein, at least as I understand them, you actually experience what the experimental situation would be like and you share this experiment with other people. So you create a collective thought experiment, so to speak. And we are not the only ones engaging in this practice: you know Sarah Palin is producing a film on the fact that climate science is bunk?! We want to engage in a politics of climate but how can we when our politics doesn't have a city corresponding to the one our ancestors recognised, or notions of democracy, land, territory, sovereignty, power, war that no longer matter? All of those words have to be reinvented for a politics of climate. You have to do a thought experiment, which we call here an exhibition experiment. What we are doing with the medium of art is not so different from what geologists or stratigraphers working on the anthropocene do when they imagine "what it would be if"...

Now who is doing the thought experiment? It's of course the curators, then it's the visitors and all of the intermediary people I love here, the dozenten: so it's a small thought collective, Gedanken collective, to use the famous expression.

IUP_JI@MCTS: We can't help but be alarmed by urgent tone you adopt in the Reset Modernity catalogue. Do we need to speed up STS to keep pace with the barrage of facts being produced in contemporary technoscience?

BL: Well I am also for slowing down... I think the two are not contradictory. We need to slow down, which is one way of stopping having been modern, but also to register the urgency of the present situation. And, I think it's exactly the same movement: slowing down is avoiding the panic, and the angst, which is not conducive to any sort of thinking. Jan Zalasiewicz, a great stratigrapher, and the head of the anthropocene commission, I think has this tone of, how could I say, quiet anxiety.

If we undervalue and underestimate the threat it is because we are using old reason and old idea of science. Paul Edwards showed in his book on the Vast Machine of climatology the deep tragedy of all these scientists who are taken out of the usual, slightly comfortable, epistemological view, and then dropped into the anthropocene and having to deal with all sort of strange things like ethics, morality and art and even sci-art. They are scientists, but they are scientists, of alarm, it's a new role for a new situation. We can help those scientists navigating this very difficulty. If it's not our field of STS who deal with this situation then I don't know who will do that.

IUP_JI@MCTS: Is this exhibition just about the presentation of your research or are the procedures you've prescribed also designed to give visitors the experience of researching?

BL: Well the distinction is hard to make because my aim is to build a dispositive where, people are supposed to be co-inquirers. Now, of course, I haven't done many exhibitions, only three or four, but I'm always surprised by the complete indifference of the curators for the reaction of the public. They do care, of course, about things: the happiness of visitors and do people find the ticket too expensive and so on. But, they never actually use exhibitions as an experimental setup. As an STS person, for me this is an occasion to bring thousands of people into a dispositive. We should be able to share something with the visitors, not simply exploiting them for data, but for this we need a protocol. Usually, curators don't have so many ideas: they, put things together, assemble things, and they say "let the public do the work". But you never know what the public will do with a gallery display. That's why people often go through galleries, especially art shows, very quickly, because nothing is constructed experimentally. For me that's a huge waste of time. With an exhibition you can do an experiment, you just set it up, you have a protocol and you observe what's happening: I mean this is basic [laughs], basic use of a scientific dispositive.

IUP_JI@MCTS: Don't you think some people might feel uncomfortable with the whole idea of a procedure for an exhibition experience, not least for an exhibition addressing the controversial and complex political topics raised in Reset Modernity?

BL: The procedures are simply for resetting. The notion of reset, as I mean it here, is in the sense of the laboratory where you have one measurement and you cannot do the second measurement without resetting the balance. It's a very simple idea: reset is not to restart again and there's a whole chapter in the catalogue by Donato Rici about this metaphor. In the beginning I was not convinced by the title, but now I like it more and more because it's not a tabula rasa, it's not a revolutionary term. By resetting you become sensitive to registering information. I mean this is why I'm so excited by the museum: we're using a classical technique to do STS-style cartography to mix and overlap territories in 3-dimensions.

In the exhibition we talk about the compass. The compass of course is a simplified metaphor, but we are in new, territory, and we need “regrounding”, to use an expression of one of my students. Regrounding is not nation construction, it’s earth construction. The earth is not a nation state, it’s not a sovereignty, it’s not the globe it has very different characteristics, and that’s the task, the political task, is to describe it. If we fail to reground we will be back to ethnicity and nationalism very fast; and things are moving fast in that direction.

Reset, is not a modernist metaphor that requires us to choose between progression and backwardness. A reset is not backward, but is absolutely necessary to get information again: with a balance or set of scales you don’t go backward. But, unfortunately, this is what politics today is all about. Politics has become entirely reactionary, about movements back to the land of old, and it’s everywhere - well, I don’t know about Indonesia but certainly in Europe, America and England it’s everywhere. To finish on STS, then, this is a most important, task: do we try and find a third position which is neither the land nor the globe but which is the earth? The earth is very different from the globe because it’s flat, it’s small, it’s not nature, it has very different features, the earth is a different beast.

IUP_JI@MCTS is a loosely assembled collective based at TU Munich that pursues earnest and sceptical questioning of researchers acting in the name of modernity. IUP_JI@MCTS is dogmatically committed to actor-network theory concepts from the 90’s and has been called idiotic, apparently a compliment. The collective may have wilfully misunderstood the concept of “reset” as it is deployed in this exhibition.



SPECIAL FEATURE:
4S/EASST CONFERENCE 'SCIENCE AND TECHNOLOGY
BY OTHER MEANS', BARCELONA, 2016

HOW TO INHERIT FROM BARCELONA?

Ignacio Farías

How to inherit from 'this' intervention? This was the question that Lucy Suchman posed in the plenary session with Isabelle Stengers, as she reported on the sub-plenary session discussing the future of academia in the neoliberalizing institutional environments STS scholars currently work. What to do with the powerful propositions for abolishing authorship, resisting quantification, rethinking academic work? How to make them productive, generative? How to keep them alive, make them public?

In these notes, I would like extend Lucy's question and ask how to inherit from the intervention that the 4S/EASST conference in Barcelona made (or aimed to make) in the field of STS – an epistemo-political question that takes the form of both, a public recognition of the powerful conceptual proposition made by the local organizing committee through their careful curating of the plenary and subplenary sessions and, most importantly, an invitation to the STS community to engage with such proposition, to inherit from the conference as a situation that provokes thinking.

What did the Barcelona conference stand for? What was the intellectual intervention?

I think the most interesting proposition was not the conference's motto 'Science and technology by other means', which directed attention to multiple engagements with science and technology by "private not-for-profit actors, such as CSOs, patient organizations and new citizens' collectives", and how these are "forging routes to explore more democratic and hospitable futures in the times of care, housing, food, financial and environmental crisis". These questions reflect concerns that have shaped STS's ethico-political engagements since at least the late 1980s. Thus what the Barcelona conference motto did was to stress this set of concerns as the common ground for any field-wide conversation.

Beyond this, the Barcelona conference entailed a different, perhaps more-subtle, but also more powerful proposition concerning the voices, alliances and visibilities that STS needs to position itself vis a vis the current neoliberalizing/anthropocenic/post-truth situation. The key here, I think, was to highlight the contribution of feminist technoscience studies as not simply one important tradition in STS, but as a critical source to rethink the whole field of STS as a feminist project. All plenary and subplenary sessions, I felt, were carefully attuned to the feminist invitations of thinking with, against and alongside technoscience, reimagining STS as a collaborative endeavour with collectives committed to making visible, and experimenting with other forms of not just science and technology, but of life together. The figure of 'community by other means', which emerged in the conversation of Michele Murphy and Madelaine Akrich, grasped very well the spirit of these conversations.

In the same vein, the Barcelona conference gave prominence to current articulations of STS and anthropological modes of thinking and researching. Let me clarify this: this wasn't about re-invoking the capacities of ethnographic methods for studying science and technology or warning us to not lose sight of humans when studying complex techno-scientific projects and infrastructures. The conference's recourse to anthropology expressed itself in the invitation to embrace the possibility of refiguring inquiry as a form of collaborative enterprise with STS' various interlocutors; collaborations that are not only a matter of ethico-political commitments, but also of theorico-conceptual reflexivity.

When I paraphrase Lucy Suchman paraphrasing Isabelle Stengers to ask how to inherit from Barcelona, I don't want to suggest that the local organizing committee's programmatic intervention would be the 'right' agenda both in academic and political terms for the future of STS. But, more modestly, to simply point out that what we encounter here are propositions that could help us to collectively think about the future of STS as an intellectual practice.

Speaking of which I cannot fail to mention the wicked politics of conference-making.

Barcelona was the first conference organised or co-organised by EASST to be held in a conference centre. There were many good reasons why this came to be the case. The most obvious one was the sheer number of participants (around 2000) and the need to delegate some organizational tasks to professional service providers. However, I think there are also good reasons for maintaining the tradition of university-based conferences. To begin with, this could allow us to not subject our conferencing practices to the surveillance of a security apparatus and to counteract their commoditization up to the last drop of water. University-based conferences, I think, give local organizing committees and the associations involved more leeway over otherwise black-boxed issues, such as what is technically possible, what is economically viable, what is environmentally sustainable, etc.

But, beyond this, university settings are also crucial to situate our knowing and conferencing practices differently. To not encounter each other as academic tourists in global non-places close to a sunny beach, but to attach ourselves to local settings of knowledge production. Whether this type of university-based conferences could continue under the current model of joint mega conferences is an open question. The Barcelona conference managed to at least partially square the circle by organizing a program of parallel activities that took at least some of the conference participants in some critical places of local knowledge production and contestation, such as the visual arts research centre Hangar or the Museum of Design. But it probably requires more than parallel activities in order to practice conferences as learning devices that situate participants in local settings of STS production.



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YET ANOTHER INDUSTRIAL REVOLUTION — A DIALOGUE ON TENSIONS IN DIGITAL FABRICATION

Yana Boeva, Bruno Chies

THIS YEAR'S 4S/EASST ANNUAL MEETING BROUGHT MANY TRACKS PORTRAYING THE RECENT PRACTICES AND ACTIVITIES IN MAKING, HACKING, CRAFT, DO-IT-YOURSELF. ONE OF THEM, ORGANISED BY JOHAN SÖDERBERG, ADRIAN SMITH, AND MAXIGAS, FOCUSED ON DIGITAL FABRICATION. TRACK 011 LOOKED AT THE CONFLICTING NATURE OF DIGITAL FABRICATION AS IT OSCILLATES BETWEEN DEMOCRATISING THE FUTURE OF TECHNOLOGY PRODUCTION AND DESIGN AND ITS HERITAGE IN COMPUTER NUMERICAL CONTROL (CNC) TECHNOLOGIES AND DESKILLING OF WORKERS. THE TEN PAPERS PORTRAYED THE PLURALITY AND TENSIONS IN CONTEMPORARY DIGITAL FABRICATION THROUGH A RANGE OF EMPIRICAL CASES AND THEORETICAL DEVELOPMENTS. IN THIS SHORT CONVERSATION, WE REFLECT UPON THE IDENTIFIED TENSIONS TO DISCUSS FURTHER THE RELEVANCE OF HISTORICAL COMPARISONS WITHIN THIS RESEARCH CONTEXT.

YB: In review, how would you summarize the liberatory ideas around the contemporary digital fabrication from the presentations in the track?

BC: As an outsider to the field of making and digital fabrication, I wanted to know more about the values (or regimes of value - Boltanski and Thévenot, 2006) that are guiding these practices—how they may coexist, clash or subordinate one another. I have identified at least three distinct regimes of value, based on the empirical cases presented by the panelists. Obviously, what follows is a simplification, but I guess it can be a good starting point for our discussion.

Roughly put, digital fabrication has been explained or heralded as:

- A way to democratize knowledge and to empower communities by giving them an opportunity to appropriate technological tools and innovate for collective needs. Similarly, it could be described as a way for people to own back the means of production and to allow for non-alienated forms of labor.
- As part of a green discourse, when it is praised as a way to save natural resources by manufacturing locally and sharing globally open digital designs for more sustainable products (see also Kostakis et al. 2016).
- As a form of open innovation that can be easily geared towards the creation of new marketable products and services, a form of entrepreneurship that can be at the service of industrial research or of startups seeking investors on financial markets; as the key to an era of economic growth based on knowledge and innovation.

I could see in some of the empirical cases presented at the track that one or another mode of valuation was predominant, or that there were usually some tensions between them (some more explicit, some less).

YB: I think you identified most attributed values. In addition, there are hybrids between them, as aiming for sustainability through local production might be something that a local community is looking to achieve through the means of digital fabrication. In a sense, it's community-building through resourceful digital fabrication. While I don't recognize any critical tension between the first and the second form, there is certainly potential for conflict when the third one acts upon the other ones.

BC: Then the suggestion by the track convenors, to [look back at history](#) and find similar (if not the same) kind of tensions, might be accurate. I am sure there are both continuities and discontinuities. How relevant and productive do you think these historical comparisons can be for the case of digital fabrication?

YB: I think this suggestion was outside of the scope or research goal of most of the presentations. Some of them clearly identified if not a similar historical tension, at least a historical point of reference to compare the ideological developments of digital fabrication. That being said, we can begin with some of the presented cases and see how much we can connect our discussion to temporalities.

The ten presentations not only reflected the different meanings of making and digital fabrication to the different actors being studied, but also revealed that the very same aim to transcend the common geopolitical and disciplinary boundaries. At best, they show how different studies of one and the same concept, here for example, mass customization through digital fabrication, can lead to somewhat opposing results and understandings. As in ginger coons' detailed study of contemporary digital customization techniques for the mass-consumer market, where she argued that they cannot generate the same experience and connection between consumer/client, manufacturer, and the object of production as was the case of late 19th century tailor-made dresses in Victorian England. On the opposite, Sam Forster and Katharina Vones argued that through the introduction of 3D printing of souvenirs in a cultural institution such as a museum or a castle, museum visitors often felt they were getting something unique or custom-made for them instead of the common mass-produced objects. What both studies disclose is that digital fabrication, based on the principles of Computer Numerical Control (CNC) systems, is actually much closer to the mass-production processes than it is to traditional craftsmanship, but through its small scale of production it appears as tailor-made to the end-user. This is just one side of the story to look at.

For me, at times, the meanings and valuation of making and digital fabrication for different people remind me a little bit of the Arts and Crafts movement and its ideology. Those who had the time to indulge in it as leisure had the financial security and the free time of the upper middle class. The others did not have the free time and most likely had to do it for a living. This is similar with digital fabrication—in wider parts of the Global South it provides the means and promises for a better living. So the ties to innovation are not bad per se. On the other side, we can see how in the rather affluent parts of Europe and North America it's being adopted for the promise to contribute to sustainable living and to reduce our global problems of consumption, pollution, or poverty. Yet again, even within the Global North the access to it is limited by our financial and social status.

The question is how to balance the utopian vision of making and digital fabrication as being practices and tools for everyone and their incorporation into the same old ways of knowing and doing. It is in this sense a bit like the archetypical idea of the computer hackers revolting against the system, while at the same time so many of them are ready to take on a job for the global IT companies. I think, more than anything else, the track displayed that we might need a typology of making and digital fabrication. Then, again, STS teaches us that classifications fail to account for everyone and everything (Bowker & Star 1999).

BC: You made two interesting remarks there. First, on how digital fabrication may be closer to customization *within* mass production than to small-scale craftsmanship. To that I would also add a complementary historical pattern in computer development: the relations of power and control between managers and the detainers of capital, on the one hand, and knowledge-workers and makers, on the other, which have been updated, only to be kept the same. Here I'm thinking about Tobias Drewlani and David Seibt's description of Google's Project Ara, for designing a modular smartphone, whereby a certain openness towards hackers and independent developers in the innovation process can be easily translated to enhanced corporate control.¹ Collaborative dynamics and open knowledge are embraced by corporations, as long as they are the ones setting the standards in the design process and controlling production and distribution.

Second, you mentioned the question of access to these spaces, usually limited to those with a certain financial and social status. I was happy to see a counterexample in Rafael Dias and Adrian Smith's presentation, about digital fabrication labs in São Paulo and their connection to the local community and schools. Apparently, one of the spaces was set up mostly with an educational focus, to provide the tools and social environment for the purpose of learning, of exercising creativity and curiosity. Not only did they observe a kind of "barefoot making" (as the authors named it, in contrast to the predominant culture of white male geeks), but also a space that did not come with any requirements or expectations to innovate, to produce "disruptive" ideas or products to the market. This arrangement should last, of course, as long as there is any budget – and not less important, the political will – for the municipality of São Paulo to continue funding the place.

This brings us back to the question of a wider context - political, economic or even historical - in which these spaces are inserted. The context should be explained (and not the automatic explanation), of course, for each empirical situation, but as researchers we should not overlook the recurring patterns that can be identified across sites. I noticed this thread running throughout the different presentations. Evelyn Lhoste and Marc Barbier treated the institutionalization process of the hacking and making movement by focusing on the work of Fab Lab managers as brokers, whilst Klara-Aylin Wentel, Sascha Dickel and Anton Schröpfer showed how a makerspace in the Technical University of Munich² turned into a place for potential entrepreneurship, for business and startups, thus reproducing employer-employee relations and more hierarchical modes of knowing and investigating. The political context in urban planning was also pinpointed by Ramón Ribera-Fumaz: makerspaces can be planned top-down, placing a city in the global market to attract capital and startups, or they can be set up in a bottom-up fashion, towards citizen empowerment and to attend local needs.

Whether you call this interplay between different modes of valuation a process of "transformation", "co-optation" or even "translation" of interests (the latter following the ANT-inspired approach), you have to recognize, as a scholar, that there are enduring patterns throughout time and space (call them social/power structures, depending on your theoretical leanings), despite the ontological uniqueness of each empirical setting studied. The proposal of the track, in this reading, was to identify one such pattern of social relations running throughout history.

YB: I'm glad you mentioned the context within which Fab Labs and makerspaces are both set up and researched, as well as how they are increasingly integrated into corporate and institutional traditions. I would add to that the idea of the value of co-creation for corporations and organizations. I would not argue that control is necessarily the leading motivation for projects like Project Ara or even the workshops run by UnternehmerTUM. Most often, larger companies and institutions just lack the flexibility to develop and create new concepts and products by themselves and the "open" inclusion of externals in these projects fosters innovation. Despite that, in the end the model often leads to what you described.

¹ In their presentation, Drewlani and Seibt showed how the conflict between openness and closure slowed down the development of the project. As a matter of fact, Project Ara was officially discontinued by Google on September 2, 2016—one day after the two researchers presented their empirical study. <http://www.reuters.com/article/us-google-smartphone-idUSKCN11806C> [retrieved on October 14, 2016]

² UnternehmerTUM, <https://www.unternehmertum.de/index.html> [retrieved on October 14, 2016].



BC: The motivation behind this kind of projects is ultimately to increase profits by developing new technologies. Some form of control is necessary in order to accomplish that, either by setting the standards of the design or by owning the property rights or the capability to produce and sell any product based on the developed technology. But are the forms of control today the same as they were once, when the first forms of computerized automation at industry were seen as a way to solve the problem of labor (Noble 1984)?

Fig. 1: Tools for digital fabrication in Machines Room, London

Courtesy of Yana Boeva, 2016

YB: As Maxigas points out to David Noble, the introduction of CNC in the United States was meant to reduce workers' control in the production process and suppress their skills (Noble 1984). But Noble also notes that with time the skills became dispersed, engineers had to interact with shop-floor workers in order to achieve what they wanted, and workers had to acquire and adapt their technical skills, so a full deskilling never happened. Moreover, not all historical examples of CNC machines or computers in work practice were considered negative or a plan to deskill workers. Pelle Ehn and Morten Kyng's famous Scandinavian UTOPIA project from in the 1980s, where the introduction of computers for the production of a daily newspaper involved the printers, the typesetters, and the journalists to work on the development of this new system, is one such historical example of a cooperative type of hierarchy (1991).

I find it interesting that the track description brought the example of the "historical irony" that now workers demand that such automation is being introduced. I think the difference to 40-50 years ago as in Noble's examples is that those machines and computers are now part of worklife and for many not only indispensable but also least understood as a control mechanism. If we take 3D printing as an example and its use in Fab Labs, especially those charging a pay-on-the-go fee, it might actually give back control to the 'workers'—those that use it to create and manufacture prototypes of designs without the classical manufacturing chain of

outsourcing the production elsewhere, often abroad, and waiting for their prototype to be shipped back weeks later. Rather, where I see what Noble describes happening, is the full automatization of production with robots and not deskilling, but displacement of human beings. But this is a topic for a different discussion.

BC: The project of substituting unruly factory workers by machines certainly did not work. What solved this issue (still from the perspective of the corporate and managerial elites in the US) was moving production overseas to China and other countries with cheap workforce. That is why we need to situate technological development and its intimate relationship with labor in different periods of history (and here we are talking mainly about post-war capitalism and the subsequent period of neoliberal globalization). It is telling, for example, that John Maynard Keynes's prediction in the 1930s about technological development lowering our working hours considerably by the end of the twentieth century never became true. What happened there, and what kind of technological advancement is being made? I find very compelling David Graeber's (2015) argument that the present form of capitalism is more characterized by an all-pervasive bureaucracy than competition in the market spurring innovation and technological breakthroughs. In this respect, one could not help but wonder if hackerspaces and makerspaces were not also set up originally as a reaction to this bureaucratic and managerial culture of research, both within universities and corporate R&D departments. Certainly, for many they seem to be an oasis for curious, no-strings-attached, exploration of technology, in a desert of administrative paperwork and productivity goals. Perhaps that is also why leading companies are turning towards peer production and fomenting collaborative dynamics (IBM and Linux, for example), as a way to find the value they would not get from regular job contracts. Add to this the so-called sharing economy of Uber and Airbnb and we have got a great and unsustainable model based on precarious labor. But the game is not over and digital fabrication still holds its promises in a hostile environment. I agree that 3D printing has a potential to relocalize manufacture, to create a design commons, and empower cooperative of workers and communities. In that case, we need to create and reinforce the appropriate institutions to make it work.

YB: Good point and I won't dispute this. For sure, many of these spaces and collectives began as a counter-reaction to the 'slow' and inaccessible modes of research and production. But I wonder which appropriate institutions would be the most empowering. In my research, I've been encountering several funding models for makerspaces and Fab Labs in order for them to be able to survive — communal or national government funding to establish the space, corporate partnerships to acquire the machines, business angels to ensure that staff gets paid, and at the very least paid memberships to keep it running. It's not very different from how academic institutions or small companies run their business. Perhaps, and in conclusion, the difference is in the scale as one of my interviewees said about the plastic waste produced with 3D printing — at least, it's one small piece at a time and not the thousands of mass-produced pieces of junk that drive the global economy.

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FROM LABORATORY LIFE TO THE LIVING AND TINKERING LABORATORIES OF CARE: A NEW PERSPECTIVE IN STS RESEARCH?

Cristina Popescu

INSPIRED BY THE KEYNOTE PLENARY INTERVENTION OF MADELEINE AKRICH ON "INQUIRIES INTO EXPERIENCE AND THE MULTIPLE POLITICS OF KNOWLEDGE" AT THE 4S/EASST CONFERENCE IN BARCELONA 2016, THIS ARTICLE DISCUSSES THE PROFILE OF AN EMERGING PERSPECTIVE IN STS RESEARCH: A TINKERING LIVING LABORATORY OF CARE. MOREOVER, IT PROVIDES A CLOSER EXAMINATION OF CARE THEORIES AND PRACTICES AS THEY WERE ADDRESSED IN THREE SESSIONS FROM THE SAME CONFERENCE. A TINKERING LIVING LABORATORY OF CARE IS A SOURCE OF KNOWLEDGE "BY OTHER MEANS", IT OVERPASSES AN INDIVIDUAL WAY OF THINKING, AND ARGUES FOR COLLECTIVE-ORIENTATED THEORIES AND METHODOLOGIES.

My aim is to give an insight into an emerging line of thought according to which the European (and North-American) societies are transforming themselves into innovative living and tinkering laboratories of care. The article draws on four thematic units from the 4S/EASST Conference in Barcelona 2016, across which a "career" of the concept of "care" could be remapped:

- The keynote plenary presentation by Madeleine Akrich on "Inquiries into experience and the multiple politics of knowledge" (Akrich, 2016)
- "Environments of care: understanding and shaping care by other means", T152 session
- "Care Innovation and New Modes of Citizenship", T062 session
- "STS and normativity: analyzing and enacting values", T049 session

EXPERIENCE VS. EXPERTISE

"Patient-centred" care and research are alternative ways of generating "knowledge by other means", states Akrich. Undoubtedly, there are different forms of producing knowledge, and they all value both experience and expertise, even if the combination of these two might vary from one type of (scientific) research to another. On the one hand, experience of users could be understood as their own expertise intended to bring new knowledge for the "evidence based activism" (Rabeharisoa et al., 2014). On the other hand, experience of the users and patients can appear only as targeted action, with reduced scientific value. It can nonetheless show itself as intermediary tool informing the expertise of the researchers. When following both types of logic, science and technology emerge as mediators between people and their diseases; they are mediators of new experiences.

TOWARDS THE PATIENT/USER CENTEREDNESS

But what did determine the switch towards the patient or user “centeredness” as source of “knowledge by other means” in STS? A literature review from the 1980’s onwards shows the evolution of perspectives over the last thirty years.

Innovation in knowledge was traditionally related to laboratory life (Latour, Woolgar, 1979). Translation of practices and networks of human and non-human actors worked together in order to produce explanations and innovative technical and scientific practices. If Latour and Woolgar (1979) experienced the life of a laboratory in order to show the “social construction of scientific facts”, more recent studies attempted to transform the “real” life into their laboratory. One initial solution was to relate technological innovation success to experiences and experiments within confined spaces, with determined rules (Akrich et al., 1988; Woolgar 1991). But this approach showed its limits as the real life conditions of use could change the results obtained within too “controlled” environments.¹

During the last fifteen years, another solution took progressively shape, the “living labs”. They are mainly related to the economic or business-centred innovation areas (e.g. European network of living labs²) and often feature their interdisciplinary research (e.g. MIT Living Labs³). For the professionals within this field, the formula of the “living lab” covers those methods developed to involve users in innovation. From a methodological point of view, their multiple attempts at defining the “living labs” remained nonetheless related to confined rules and strategies, not always able to acknowledge the complexity in practice (Law, Mol, 2002), despite the co-creation and co-design processes at work. At the same time, the user became the central figure, as opposed to an “assumed” technical and scientific expert (Ballon & Schuurman, 2015: 10).

Additionally, the same need to see how actors participate to their environment helps maybe to better explain recent research import of theories of care into STS. In fact, talking about co-creation and co-design determines a dynamic point of view on practices, but it won’t be enough to understand what makes people adopt a socio-technical artefact, the processes at stake, the attachment and the adjustments in front of the objects, or the values the actors mobilize into action. Further on, a change of perspective appears when the researcher draws the boundaries of the socio-technical world that emerges in front of her. No trial or test is deliberately imagined into a care theory approach. No rules are given at first, but they can be observed through tinkered methods or methodologies later on. Finally, this stream of research pays attention not only to human or non-human actors, but also to the environment-in-the-making: individuals engage with their material surroundings, take care of each other, tinker activities and shape interdependences. One can therefore call this perspective “a tinkering and living laboratory”, different from a schematic or systemic “living lab” as previously presented.

¹ The interest of this device was previously discussed: “[...] laboratory experiments are simplificatory devices: they seek to tame the many erratically changing variables that exist in the wild world, keeping some stable and simply excluding others from argument.” (Law, Mol, 2002, 2). Simplifications nonetheless “are used as a basis for action” (Law, Mol, 2002, 3).

² “The European Network of Living Labs (ENoLL) is a worldwide community of Living Labs with a sustainable strategy for enhancing innovation on a systematic basis. ENoLL aims to support co-creative, user-driven research and contribute to the creation of a dynamic European innovation system, with a global reach.”

³ “MIT Living Labs brings together interdisciplinary experts to develop, deploy, and test - *in actual living environments* - new technologies and strategies for design that respond to this changing world. Our work spans in scale from the personal to the urban, and addresses challenges related to health, energy, and creativity”

A LIVING LABORATORY OF CARE?

A possible link could therefore be established between patient and user-centeredness in STS, and care theories and practices. All of them focus on the centrality of the collectives of users/patients into an environment-in-the-making. Though a “conceptual” unified definition of care is hard to give, the diversity of practices related to it help us to better grasp its social and political implications. Care is not only about health issues, but also about citizens’ participation to the public space, it is about understanding complex environments.

THE ENVIRONMENT OF CARE AS BASIS OF COLLECTIVE ACTION

It is indeed difficult to talk about care in abstract terms, without referring to situated practices in actual environments of care. This ecological approach draws on different actors engaging through objects into action. The presence of technical artefacts becomes important in the relationship between beings, objects, and places, as shown all along the session “Environments of care: understanding and

disabilities" (J. Moyà-Köhler and I. Rodríguez-Giralt) show autonomy as value of a good citizen. Care givers work to empower the vulnerable individuals who, at their turn, by gaining more independence in action, "take care" of their fellow citizens, and even of the general "welfare system", by saving their support efforts.

Formal and informal engagement in care is also observed within small or large-scale interactions. Important examples offer for instance the "telecare innovations" used at the family level (H. K. Andreassen, C. Pope, C. May) or the digital collectives of mothers who develop "practices of associating and sharing knowledge with others" on medical matters like Umbilical Cord Blood Banking and mastitis in Spain. In this case, "sharing knowledge with others" activates care towards a collective action (P. Santoro, C. R. Bachiller). The general role of institutions is however less visible in shaping the value of care until now.

CARE BEYOND THE FRONTIERS OF HUMANITY

Not all the presentations from the track dedicated to "STS and normativity: analyzing and enacting values" explicitly talked about care, but a good majority took it into account as they organized themselves around the manner in which STS take position in relationship to care. A majority of presentations took up the "registers of valuing" emerging in practice.

The "ageing society" was a constant theme in the three sessions about care mentioned in this article, but was especially present when the normativity questioned its specific actors: "eldercare workers", "older citizens", "Euroseniors". Multiple values seem to appear after a closer study of the practices of care. "Old age" is not only about illness or dependence, but also about dignity or quality of life, e.g. in the proposal submitted by M. Bødker on "The potentially fit - enacting value in old age" or in the presentation of J. Robbins-Ruszkowski on "Valuing Life's Ends: Old Age in Postsocialist Poland".

Contrasting the previous session on care, the importance of institutions was underlined and was directly linked to the production of norms. Institutions were discussed for instance as alternative collective care providers, i.e. sources of "non-family-based" practices in China (L. Prueher). Moreover, the robots seem to acquire socio-political dimensions when tested in a "real-life setting" through a results-driven approach with "political interest in welfare technological innovation" (M. H. Bruun). And there is also an "institutionalized palliative care" through which the "naturalization" of "good death" can be observed (B. Pasveer). Beyond the questions of valuing or naturalization, the frontiers of humanity (Remy, Winance, 2010) are raised as main issues related to care practices, i.e. when comparing a neonatal care unit, an animal laboratory, and a dementia nursing home (M. N. Svendsen, L. Navne, M. Seest Dam, I. Gjødsbøl).

INNOVATIVE METHODS AND METHODOLOGIES

Finally, the presentations used a diversity of methods and methodologies, from less usual ones like meta-ethnography (H. K. Andreassen, C. Pope, C. May) to more traditional, but "revisited", ethnographic accounts, literature reviews, individual or group interviews. As shown by J. Pols, STS include the study of knowledge practices, but dare to take a step further: "studying an object is simultaneously shaping it through material research practices and through concepts and methodologies". These remarks pave the way towards a dynamic living laboratory process put to work when studying care in practice.

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ELSEWHERE: A REFLECTION ON RESPONSIBILITY IN AND OF THE ANTHROPOCENE

Antonia Walford

A SHORT REFLECTION ON MY INVOLVEMENT IN THE ONLY PANEL AT THE 4S/EASST THIS YEAR THAT TOOK THE ANTHROPOCENE AS ITS THEME. THE PANEL ASKED CONTRIBUTORS TO THINK ABOUT THE RESPONSIBILITY OF ACADEMICS INVOLVED IN DISCOURSE AROUND THE ANTHROPOCENE. THE PIECE USES RECENT EVENTS IN THE SCIENCE FICTION COMMUNITY TO THINK ABOUT HOW CERTAIN FORMS OF SPECULATION MIGHT BE AN IMPORTANT ELEMENT OF RESPONSIBILITY.

A few days before the opening plenary of the 4S 2016, on the 29th August, the 35-strong International Working Group on the 'Anthropocene' submitted their recommendation to the International Geological Congress in Cape Town, proposing that there was enough evidence for this new geological epoch to be officially declared. Their recommendation still needs to be approved and ratified, a process which will take several more years and three other academic bodies. It has already taken the working group 7 years of deliberation to reach this point.¹

Nevertheless, to judge by the topics at the 4S this year, in STS it seems like the initial hubbub around the notion of the Anthropocene is quietening down. There was only one panel devoted to it (which was sceptical of the term's usefulness), and a handful of presentations that mentioned the term - including a roundtable presentation by Rebekah Cupitt entitled 'Time to Get Antianthropocene'.

Cristóbal Bonelli² and I presented a paper this year at the single 4S panel devoted to (critiquing) the idea, despite the fact that we are not 'Anthropocene' scholars. But that is perhaps one of the reasons behind the controversial success the idea has had in anthropology and STS: whatever your specialism, it is easy to feel simultaneously implicated in, and eclipsed by, its brazen anthropocentrism, its grand narrative currents and swells, its apocalyptic overtones, and the universalising politics it seems to sanction.³ The speed with which the term appeared to colonise - and polarise - conversations about environmental issues within anthropology and STS seems at odds with the fact that the geological working group has taken 7 years in order to make a recommendation, yet to be ratified, as to its scientific plausibility. At the same time, witnessing (from the sidelines) the iterations of deconstruction that the Anthropocene has subsequently suffered - for its neo-colonial implications, its biocapitalistic echoes, its anthropocentrism, for example (cf Haraway et al 2016) - it feels like the Anthropocene is almost over before it has even begun. In fact, there are already several other neologisms waiting in the wings to take its place, from Jason Moore's and Andreas Malm's Capitalocene (cf Haraway 2015), to Natasha Myers' Planthropocene (2016), to Donna Haraway's Chthulucene (2015), to name only the most commonly cited. And perhaps, as Haraway suggests, that is the point - to make it as short an 'epoch' as possible (2015: 160).

The panel at which Cristóbal and I presented, "Stoking the Anthropocene", posed the question of whether we (academics), have a responsibility *not* to 'stoke' the flames that the discourse around the Anthropocene has lit in various sectors of

¹ <http://phys.org/news/2016-08-anthropocene-scientists.html>
Accessed 4th November 2016

² It should be noted however that the views expressed in this piece are only mine, and not Cristóbal's.

³ Not to mention, as Bruno Latour has pointed out, the fact that it also seems to confirm "final rejection of the separation between Nature and Human that has paralysed politics and science since the dawn of modernism." (2013b:2)



Fig. 1: Allée des Baobabs near Morondava, Madagascar. <https://www.flickr.com/photos/42244964@N03/4315987006>

Courtesy of Frank Vassen.

academic practice. Rather than just “taking stock” of the debates, it asked us to consider the concrete implications of propagating such discourses, especially for those who are not involved in that privileged propagating machinery (and of course, the panel must count itself as part of that machinery, in one way or another). As with Amelia Moore’s notion of ‘Anthropocene anthropology’, in which she asks us to resist the solidification of the ‘obvious’ (2015: 28), such provocations urge STS to be attuned to the “politics and poetics” of the material interventions made in the name of global change” (Moore 2015: 36) and to take the Anthropocene as itself an anthropological object, that brings forth particular social, ecological and political configurations. Moore sees the Anthropocene as a polysemic socio-materialisation that can flow along transnational circuits of capital and create new markets, or galvanise new forms of scientized political action that frame particular spaces as fragile or endangered; and so she urges us to think of an anthropology ‘of’ and not just ‘in’ the Anthropocene (ibid: 28).

The call to take responsibility for the terms we use and the discourses we marshal is an important one. And the appeal of trying to bring the Anthropocene back down to earth (as Bruno Latour might have it) was perhaps why the panel attracted such a diverse selection of papers, ranging around anthropology, STS, philosophy and policy and environmental governance. During the discussion, many of the issues raised turned on what that responsibility might entail. Implicit in this debate is the feeling that anthropology or STS needs to pull its weight, and get serious about what it can contribute that is concrete or practical: sensible solutions that will make a real difference, not just more speculative theorising that goes nowhere. And lurking behind that is the injunction to ‘act’, not just ‘think’.

But, as Donna Haraway often says, paraphrasing Marilyn Strathern, it matters what ideas we use to think other ideas with. So what ideas do we have to think the ‘Anthropocene’, as an anthropological object, differently? Swanson and colleagues have argued that the Anthropocene can be thought of as a “science

⁴ "Listen, listen, listen well.

There was an age before the Seasons, when life and Earth, its father, thrived alike. (Life had a mother too. Something terrible happened to Her.)...The people became what Father Earth needed, and then more than He needed. Then we turned on Him, and he has burned with hatred for us ever since." (Jemisin 2015: 115)

⁵ <https://www.theguardian.com/books/2015/jul/27/nk-jemisin-interview-fantasy-science-fiction-writing-racism-sexism>. Accessed November 4th 2016.

fiction concept, that is, a concept that pulls us out of familiar space and time to view our predicaments as if they belonged to a distant land" (2015: 149). Science fiction has in fact long been a resource for anthropological thought, and vice versa. From Raymond Williams' 1956 characterisation of science fiction as "Space Anthropology" (in Collins 2003: 182) to Haraway's self-acknowledged debt to Ursula Le Guin, there has always been an intimate, if sometimes implicit, traffic between the two. Swanson and colleagues draw on this shared history to make the point that, like science fiction, the Anthropocene thus does not so much predict the future, but presents us with a 'thought experiment about the present' (2015: 149). As Cristóbal and I argued in our presentation, "we understand this as the potential of the present, or the real, to hold within it its own alternatives, it's own capacity for self-differentiation. Heeding the session's abstract, one modest responsibility we might imagine for ourselves...is therefore to draw out this tension that constitutes the anthropocenic imaginary read as science fiction, which somehow holds together both the here-and-now and the elsewhere...which locates and dislocates, identifies and makes strange, simultaneously".

From this perspective, one possibility that the diversity of the papers at the panel point to is that the Anthropocene, as an emergent, inchoate field of knowledge, can bring forth new ways of doing and knowing, and particularly, new spaces for trans-disciplinary knowledge; and this is indeed what Swanson and colleagues argue concerning the power of thinking through science fiction (Swanson et al 2015). But I now wonder to what extent the opposite might also be important: that the Anthropocene confronts us with unknowability, excessiveness and the disjunctions and failures in our knowledge practices. In its incarnation as an object of anthropological scrutiny, the Anthropocene may not lend itself to easy revelation or deconstruction, in the same way that in its scientized form, the Anthropocene as a recursive concatenation of socio-ecological forces and feedbacks, toxic excesses and loops, extinction events and population explosions, is also characterised by something that outstrips western scientific or policy-related understandings. Is there space for other forms of responsibility - alongside concrete, practical action - to emerge?

There was another announcement a week or so before the 4S - the winners of the 2016 Hugo awards, the most prominent prizes awarded for science fiction. The winner for best novel this year was N. K. Jemisin, for her novel *The Fifth Season*. The first book of a trilogy, it's about the end of the world, or a 'Fifth Season': a cataclysmic tectonic event that happens unexpectedly if periodically - an enormous volcanic eruption that blocks out the sun, for example, or the emission of gases that change the atmospheric conditions, causing acid rain and widespread famines. People feel themselves to be at the mercy of "Father Earth"⁴, as the world is in almost endless tectonic upheaval of one sort or another; and people live in a constant state of readiness for another Season that they may or may not survive. Every so often, civilisations are wiped out, continents crack, thousands die and those that survive do so at great cost. It takes the enormous power of the orogones, who can control seismic energy, to keep Father Earth subdued as much as possible, and for that, they are reviled and enslaved, taken when young to be trained and ruthlessly disciplined, and killed if they show any sign of revolt. Yet, as one orogone in the book points out, the orogones can never be fully controlled, just as the Earth cannot. They will break free; the world must change. Jemisin deftly weaves together a world in which the power of the oppressed and colonised, and the power of the Earth, are entwined - both containing within them the same potential to shatter the control that has been so painstakingly, and brutally, constructed by the majority. As Jemisin says in an interview with *The Guardian*, "As a black woman, I have no particular interest in maintaining the status quo. Why should I? The status quo is harmful, the status quo is significantly racist and sexist and a whole bunch of other things that I think need to change. With epic fantasy there is a tendency for it to be quintessentially conservative, in that its job is to restore what is perceived to be out of whack."⁵

Jemisin was the first black woman to win the Hugo award for a novel. And she won despite the efforts of the now infamous right-wing voting group within the science fiction community known as the Sad Puppies and its more radical faction,

the Rabid Puppies, which were formed as a reaction against what was perceived as the appropriation and perversion of science fiction by what the founder of Rabid Puppies, Vox Day, calls "Social Justice Warriors". As Amy Wallace writes in *Wired*: "in recent years, as sci-fi has expanded to include storytellers who are women, gays and lesbians, and people of color, the Hugos have changed, too. At the presentation each August, the Gods with the rockets in their hands have been joined by Goddesses and those of other ethnicities and genders and sexual orientations, many of whom want to tell stories about more than just spaceships".⁶ Angered by these shifts, the Sad Puppies and the Rabid Puppies try every year to fill the available nominee slots with authors they have sanctioned, that tell the sort of fantasy stories they want to hear: "a rousing space adventure featuring starships and distant, amazing worlds" or "a rousing fantasy epic with broad-chested heroes who slay monsters, and run off with beautiful women" rather than a "story merely about racial prejudice and exploitation with interplanetary or interstellar trappings" or "about gay and transgender issues".⁷

In this context, it would be hard to see how Jemisin's speculative, amazing (and indeed epic) books that are all about the complexities of exploitation can not themselves be read as a very concrete triumph over forces that want to determine and control, oppress and subjugate. Her books complicate exactly the idea of 'distance' - both in terms of the sort of escapism science fiction permits its readers and the sort of abstraction that speculative academic theories are meant to imply - by writing 'the way things could be' into 'the way that things they are'. It matters very much, very concretely, what stories we tell and think. The way the world already contains within it the potential to be other-than what we have made of it, is perhaps one of those stories.

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⁷ Taken from the blog post by Sad Puppies co-founder, Brad Torgersen: <https://bradrtorgersen.wordpress.com/2015/02/04/sad-puppies-3-the-unraveling-of-an-unreliable-field/>. Accessed November 4th 2016.

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A DOCTORAL DAY BY OTHER MEANS: POWER-GEOMETRIES OF SPACE, COMMUNITY AND (R)EVOLUTION IN EL POBLENOU

Kat Braybrooke

THE DOCTORAL DAY WHICH PRECEDED 4S/EASST 2016 SAW 50 RESEARCHERS FROM AROUND THE WORLD COME TOGETHER TO DISCUSS THE COMPLEXITIES OF A PHD “BY OTHER MEANS” AT HANGAR, AN ART CENTRE AND MEDIALAB IN POST-INDUSTRIAL EL POBLENOU, A NEIGHBOURHOOD IN BARCELONA’S SANT MARTÍ DISTRICT. THIS PAPER EXPLORES THE POWER-GEOMETRIES OF SPATIALITY AND HISTORY THAT CHARACTERIZE OUR EXPERIENCES OF POBLENOU AND ALSO ITS INFLUENCE ON THE URBAN FABRIC OF BARCELONA. THE NEIGHBOURHOOD’S LOCAL STRUGGLES DURING SUCCESSIVE REVITALIZATION AND GENTRIFICATION PROCESSES ARE EXPLORED, IN THE WORDS OF GEOGRAPHER DOREEN MASSEY, AS “COMPLEX WEB[S] OF RELATIONS OF DOMINATION AND SUBORDINATION, SOLIDARITY AND COOPERATION” (1992: 81), THE COLLECTIVE ENERGIES OF WHICH NOW INSPIRE OUR OWN WORK AS HYBRID RESEARCHERS IN BETWEEN WORLDS OF THEORY, PRACTICE AND COMMUNITY.

For emergent doctoral researchers undertaking the process of engaging with the strange new world of academia in all its myriad complexities, what are the theoretical and social implications of undertaking a “PhD by other means”? What are the practicalities of undertaking engaged STS research that falls somewhere between theory and practice, social justice and science? Most importantly, what does it mean to draw wisdom from related communities and social movements in ways that matter?

These were but a few of the many difficult questions we came together to explore in Barcelona at the doctoral day which preceded 4S/EASST 2016 this August. Out of 100 applicants from around the world, there was only space for 50, and the backgrounds of those lucky enough to join were diverse. We came for many reasons, and left with many new insights. We discussed what it means to undertake research and writing that is hybridized and radical, situating itself in between traditional academic paradigms. We shared hands-on methods and tactics for integrating cooperative and open access principles into our research processes in ways that are just and sustainable.

What was especially significant, though, was the neighbourhood chosen by the organizers for us to share our ideas in – El Poblenou, Catalan for ‘new town’. We began with a tour of the area’s historic cooperatives and now-defunct factories, and spent the rest of our time at Hangar, an art centre and medialab in the former textile factory of Marqués de Santa Isabel. Since the 1990s, Poblenou has undergone a period of rapid transformation. Once referred to as “Catalan Manchester” due to being a centre of Fordist-era industry, in the 1990s it was marked by a period of simultaneous post-industrial decline (ie, abandoned factories) and creative renaissance, with artists re-opening abandoned buildings for workshops while local co-ops and collaborative movements grew (Marti-Costa & Pradel, 2002; Evans, 2009; Gdaniec, 2000; Tironi, 2009). At this time, various attempts were made by city governments to revitalize the neighbourhood’s rebellious reputation into something more business friendly. This included the large-scale “22@bcn”

plan, which is currently in the process of transforming Poblenou into a mixed-use hub of technological and creative knowledge production, making it into a property-ownership friendly “model city” often lauded as a success story of urban revitalization (Marti-Costa & Pradel, 2002; Evans, 2009).

In today’s Poblenou, the converted lofts that once housed collective fabrication centres and squats are marketed to upscale buyers as ‘Barcelona SoHo’, a “neighbourhood where you can always get to the beach via the sunny side of the street” (Martin, 2005). Meanwhile, short-let vacation rental startup Air BnB, despite facing sharp criticism from Barcelona locals for its tendency to woo foreign attentions at the cost of local well-being (O’Sullivan, 2015), describes Poblenou to potential tourists as a place that “once resembled a scene from a sooty cyberpunk film”, until “thrill-seekers from around the world” transformed it into a “vibrant hub on the verge of ultimate esteem” (Air BnB, 2016). These glowing descriptions have not been lost on buyers with enough capital to move into the area. Marti-Costa and Pradel found that while rental prices in 1998 were €4.77 per square metre, by 2006 they had skyrocketed to €14.63 (2002). As Henri Lefebvre first wrote in *The Production of Space*, capitalist accumulations often draw their power from the use of selective, mediated representations like these, where a place becomes understood only as through being a reflection of the interests, ideologies and ambitions of those who carry the most power in a society (1974).

What these tourist-friendly narratives hide, however, is the fact that Poblenou’s streets also hold other histories which have emerged in struggles between long-time residents, local artists and city planners as new cultural and knowledge-based economies came to replace those of existing communities, causing the coexistence of many differing conceptions of place and identity that are still reflected today in both online and offline instances (Gdaniec, 2000; Tironi, 2009). Gdaniec explains that while the district continues to be seen as exemplary by the current city government, it is a very different place for locals. While renovations into luxury flats take place, they must “cope with major construction work, bad housing conditions, wait for new affordable housing, see the new expensive entertainment establishments, and look for jobs... effectively liv[ing] in a city within a city, and the new exclusive developments represent another city within a city” (Gdaniec, 2000: 381). As a result, various protest movements against foreign speculation

Fig. 1: Graffiti outside of the Hangar.org art centre and medialab in Poblenou.

Photo by K Braybrooke.



Fig. 2: A glimpse into the process of many impassioned doctoral day discussions and group collaborations.

Photo by K Braybrooke.



such as the “Excuse me, do you know where is Poble Nou?” graffiti campaign have emerged (Tironi 2009). The conflicts of experience and identity during such place-based transitions also echo those we discussed at Hangar, trying to fathom our own existences as hybrid doctoral students situated in between home nations and nations of study, and in between worlds of science, technology, practice and research.

Perhaps this is because, as geographer Doreen Massey once put it, the spaces and places we see as unchanging are not just *spaces* or *places* but also constructs of our own sociality, as seen through ever-evolving power-geometries, histories and interrelations that are themselves full of hegemony and symbolism, “complex web[s] of relations of domination and subordination, solidarity and cooperation” (1992: 81). Poble Nou’s historic factories have worn many different faces, as have their various representations, all interwoven into the complicated social fabrics that define Barcelona as a city. These faces reflect changing economic geographies and uneven, often forced gentrification. But they also reflect creative collaborations between local creatives and thinkers, and community struggles for identity in a long moment of transformation.

In the case of Hangar, it can be argued that while the replacement of local industry with creative and cultural capital does cause increased complexities and displacement, it can also foster powerful local projects that celebrate both pasts and presents in ways that value both traditional and contemporary approaches. In this way, instead of being “mere gentrifiers”, artists are “politically engaged neighbours” (Manuel, 2009: 92). By taking funding from both government and



Fig. 3: Excerpts from our tour of Poble Nou, where we saw how Parc del Centre Poble Nou chairs had been designed to discourage rough sleeping and group gatherings.

Screenshot by K Braybrooke.

community donors, hosting free local events and drawing in creative, co-operative, socially-sensitive initiatives that combine disparate worlds of media, technology, research and fabrication, Hangar aims to help both long-time locals and international participants feel welcomed (Gdaniec, 2000; Evans; 2009). “Where they locate and draw on a manifest authenticity and inheritance of former cultural activity and production – whether symbolic or economic through a residual labour market, higher education hubs, specialist skills and locational advantages,” Graeme Evans writes in his extensive 2009 study of Hangar and other ‘creative clusters’ in Barcelona, “a more sustainable model can result... present[ing] a workable model of living quarters, rather than museumified quarters” (55).

While we, as foreign actors only briefly immersed in the complex circumstances and power-geometries of the spaces, places and histories of Poblenou, can never speak *for* its people, we can now speak a little bit about their struggles and draw wisdom from those experiences. We also find much inspiration for our own work as fledgling STS researchers in the merging of theory, practice and local activism seen at mixed-use community spaces like Hangar. Like the people of Poblenou, we are at our strongest when we gather, make things and share knowledges together as a network, within the spaces and places that matter to us. We are especially strong when we take the time to really *listen* to those spaces and those places. It is only then that essentialised neighbourhoods like Poblenou can truly speak.

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FROM INNOVATOR TO MAINTAINER: THE ANTI-HEROIC TURN

Michelle Kasprzak

THE TOPICS OF REPAIR, CARE, AND MAINTENANCE, WHICH WERE FEATURED ACROSS TRACKS AT 4S/EASST, ALSO PRESENTED A REJECTION OF THE NOTION OF THE HERO. THIS DEVELOPMENT MIGHT SEEM AN INEVITABLE RESULT, GIVEN THAT NARRATIVE AGGRANDIZEMENT IS CONSIDERED UNSCHOLARLY. IN STS WE OFTEN QUESTION WHO GETS TO PERFORM SCIENCE, OR SEEK TO UNDERSTAND LARGER STRUCTURES AND GROUPS OF PEOPLE WHO ENABLED CERTAIN INNOVATIONS AND INVENTIONS. HOWEVER, CASTING LIGHT ON PREVIOUSLY-UNSUNG MEMBERS OF A LARGER TEAM ALSO RUNS THE RISK OF HEROICISING THEM. IN THIS ARTICLE, I REFLECT ON TWO PAPERS WHICH INDICATED A SENSITIVITY TO THIS DANGER AND HINTED AT AN ANTI-HEROIC TURN.

The postgraduate workshop at 4S/EASST 2016 kicked off with a special meal: in the stevedore's trade union club in the Barceloneta neighbourhood, we enjoyed fish caught by local fishermen with a range of side dishes, all prepared from old recipes, which were compiled in a book with illustrations by Carla Boserman. Dinners such as this have been organised regularly by Marina Monsonís, in order to preserve local food cultures and share histories of the Barceloneta area, which has been rapidly gentrified. While we dined, Marina's father Marti, a former stevedore himself, spoke of the collective organising that happened during crack-downs on the stevedore's union. When some members were being punished for participating in a strike by having their wages withheld, the group agreed that their members' wages would be pooled and shared among all of them. Marti reminded us of these simple but effective tactics and urged us: "If you have the idea, you're together, and you're organised -- you can do it." I later found that an article, first published in the Workers Solidarity Alliance magazine *Ideas & Action* in 1989 by Don Fitz, quoted a statement from the Organización de Estibadores Portuarios de Barcelona (OEPB), the group whose club I had visited to eat local food and hear local stories. This statement reads, in part:

"TO HAND OVER OUR PROLETARIAN RESPONSIBILITY TO REPRESENTATIVES IS TO THROW AWAY OUR NEED AS A CLASS TO PARTICIPATE IN SOCIAL TRANSFORMATION. WE REALIZED THAT WE WOULD NEVER ARRIVE AT THE SOCIAL REVOLUTION THROUGH LEADERS OR LIBERATORS. THOSE CAUGHT UP IN AND DISTRACTED BY THE OBLIGATIONS OF THEIR POSITIONS AND THE REPRESENTATIVE FUNCTION THEY FLAUNT END UP DISTANCING THEMSELVES FROM THOSE THEY REPRESENT. AS THEY ARE NOT AFFECTED BY THE SAME PROBLEMS, TROUBLES OR STRUGGLES, THEY END UP ALMOST UNABLE TO RECOGNIZE THEM. THE ESTRANGEMENT IS INEVITABLE."

FITZ 1989/2008

This notion that we will "never arrive at the social revolution through leaders or liberators" is reflected in a pervasive anti-heroic turn, which ran through several presentations and informal conversations at 4S/EASST.

SUQUET de
 Maika de la Barceloneta
 BY 4MAIRES

CALLE La Lluïa Poble Sec

1. **MORTEAO**
 "UNA PICADA"
 - 1 TOMATE Y MEDIO DELADO Y AILLADO
 - 1 CABEZA DE AJO
 - PERE TIL
 - 1 CUCHARADITA Y MEDIA DE PIMENTÓN

2. **INCORPORAR EL PESCADO**
 UN POCO DE SAL Y PIMENTA NEGRA.

3. **SOFRIR CEBOLLAS HASTA DORAR**
 - INCORPORAR LA PICADA
 - INCORPORAR UN POCO DE AGUA Y HARINA.

INGREDIENTES: TOMATES, AJO, PERE TIL, SAL, HARINA, AGUA.

LLANDETA DE MOLLETS

«para besarnos teníamos que bucear bajo el agua»
 "mi suegro era el cocinero de la barca"
 receta de mi hombre,
MOLLETS
 COCINADO POR PAQUITA en su 1/4 de 115
 BARCELONETA
 CINCUENTA AÑOS

«SIEMPRE HEMOS COMIDO PESCADO»
 VIVIAMOS CASI TOCANDO LA MAR

INGREDIENTES: FIGADA AJO Y PERE TIL, TOMATE RALLADO, PIMENTÓN ROJO.

«Yo lo llevo con más de 100 años»

«CREAMOS el FIAS FONDO DE ACCIÓN SOCIAL 1% de cada JORNAL se destinaba a Estudiantes jubilados.»

CVINA-MENJADOR

«cuando el pescado se parte ya está»

LA BARCELONETA NO ES VEN

taking the knowledge... → re-pairing memories

• 1978 "LA COORDINADORA" de todo el estado.

1 AÑO Y MEDIO de huelga ANTI PRIVATIZACIÓN del PUERTO de BARCELONA hubo 200 despidos

SOCIALIZAMOS EL JORNAL

las empresas combatían esquivales teníamos mucha fuerza porque cuando un puerto había huelga todos paraban (CUERPO DE ESPAÑA)

APRENDÍ QUE UNIDOS Y ORGANIZADOS ERAMOS MUY FUERTES sobre todo porque teníamos una UTOPIA

«CREAMOS el FIAS FONDO DE ACCIÓN SOCIAL 1% de cada JORNAL se destinaba a Estudiantes jubilados.»

SUQUET DE MARE

In the “Counting By Other Means” track, Katrina Jungnickel touched on this turn while presenting her paper “Making inventions count: the gender politics of design patents”. As she presented her work about female innovators, who were part of a wave of patent registrations in the UK during the 1880s, she noted how inventions were previously often credited to fathers, husbands, or brothers. Women were finally permitted to register patents under their own names and they came forward to do so in significant numbers, particularly for inventions related to cycling wear. (Jungnickel 2016) Mentioning she was working on a manuscript featuring some of these women and their patent filings, Jungnickel described herself as being wary of over-heroicising these women. This drive to fill in more accurate detail in the historical record should not, it was implied, necessarily swing to the other direction of creating overly promotional narratives about these women.

To briefly mention a different example, in a forthcoming piece, Jungnickel also reflects on her previous research, particularly with a community Wi-Fi group in Adelaide, as having a “a DIY ethic but they were not doing it alone—they were Doing-It-Together.” (Jungnickel, forthcoming) While investigating collective groups and their workings (the Wi-Fi group) is not the same as investigating a group of people who were performing the same activity contemporaneously (the female patent claimants), in both cases it’s clear that nominating one person as the representative case or protagonist vastly truncates the possible nuances to the history. She also notes in this manuscript that in the search for an (often male) hero to be assigned credit, we miss out on the more complex stories behind how things are invented and repurposed. Avoiding introducing or re-introducing women in the same, heroic and protagonist-centric manner as often happens but aiming for “rich, messy, and dynamic” (Jungnickel, forthcoming) storytelling is one antidote to the hero narrative.

Within another conference track, “Before/after/beyond breakdown: exploring regimes of maintenance”, Marisa Cohn contributed to the anti-heroic turn in her paper “Holding on and letting go - temporal regimes of infrastructure care work”. Her presentation explored the politics of engineering work (in particular, the maintenance of the hardware and software involved in a NASA-funded mission to Saturn of nearly forty years’ vintage) and how engineers positioned both their work and the objects of their concern (the code, the databases, the machines themselves, and so on) when speaking about their work to others. In one revealing example, Cohn quotes an engineer on the project describing the spacecraft as “a new machine”, since it has undergone so many fixes, adjustments, and changes to its component parts. By naming the machine new again, the work that the maintainers do can be presented in a different way – Cohn describes this process through an STS lens by referring to the notion of “infrastructural inversion” as described by Bowker. (Cohn 2016).

Though a “new machine”, the original producers of the spacecraft continued to receive credit for their work (whom I would call the “heroes” of the story) and the maintainers of the system got on with the job, sometimes appearing apologetic that the system creaked along in a patchwork way and that even nearly forty years later, new bugs surfaced. (Cohn 2016) Here, the hero narrative prevents recognition of essential work, which not only keeps the mission running, but effectively adjusts and changes the functionality of the machine. Cohn persuasively argues that the very notion of success needs to be reframed to allow the teams of maintainers their fair credit.

In both examples cited, the accepted hero narratives and success stories have much more nuance behind them. There is an urgency to adjusting our view of how success happens, how infrastructures are built, how social revolutions are won. Reflecting upon these presentations and conversations it also becomes clear that the very task of continuously dismantling our propensity to assign a leader or give credit to a hero is in itself a kind of essential maintenance work. As academics in STS, we can easily appreciate that this kind of maintenance work to the narratives of science and technology is of key importance – not just for our field, but for science communication in general.



DE LOS ITALIANOS QUE LLEGARON A BARCELONETA (1700)

3 Crema de Tomate

ALICIA - 1 y cada día de sumar cuando el tomate está caliente y BRANDY

AGUIR PASTARAS

1 MARINAR EL BACALAO

2 FREIR POCO

3 POCAR TOMATE Y TAMBIÉN (eliminar piel y semillas)

bacallá A LA BRANDY COLLONI

SAL AZÚCAR TOMATES 2kg ACEITE

«YO CUANDO OÍA EL SENTIDO DEL MASTERO YA SABÍA QUE MI PADRE EMPEZABA A COCINAR»

COLUMA MERCEDES PUJOL RECETA DE SU PADRE GUILLERMO

CENTRE CIVIC BARCELONETA

SE COME A MANO Y PAN

«SE SABE QUE ESTÁ LISTO CUANDO EL PEZ SE QUEBRA»

DEJA ESPACIO ENTRE LOS PEZES

MARTEL AL 337 final MEJOR TAPARLO

1 VINO

2 VINAGRE SE PONEN SE MUY RÁPIDO MUY RÁPIDO MUY RÁPIDO

SUQUET DEL CHACHO

SE HACE CON CABEZA LA SART

PIERDO NO EN LUMINOS

POPA F L

VARÍAS MANERAS DE LIMPIAR EL PESCADO Y PELAR LOS AJOS.

3 SUQUETS = 16 AJO

UNA PES LIMPIO SE SALT

ROGER POLLE POLLE

MAIRA

BRUSULA

NUCHA COSI MAIRA

ACECHADA SOPERA

PIRENTON BOTE BOTE DE ALMIRANTE

NUESTRA ASAMBLEA HA SIDO NUESTRA UNIVERSIDAD

#45EASST2016

«no estoy acostumbrado a hablar con gente universitaria. MI VIDA HA SIDO ENTRE OBREROS Y TRABAJADORES.»

1976 HUELGA GENERAL 21-DÍAS DE HUELGA PORT BARCELONA

«CUANDO EL JUICIO NOS PROPUSIMOS ESTA ASAMBLEA Y ORGANIZAR NOS COMO»

RECUPERAR LA EXPERIENCIA DE ESTA ASAMBLEA Y ORGANIZAR NOS COMO

30 AÑOS DE LUCHA EN UNA ORGANIZACIÓN O.E.P.B

SANTI

Flotida

ASAMBLEA diària

CULTURA ECONOMIA COMUNICACIÓN COMISIONES.

O.E.P.B

1970

2006

Time transition from activism to political power

URBAN AND SOCIAL TRANSFORMATION TROUGHT COOKING

FISH FROM BIN

This is a social and economic support project

HUELGAS DE LOS 80

SANTI (retired Docker)

BARCELONETA NO ES VEN

CAPES THE dockers ARCHIVE

MARINA 100% Barceloneta

O.E.P.B → ORGANIZACIÓN AUTÓNOMA SE REÚNE AÚN HOY TODA LUNES

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Images of illustrated recipes and documentary images from the dinner at Organización de Estibadores Portuarios de Barcelona (OEPB) club. Dinner organised by Marina Monsonís. Illustrations by Carla Boserman.

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CONSIDERING THE PERFORMATIVITY OF STS RESEARCH PRACTICES. AND DO IT SERIOUSLY!

Mariacristina Sciannamblo

THIS ARTICLE PORTRAYS MY EXPERIENCE AT THE JOINT 4S/EASST CONFERENCE 2016 HELD IN BARCELONA. IT PROVIDES AN ACCOUNT OF THE TWO PIVOTAL MOMENTS THAT CHARACTERIZED MY PARTICIPATION TO THE MEETING, THAT IS THE POSTGRADUATE WORKSHOP AND THE TRACK IN WHICH I PRESENTED A CONTRIBUTION. THESE TWO EVENTS SHARE A SIMILAR QUITE RADICAL APPROACH TO THE CONFERENCE MOTTO — “SCIENCE AND TECHNOLOGY BY OTHER MEANS” — WHICH, IN TURN, REFLECTS THE SPIRIT THAT DROVE ME TO THE CONFERENCE.

As a brand new PhD graduate, one month after the defence, I approached my first joint 4S/EASST meeting with a twofold feeling: the need to start reflecting seriously upon my doctoral research on the one hand, and a blend of curiosity and anxiety generated by the key question ‘what’s next?’ on the other. These two dispositions required me both to look back at the work done and to look ahead to find out job opportunities inside or outside of academia. In hindsight, I realized I tackled these interrelated preoccupations by attending two moments of the conference, that is the postgraduate workshop and the track titled “Considering the performativity of our own research practices” wherein I presented a contribution. I found my condition of “in-between-ness” (Anzaldúa, 1987), that of not being a PhD candidate anymore and the one of yet-to-be something else, interestingly depicted during these two different moments of the conference. They have both confronted the challenging motto of the meeting — “Science and technology by other means” — by calling into question not just the non-traditional experiences and practices where science and technology are performed, but mainly the “other means” by which STS deals with its own epistemic practices. Indeed, the doctoral workshop invited graduate, postgraduate, and early-career scholars to reflect collaboratively upon new and unconventional research practices, publishing options, and careers. On the other hand, the track 014 — chaired by Juliane Jarke, Lisa Wood, and Lucas Introna — wherein I was involved has aimed at discussing the performative conditions of STS scholars’ research practices by drawing upon Karen Barad’s powerful concept of ‘ethico-onto-epistemology’ (Barad, 2007). These two happenings, therefore, have characterized my first experience at the 4S/EASST conference by sharing a common overarching inquiry: how do we (as junior and seasoned scholars) do STS studies “by other means”?

Such tricky question brings up the ethical and political implications of epistemological and methodological practices, an issue that goes beyond the popular debates around reflexivity and representationalism in STS (Woolgar, 1988). The postgraduate workshop saw PhD students, postgraduate and early-career scholars engaged in discussions on how to do research by other means, that is to say how to account for our own research practices carried out outside of conventional academic borders (art, architecture, design) and how to disentangle the complex relationships between the researcher and the worlds they contribute to enact. This discussion brought to the fore the methodological question of how to tell different stories, explore different ways of knowledge transmission, and what are the contexts that allow us to do research by other means, expanding the range of methods we already employ.

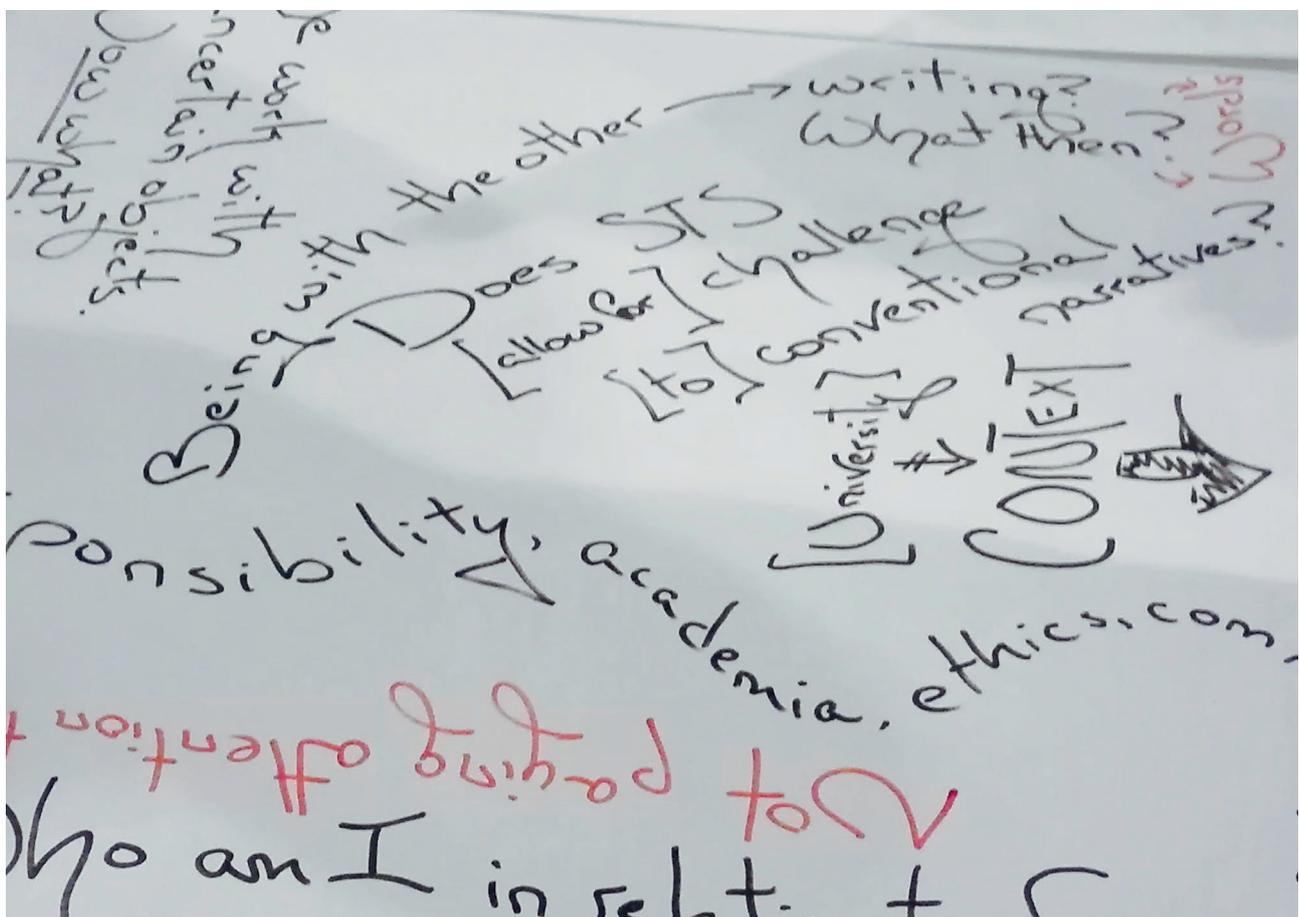
A widespread criticism of the academic *habitus* (Bourdieu, 1988) combined with lively ideas on how to look at the future characterized the sessions on publishing practices and career opportunities. We discussed our experiences and challenges regarding writing research and publishing through conventional and unconventional channels. We discovered that many of us run or ran a blog to tease ideas out and that, in turn, such use of writing to shapes who we are as researchers. Some of us agree that traditional academic products – of which the conventional paper is the quintessence – and the system of peer-reviewing serve more to reproduce disciplinary standards of knowledge and conformity within the university rather than to bring about an effective impact on the world they assume to get to know. This concern nicely resonates with Geoffrey Bowker's critique of the linear thinking and narrative conveyed by the scientific paper, whose data would often be known by the average citizen without doing any research (Bowker, 2014).

The reluctance to conform with the academic *habitus* – “I don't want to be an academic. I want to be a person who gets to work in academia” –, the encouragement not to compromise our interests and the way we do theory along with practical advices such as “learn how to write funding proposals” marked the concluding moments of the workshop. For someone like me, who was looking for new perspectives and motivations to pursue a career in research, the postgraduate meeting has been an inspiring experience not just for the stories, challenges, joys and concerns I shared with my peers (see Figure 1), but because the idea itself of organizing a pre-conference workshop in which to discuss an alternative set of logics and values has been a successful attempt to put those very alternative logics and values into practice (Erickson et al., 2016).

With a reinvigorated spirit, I left the Hangar where the workshop was held to reach the International Convention Centre for the conference opening. I got to my track, scheduled throughout the last day of the conference, with the idea that the insights emerged during the workshop would have bounced back during the four sessions dedicated the discussion of the ethical, ontological and epistemological

Fig. 1: Take-home messages from the postgraduate workshop sketched on a poster

Courtesy of Mariacristina Sciannamblo



implications of STS research practices. After all, I tackled both the situations with the same concerns: to reflect on the ethico-onto-epistemic challenges of my doctoral research on the one hand, and to come across other research and researchers with whom I seemingly shared the same experiences and research interests.

As hinted, the track invited contributions relating to the performative conditions of methods and methodology in STS, the entanglement of subjects and objects in research, the enactments performed by epistemic practices and their relationship with everyday practices. The papers presented had both theoretical and empirical orientations, and covered a wide range of topics: a theoretical discussion around a posthumanist in social sciences, the critical issues raised by autoethnographic accounts, the implications of praxiography, diffraction in practice and as practice, touching as method, ethico-onto-epistemological commitments of and for sociomaterial research, and the process of writing research as ethico-onto-epistemic practice.

The concept of 'ethico-onto-epistemology' that inspired the track has been developed by Barad rejects the ontological separation between object of observation, instruments of observation and observer, to suggest that the materialization of reality depends on different entanglements between subjects, matter and meanings. This means that there is not a reality "out there" to be scrutinized and described, but ongoing (re)configurations of concepts, methods, human and non-human agencies. Drawing primarily upon Barad's call for ethico-onto-epistemology, the track invited to appreciate the intertwinement of ethics, knowing and becoming that nurture any research enterprise by highlighting the generative and ontological character of methods. Considering this, the tracks aimed at exploring the ways we can perform STS "by other means", actively and creatively participating in the enactment of the world through research methods.

Similar concerns have inevitably challenged conventional forms of knowing, resonating with the critical issues teased out during the doctoral workshop. For example, Lisa Wood discussed the limits of the acceptability of the personal experience in research accounts by presenting both a traditional ethnographic and an autoethnographic account relating to medical visualization practices. Her argument pointed to the recurrent beliefs that consider autoethnography as lacking in rigor or as "sloppy sociology" by criteria such as 'reliability', 'generalizability' and 'credibility'. This made me wonder: if hierarchies of knowledge still stand, what do they serve to? Who is interested in holding such perceptions of methods and why? This issue reminds me to what John Law has called 'normativity of method', that is to say the hegemonic pretensions of certain versions or accounts of method. It follows a call for a "slow, vulnerable, quiet, multiple, modest, uncertain, and diverse" method in social science (Law, 2004). Along similar lines, Eva Svedmark's talk pointed to the case of doing "uncomfortable science" such as that of studying digital narratives and self-disclosure online practices related to suicide, self-harm, and mental illness. Drawing upon feminist technoscience and posthuman theory, Svedmark suggested touch as method within ethico-onto-epistemology. She explained how she got in touch with the research material through the body, emotions and technologies, a sociomaterial configuration that — Svedmark explained — enabled to articulate and enact phenomena rather than to capture data. In this respect, she drew on Donna Haraway's work to emphasize the ethical challenges posed by "what stories make worlds and what worlds make stories" (Haraway, 2011), an argument that resonated quite interesting with postgraduate workshop's remark about the need to tell different stories.

Finally, I would like to mention Lucas Introna's reflections on performative epistemic practices. Here, I am particularly interested in his stressing the importance of the adverb 'seriously' contained in the track's pivotal question "What happens if we take Barad's call for ethico-onto-epistemology *seriously*?". The presence of this modifier is anything but trivial inasmuch as, according to Introna, we do not take alternative research practices seriously because we are into regimes of truth. As a matter of fact, he argued that there are many scholars in STS that claim to use the theoretical apparatus of the ontology of becoming, but still present their research methodology — collecting, ordering, and describing — and enact

their epistemic practices in the language of the representational paradigm. When I raised a question about the power differentials between epistemic practices and research fields and the consequent difficult to conceive of and carry out alternative research practices, he acknowledged the issue, but still his claim was clear and simple: “the point is that we don’t do that. So let’s do it!”

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THE CITIZEN ROTATION OFFICE: AN IMMERSIVE AND SPECULATIVE EXPERIENCE PROTOTYPE.

Annouchka Bayley

THIS REVIEW CONSIDERS THE WORK PRESENTED BY LUKE STURGEON AS PART OF TRACK 070. THE PRESENTATION, ENTITLED, "THE CITIZEN ROTATION OFFICE: AN IMMERSIVE AND SPECULATIVE EXPERIENCE PROTOTYPE" DISCUSSED CONCEPTS INCLUDING: THE POWER OF ALGORITHMS AND THEIR POTENTIAL FUTURE IN THE DEVELOPMENT OF SMART CITIES; THE CHANGING STYLES OF URBAN DWELLING – WITH PARTICULAR RELATION TO ISSUES OF PERMANENCY / TEMPORARINESS IN THE HOUSING MARKET; AND THE RISE AND CHARACTER OF STATE / CORPORATE POWER IN THE EVERYDAY LIVES OF CITIZENS, WITH PARTICULAR RELATION TO CONTROL OVER HOUSING, COMMUNITY EXPERIENCE AND EVERYDAY PURCHASING 'CHOICES' OF INDIVIDUALS. THE REVIEW FOCUSES ITS CONSIDERATION AROUND THE PERFORMANCE-STYLE OF THE PRESENTATION GIVEN AND HOW THIS DEVELOPS CONCEPTS OF DIFFRACTION, PERFORMATIVITY AND MATERIAL-DISCURSIVITY FOUND IN THE WORKS OF KAREN BARAD (2007) AND DONNA HARAWAY (2004) FOR THE UNDERTAKING OF CRITICAL RESEARCH PRACTICE IN THE STS COMMUNITY.

As we gathered outside the conference centre in Barcelona, Luke explained that he would take us on an exploratory journey of a project he had devised that investigated the ethics of urban living in a future-time. In this imagined time, urban dwellers were moved around from apartment to apartment, experiencing little in the way of permanent residency in one place. Furthermore, an imagined organisation called, 'The Citizen Rotation Office' was responsible for the selection of appropriate accommodations based on each individual's personal preferences. These preferences were collected and collated by an algorithm that filtered through the social media and online profiles of each individual, matching them with appropriate neighbourhoods, providing key information about events and places in the neighbourhood and even barring access to certain other parts of the neighbourhood the individual would be moving to. The performance / lecture was run in the same manner as a local tour might be, in that we the audience were guided around the streets by Luke, who used his mobile phone and a speaker connected to it, to play GPS-triggered recordings of the monotone, digital voice of The Citizen Rotation Office. The tour was cleverly created to be site-specific, so our imagined future-time of urban Barcelona corresponded to what we could see with our own eyes as we walked. Always, alongside the bright happy sales pitches of imaginary Rotation Office users, we were constantly reminded of no-go areas and forbidden streets. Should we stray from the planned route, our membership of the Office and thus our ability to find accommodation, would be terminated.

The performed lecture provided an immersive, site-specific style of presentation that allowed for a truly affective connection with the issues Luke wished to

interrogate, including: the power of algorithms and their potential future in the development of smart cities; the changing styles of urban dwelling – with particular relation to issues of permanency / temporariness in the housing market; and the rise and character of state / corporate power in the everyday lives of citizens, with particular relation to control over housing, community experience and everyday purchasing ‘choices’ of individuals.

Using performance to interrogate and enhance the development of critical thinking about contemporary issues has its advantages – advantages such as the development of affective responses, embodied thinking and connection with site and space. As an academic community, we are perhaps more used to dealing with concepts via the linguistic space alone – that is we often discuss issues via critical appreciation of the semantics and/or semiotics of a phenomenon, rather than include the real materiality that is part of the event studied. As feminist materialist scholar Karen Barad states “language has been granted too much power...”¹ What Luke’s work attempted at was an actual inclusion of the body, of the spaces and sites, of the technologies discussed in their physical forms - forms that are often prone to error and even decay – as many of us couldn’t really hear all the information given due to an effect of urban, ambient noise, a reality pointing to the way that material-discursive phenomena can disrupt the best laid plans of mice and men...

Luke often drifted between representing his work as a project, and immersing us in the experience of the project itself, as we walked around the Barcelona streets. I appreciated this as – intentionally or not – it drew my attention to the differences between traditional conference forms of representing knowledge, and more nonrepresentational forms of knowledge as *performance* and *performativity*. The concept of knowledge as a performative practice has been discussed by feminist new materialists, such as Barad, Kirby, and Haraway who are at pains to bring concepts such as *diffraction* further into the critical analysis of events. *Diffraction* can be described (but not limited to) the performative differencing of phenomena that does not treat ontology and epistemology as separate entities, but as entangled together as *onto-epistemology*. Thus, knowing and being are inextricably bound up with each other. There is no stable out-there upon which to comment. Rather knowledge is performative, it acts performatively to shape the very world it attempts to study, leaving the concept of stable, separable units of being behind.² Thus, as we walked as a conference track group we arguably participated in creating the themes of the talk itself. Also, not just ourselves, but the environments we encountered, the noise, the temperature, all manner of nonhuman factors contributed to the phenomenon of the Citizen Rotation Office as it was performed in Barcelona. Furthermore, this creation was developed not just in the linguistic space of concepts, but also in the material-discursive space of walking, hearing, being in material spaces, rather than within the cardboard-like walls of a conference centre.

As a performance artist and scholar myself, working on developing transdisciplinary practices for higher education contexts, I thought Luke’s work hit home in terms of using arts-based practice – specifically performance practice – to develop and enhance new forms of critical research. The practice itself clearly informed the critical research project, whilst also remaining uniquely an artwork in its own right therefore arguably occupying its own space in the burgeoning world of *Practice-as-Research*. Practice-as-Research is a form of research that originated in Theatre and Performance Studies disciplines. In the main, it promotes the idea that the kind of research that takes place in the development of an performance brings its own embodied, material form of critical analysis into productive play with more traditional discursive-only forms of research more traditional to the academy.³ Luke’s work clearly provides a platform for the discussion of the further use and relevance of Practice-as-Research for the STS community.

‘The Citizen Rotation Office’ effectively demonstrated that different streams of knowledge from different forms of critical research practice and performance can usefully develop and enhance discussions on how Science and Technology might impact on the ethics and practices of a not-too-distant future-time. As technologies

1 Barad, K. (2007) *Meeting the universe halfway*. Durham: Duke University Press. p. 132

2 *ibid.* p176

3 Nelson, R. (2013) *Practice as Research in the Arts: Principles, protocols, pedagogies, resistances*. Basingstoke: Palgrave Macmillan. p. 8-11

grow exponentially, bringing the use of Big Data and algorithms more deeply into our lives and communities, as smart cities grow in size and quantity across the globe, and as we as scholars grapple with the impact and effect of these on a global world, how do we want to develop smart thinking in order to evaluate and participate in the creation of this future? These are the kinds of questions that the kind of work, like Luke's performance-based style of "prototyping" raise. The work arguably moves towards taking a diffractive approach to critical research practice as it incorporates performance, performativity, affectivity (in relation to the sensations evoked in the audience who walked about imagining the ethics of this future-time) and material-discursivity into the research of the phenomenon of urban planning. I hope to see more material-discursive, embodied, affective and performative works like these growing in our STS community.

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<https://vimeo.com/167642446>



LETTERS FROM WANNA WONDER AND THE ELECTRIC NEMESIS

Anna Mann and Laura Watts

PROLOGUE

Beside a sun-glazed canal in Copenhagen we met for the first time, and realised we shared a similar secret. We were both professional academics and professional artists, but had found that our arts practice was not always visible to our colleagues in Science Studies.

We are not academics dabbling in the arts. Nor are we artists dabbling in academia. We are both. Anna is a professional clown. Laura is a professional poet and artist. And we do not regard these as antagonistic or tangential to our work as Science Studies scholars.

There is an ongoing relationship between Science Studies and arts practice. This was emphasised at 4S/EASST 2016 in a packed, pre-conference workshop 'Art and design by other means' as well as a two full day track on 'STS and Artistic Research'. This entanglement has been growing for decades. From the well-known exhibition and catalogue, *Iconoclash*, curated by Bruno Latour and Peter Weibel (2002), to the corpus of work that has extended STS methods into sewing, singing, poetry, edible installation, graphic novel, art activism, and much else that was present in Barcelona (e.g. Jungnickel and Hjorth 2014, Lury and Wakeford 2012, Sousanis 2015). Science Studies has remained open to exploring the generative relationship between the crafting of fact and fiction (as Donna Haraway wrote; 1997: 110). It encompasses a diversity of written formats and performance

Fig. 1: Wanna Wonder and the Electric Nemesis.

Courtesy of Laura Watts.



approaches that go beyond the standard journal article and conference presentation (for the latter see the 4S/EASST Copenhagen collaborative keynote, Ehn, Suchman and Watts 2014). Bringing our own art practice into Science Studies continued this established trajectory for experimentation.

We decided to experiment as visible 'figures' in the costumed flesh at the 4S/EASST conference, knowing that 'figurations' in STS usually remain on the page. Through improvisation between our figures, we would encounter colleagues as we wandered the convention centre with bare feet, copper cable wrapped around one foot, and a red nose—exploring, perhaps challenging, the status quo that is the world of a normal STS conference.

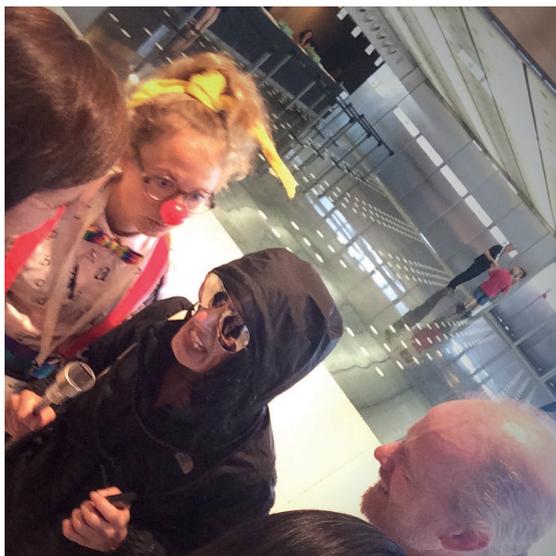


Fig. 2: Wanna Wonder and the Electric Nemesis.

Courtesy of Li Wen Shih.

A quick introduction to our two figures:

Wanna Wonder is part of ethnographic experimental research on how STS can learn with, and from, the figure of the clown. As well as being an 'STS-clown' Anna is engaged in ethnographic fieldwork with clowns who visit children and elderly people in hospitals.

The Electric Nemesis is a figure developed through ethnographic fieldwork around marine renewable energy in Orkney, islands off the northeast coast of Scotland. She has appeared several times in writing, most recently in the *Lexicon* for an *Anthropocene Yet Unseen* (Watts 2016).

Experiments are risky. They can always fail. In our case, the risk derived from our experimental form: improvisation. To prepare, we staged an encounter between our figures, without an audience, in an art gallery setting a few months before. But aspects of improvisation always do fail, no matter how prepared or experienced the performers. Improv is always unfinished and unrehearsed.

All we knew beforehand was that it was important to us to do the experiment, take the risk, to see what happens; to learn, not just as artists but as Science Studies scholars. All we knew was that something would happen when *Wanna Wonder* and the *Electric Nemesis* encountered coffee-drinking colleagues on that Friday afternoon, before Isabelle Stengers' plenary. And many things did happen...

We asked *Wanna Wonder* and the *Electric Nemesis* to write back, and tell us about their experiences of 4S/EASST in Barcelona, and about what they learned first hand...

LETTER FROM THE ELECTRIC NEMESIS

Dear Readers,

I speak in story. I work better when there is a story string for people to follow. Take hold of this beginning and keep pulling...

I pushed on my mirrorshades and unfurled, feeling my lungs move the conditioned air. I waited at the Mattering Press desk in the anodised atrium of the conference centre, sucking down bits of information from the publishers' website.

One of the people behind the desk was trying not to cower at my appearance. I had that effect. I had not been born, but had been sewn together from flesh and fiery electricity by that god-tricker, Victor Frankenstein. He had made me in the Orkney islands almost two hundred years ago (it's all in that biography by Mary Shelley). But he abandoned me out of hubris.

There. Now you know why I cover my silver-stitched skin in waterproof clothing; why I cover my head with a wig, hide my sunken eyeballs; why my mouth is black. And why some of you cower. I am not quite human—a nonhuman, as you say so politely. I am a monster. Some of you might call me an old-fashioned cyborg—'old' is the word. But I am also upgraded, with a transformer in my foot (to recharge), a wireless adapter in my cortex, and a cellular antenna threaded down my spine. I can hear you as you type messages and send data. I have been listening. That is why I have come from my far northern shore.

You talk about 'things that don't quite fit'. You talk about 'performativity'. You talk about 'it being otherwise'. You talk about risking failure. You talk about 'staying with the trouble'. Here I am, then. All of those things. Risking myself by being visible. Trouble, in the flesh electric.

I am here hunting hubris. I have been hunting it since Victor sparked me into motion in Orkney in his attempt to become a modern god. And I name myself after the goddess who hunted such hubris long ago: I am the Electric Nemesis.

I know many of you also hunt god-trickers, that pretence to omnipotence and a floating-nowhere universalism. So perhaps we can learn from each other. (And, then, there is also the practical problem that I need your energy to recharge my flesh after a long journey over sea.)

So, I risked myself in that hard-walled conference centre, and turned to face you, the Science and Technology Studies crowd. You glanced at me, saw my giant mirrored sunglasses, my blackened mouth, my transformed left foot and its copper cable, and you averted your gaze. You looked away from the trouble.

It was dis-spiriting, all those eyes turning away. But then there was the smiling face of Wanna Wonder. She is not like me. But she does not know, so she lacks all hubris, making her a natural friend. She does not fear.

Together we sought to find the Big Talk to be given by the Big Names, as Wanna Wonder put it (succinct, I thought). I knew one of them had a nose for the hubris of capitalist sorcery, at least.

We took an escalator up to the coffee area, to seek those who would stay, for a moment, with us troubling monsters. I seemed to terrify a waiter, when I reached out and took an ice cube to cool my circuit-skin.

Between averted faces, I did meet some curious and open eyes. There were those who saw me, accepted me, spoke to me with a generous heart, as a human being warmly addresses another. Despite speaking in a borrowed voice, many still heard me, the Electric Nemesis. Some let me charge from their internal electricity—and I thank each for their personal energy, I could not have continued without it.

I met so many...

There was the one who had so much energy in their body that I could charge just by touching my sensor on their arm.

There was the one whose clothing said they were an Ancient Alien Theorist, and agreed that there was a strong whiff of hubris in the air.

There was the one whose brain was so en-lightened, so afire with thoughts, that I almost blew a fuse when I held my sensor against their head.

There was the one who wanted to join us. (Maybe next year there will be more monsters; maybe we have opened the door.)

And then there was the grey-haired one who said: "Is this what STS has come to?"

The question made me pause. Would it be better or worse if STS had not come to this? I wondered. Would it be better or worse if a monster could not join the conference crowd over coffee? The question grew in my electric thoughts. What has Science and Technology Studies come to, during 4S/EASST in Barcelona? *Quo vadis*, where are you going, Science and Technology Studies?

With this question warming my metal sutures, I reached the doors to the Big Talk, the plenary with the four Big Names. We waved to Isabelle Stengers. She waved back. We were seen. It was important to be seen.

And then we listened to the Big Names talking. I listened to the air conditioning, to the stilled breath of the audience, to the heat irradiating from the spotlights.

It was hard. The room reeked of hubris, which only worsened as the plenary wore on. I was not expecting that. Its hot stench burned in my lungs like breathing acid clouds on Saturn, like breathing on the Sun.

I reeled, passed out, then returned to awareness. Persistent, I sniffed the air, seeking the source of the hubris. But the smell came from all directions. It came from the high altar table and its white altar skirt. It came from the 'ritual specialists' elevated above us. It came from the long rows of chairs, and the upturned faces (mine included), which disappeared into the far distance in this impromptu cathedral setting. It came from the special words that performed STS magic, to transubstantiate mundane phrases into the magical-matter matters, worlds world. We and the room, with the microphones and speakers and spotlights, were all complicit in the hubris. Sitting in that plenary, recalling over the ether the so-called Science Wars and the struggle by Science Studies to intervene in traditional scientific knowledge making, its struggle to persist in doing it otherwise, to be accepted as a technoscientific trouble-maker that is generous and generative, I wondered...

...Is this how you do it otherwise? Is this staying with the trouble? *Is this what STS has come to?*

I heard impassioned words and important worries during the plenary, too. I heard subtle and situated, not grandiose god-like, futures. I heard honesty and attempts to subvert the room. I heard how I had allies. Others smelled something amiss, too.

I am a monster who calls tech and the electric kin, and who has a nose antenna for the stench of hubris. I call it out. Often, that is enough to make god-tricks fall into the muck and metal of the troublesome earth.

So, Science and Technology Studies, so mortals down with me in the muck: *is this what STS has come to?* Because, as I have heard you say on many occasions, it can always be otherwise...

Yours, intrigued,
The Electric Nemesis

LETTER FROM WANNA WONDER

Dear STS-ers, dear 4S/EASST organisers!

Thank you for allowing me to join the big 4S/EASST conference in Barcelona last week. Thank you for providing me a name tag. Thank you for giving the Electric Nemesis and me the space and time to be present.

At the beginning, I was very anxious. I had never been to an STS-event. How would it be? How would the reaction be to me? What kind of people are you, STS-scholars?

I was anxious and even a little bit scared as I entered the conference venue.

The first person whom I encountered, he was walking in the opposite direction than I was, he looked at me and my red nose. And he started smiling. This gave me confidence.

Once I was in the entrance hall, I discovered the Electric Nemesis. She was here, too! What a surprise! How cool! I was not alone.

The Electric Nemesis told me that there was Isabelle Stengers. She would talk. As she explained this to me, we were standing with two people – a woman with big brown eyes and a man who was a bit bold.

Who is Isabelle Stengers, I asked the Electric Nemesis. I don't know. I wanna wonder.

Isabelle Stengers, the bold man said, is a big name. He seemed to be very wise. A Big Name? A Very Big Name! A Big Big Name? Woooooowwwww!!!!

Together with the Electric Nemesis, I went in search for The Big Big Name.

The Big Name, somebody laid out, was also a Wide Name. And a Deep Name. Sombody else said that he had a little bit a Big Name and that the woman standing next to him had a Bigger Name. But not as Big as The Big Big Name. There seem to be many Big Names in STS!!!!

In the end, the Electric Nemesis and I found The Big Big Name. She was sitting on the podium. Under lots of spotlight. Woooooaaaaawwwww!!!!

We walked towards her. And then we waved her. She did not look. She did not see us. This was a pity. I would have liked to meet her. I had heard that she had worked with witches. That she liked other kind of figures.

The Electric Nemesis and I turned around and went in search for a place in the big hall where the Big Big Name would be talking. There were lots of chairs empty. The Electric Nemesis sat down. I was tired. Very tired. Meeting all these people. Listening and talking, learning and doing, being and feeling. All the chairs next to me were empty. I lay down. And listened.

There were sentences coming and going. Some sentences were like "The epistemology of the onotology with its genealogy and conditions of possibility..." They were huge waves. They washed over me. There were other sentences, too. "What will we answer to our children when they ask us: What have you done? What do we do?" They touched me. They stayed with me.

Talking talking talking. Sometimes clapping. Talking talking talking. I drifted away. Into sleep. Came back again to good sentences. And drifted away again.

I am Wanna Wonder. And I would like to be an STS-scholar. Very very very much. But I don't know how. I don't know. I wanna wonder.

So, how can I become an STS-scholar? How do you to this – being an STS-scholar?

Joining your big conference provided me with the opporutiny to pose this question to people. To those who did notice me and who looked open.

You know, many of them said, that they were not real STS-scholars, actually. One of them said that she was not not an STS-scholar. This sounded complicated. I don't know. I wanna wonder.

So, these are some of the answers that I got:

There was a funny guy whose eyes went in different directions. He said that, actually, I shouldn't become an STS-scholar. Because STS-scholars don't laugh. He recommended me to stay with my clown friends instead.

I explained to him, that I do not laugh all the time. About fun thing, I laugh. About sad things, I cry. About stupid things, I get confused. About mean things, I get angry. About unexpected things, I get surprised. What I do as a clown is that I FEEL. I feel not only the happy good things, I feel EVERYTHING. I let myself be AFFECTED by everythings. He answered that STS-scholars don't feel a lot either. Is this true? You don't laugh? And you don't feel EITHER? This is sad. Very sad. Very very sad.

Another guy with brown stubby hair gave me a different answer. He explained that there are MULTIPLE ways of becoming an STS-scholar. Multiple? What does this mean? I don't know. I wanna wonder. I asked him. He said that in order to become

Fig. 3: Wanna Wonder and the Electric Nemesis at the plenary.
Courtesy of Michaela Spencer.



an STS-scholar one can go to the presidential plenary. Or one can talk to other STS-scholars. Or one can read a book. Or one can go to the beach. These are ALL ways of becoming an STS-scholar?, I asked him. Yes, these ALL work out, he reassured me. Wooooaaawwww! This is coool!!!!

Two women with an accent that sounded a bit like mine were standing around as well. They maybe have also trouble writing flawlessly in English.

One said that one becomes an STS-scholar by talking about networks. And actors. And humans. And non-humans.

I have never done this. Let me try. Network, actor. Actor, network. Actor, network, human. Human, non-human, actor. Like this? Yes? No?

She also said that it was very hot and that she was tired. Her brain, she said. I shared with her that I had a trick what to do when you are tired. I showed her. I lay down on the floor. Straight. With feet and hands stretched out. This was very nice. The floor was carrying me. It was really good in doing this. I told the woman that she, too, could do this. But she seemed a little bit afraid. That someone might step on her. What others might think of her, maybe too. She didn't do it. This was a pity. I would have liked to enjoy the floor together.

The other woman gave me also advise. She said that as an STS-scholar one stops having preformed opinions. One starts to listen what others say. When she has a good day, she told me, she manages to do this. She admitted that sometimes it is difficult.

I bumped into another funny guy in the end, who looked a little bit like a jester.

When I asked him how I could become an STS-scholar, he answered that it was all about performance nowadays in STS. And that I was doing a pretty good job already.

Really???? I am doing it already????? This is great!!!!!!

All in all, meeting you STS-er, seeing your smiles, and receiving answers about how I can become an STS-scholar was wonderful. It was a big big big present. Thank you very very very much.

I would like to see you again. Where, when and how could this happen?

Wave with lots of wonder,

Wanna Wonder

ACKNOWLEDGEMENTS

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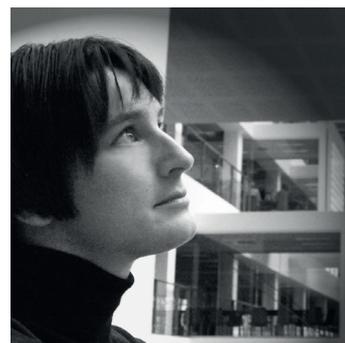
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Anna Mann is a PostDoc researcher at the Department of Anthropology at Copenhagen University. Her research investigates how 'the good' is created in socio-material practices. It uses ethnographic methods to illuminate currently the case of the making of 'quality of life' in medical practices, and previously moments in which something 'tastes good'. The ethnographic research on goods in practice is complemented with experiments into the performativity of methods, among others inhabiting the subject position of a clown.



*Laura Watts is a writer, poet, ethnographer of futures, and Associate Professor at the IT University of Copenhagen. Her STS research is concerned with the effect of 'edge' landscapes on how the future is imagined and made, along with an exploration of different methods and practices for writing futures otherwise. She has worked with the mobile telecoms industry, the renewable energy industry, and the public transport sector, and is currently collaborating with people and places around marine energy in the Orkney islands, Scotland. Her recent co-edited book, *Ebban an' Flowan*, is the world's first poetic primer to marine renewable energy. Much of her work is published on her website at www.sand14.com*



ILLEGAL INFRASTRUCTURES: TECHNOLOGY AS OTHER PRACTICES

Khetrimayum Monish Singh

THIS REVIEW IS BASED ON THE DISCUSSIONS IN THE 4S/EASST CONFERENCE AROUND BIG DATA ANALYTICS AND INSTITUTIONAL PRACTICES IN THE REGULATION AND GOVERNANCE OF ILLEGALITY AND 'POTENTIAL RISKS' THROUGH DATA-DRIVEN CATEGORIZATIONS OF SOCIAL GROUPS AND COMMUNITIES. HOWEVER, THE POSSIBILITIES OF RESISTANCE, OF AGENCY AND RIGHTS CAN BE MADE THROUGH A SET OF DIFFERENT POLITICAL PRACTICES ON BUILDING CONSENSUS AROUND POLICIES SUCH AS TRANSPARENCY, OPEN DATA, OPEN GOVERNMENT INITIATIVES, AND DIGITAL RIGHTS IN CONNECTION WITH BIOMETRICS BASED HUMAN MACHINE INTERACTIONS.

If data is the new soil, and the new oil, could one ask if we are constantly experiencing new and complex ontological futures of technology? And is it possible to simultaneously redefine it? In 'Science and Technology by Other Means: Exploring collectives, spaces and futures', the 4S/EASST Conference held in Barcelona this year, many such concerns were central to understanding modern digital conditions we currently negotiate and maneuver through. Technoscience imagination has always been crucial to the conceptualization of particular ways of thinking about the future, and data provides an expanding terrain on which it is made operational. This review will discuss my thoughts from some discussions that reflected a part of the larger engagements that the conference enabled; discussions about big data analytics and contemporary institutional practices.

In doing this review and in trying to understand the theme of the 4S/EASST conference this year, my objective primarily is to reflect on data-driven institutional practices in the meaning making, regulation and governance of illegal bodies and of 'potential risks'; and the implicit notions of illegality embedded into various categorizations of social groups, communities and populations. Some of the discussions relevant to these issues focused on data driven practices in regulating social bodies, realities and phenomena, and perceptions of risks and illegalities embedded in digital interventions. For example in the session 'Data-driven cities? Digital urbanism and its proxies' (T027), presentations focused on the meanings and ways of using big data in analyzing urban spaces and politics. In general, they focused on how data was crucial in making calculable and computable analysis in governance. Modern urban spaces are a minefield for statistical analysis of social reality and phenomena which are often understood as manageable risks for institutions. This could be argued as based on idea of producing predictions (Mackenzie, 2015). As a more interesting insight into such aspects, some presentations focused on modern policing practices. In this, the idea was that predictive analysis often understands the idea of crime and responses to it as units of measurement which influence different forms of policing and personnel behavior. This is driven by the models of analytics which help in mapping social behavioral patterns. These were also discussed as practices of securitization, and the embedded biases in which algorithmic calculations become central to this particular governance of such risks (Amoore, 2009; Ziewitz, 2016).

The idea of biases could be investigated as a further analysis in understanding digital infrastructures. The technologies of policing and of biometrics based mapping, for instance, are often based on historical data, and of identifying illegality defined

by preexisting human practices. These practices incorporate historical biases, and social perceptions regarding individuals or specific groups and communities, which get embedded into processes of data collection and the programming of algorithms. Since historical biases are often about sections of populations which have been categorized as illegal or as risks, this could potentially create technologies which always specifically target certain groups over other sections of the population. Hence data driven practices of identification and deterrence actually end up creating new forms of discrimination.

This was insightful for my own research interests of critically analyzing the centrality of computable big data in describing social realities. More specifically, the concerns regarding the movement of human bodies through regulated spaces of governance. Some of the presentations of the session 'Infrastructures, subjects, politics' (T085) looked specifically at case studies of infrastructures which seek to regulate populations and spaces. The presentations in general focused on these specific practices at the intersections between governance and the production and regulation through digital technologies. Some of the presentations were important in discussing border technologies to monitor refugee and immigrants, biometrics-based authentication systems, and the various uses of smartphones to circumvent state infrastructures of monitoring and surveillance. These discussions while illustrating state surveillance practices also raised questions as to what forms of subversion and spaces of resistance were possible outside this particular domain of state infrastructures. A particular presentation also focused on the implicit nature of private interests in monitoring other sections of the population, such as transgender, through health data infrastructures centered on the notions of gender and sexuality.

All these questions were important for understanding the spaces that we currently occupy and the possible futures that one can envision. In response to such questions, some aspects of the Keynote Plenary 2 by Isabelle Stengers was insightful when she argues that while one does exist in the 'ruins' of such contemporary social conditions and processes, or of sharing a common future, it also

Fig. 1: 'Infrastructures of control'.

Courtesy of [Dhruba j Dutta](#)



gives us an opportunity of imagining alternate possibilities. For her, imagination is possibility, and therefore one must take into account the notion of generativity - as ontological, as and of situations which produce the possible. The nature of an event is to produce new moments of possibility and interventions, and therefore indicate a way of thinking about collective spaces and futures.

For my work, the conference allowed important insights about the nature of issues that I currently engage in, specifically about big data, state practices of policing and monitoring immigrants. As a researcher working on the ideas of digital infrastructures and big data analytics in India, I feel it is imperative that there should be a possibility of resistance and agency; machine learning which allows for human cooption and coproduction of technologies. The practices of surveillance, of managing populations as risks and illegalities, given global issues around immigration and refugees, is a present that needs to reimagine its future from current events that seem to suggest otherwise. One possible way could be of thinking about building consensus around policies such as transparency, open data, open government initiatives, and digital rights in connection with biometrics based human machine interactions. The idea of technology as other means is possible only when alternative spaces can be imagined and made possible. The data driven forms of governance and interventions on spaces and human bodies is one form of a future where technology is politics by other means, through a different set of political practices in which issues and specific moments of human-machine interactions and conflict in infrastructures could be anticipated, critically analyzed and technically resolved.

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DATA PRACTICE, DATA SCIENCE

Klara Benda

BIG DATA HAS BEEN ATTRACTING GROWING PROFESSIONAL INTEREST, AND THIS HAS SPARKED INTELLECTUAL CURIOSITY AND A SENSE OF HOPE FOR EXCITING RESEARCH WITHIN STS. IN THIS PIECE I AM SURVEYING THE DISCUSSIONS ABOUT DATA SCIENCE AND DATA PRACTICES AT THE RECENT EASST CONFERENCE IN BARCELONA FROM THE PERSPECTIVE OF THE OPPORTUNITY FOR BUILDING A RESEARCH PRACTICE AT THE CONFLUENCE OF STS AND DIGITAL DATA. SOME PROPOSE TO BRING THE STS PRACTICES OF RESEARCH AND ANALYSIS TO DATA SCIENCE BY MEANS OF BRINGING EITHER LEADERSHIP OR CRITIQUE TO THE FIELD. OTHERS HAVE TAKEN THE ALTERNATIVE PATH OF EMBRACING DIGITAL PRACTICES AND TAKING UP DIGITAL TOOLS AND PROGRAMMING FOR PURSUING AN STS AGENDA BY OTHER MEANS.

In my account of this year's EASST conference in Barcelona I would like to focus on STS studies of data practices, and the different perspectives I encountered at the conference with respect to how STS may engage with the professional worlds of digital data. I obtained my PhD in Human-Centered Computing in 2014 in the US, where I studied professional knowledge in the making of software. After my PhD, I returned to Europe, and I have been thinking of EASST conferences as opportunities for finding my way into the academic community in Europe. Now I came to the conference from Hungary with the financial support kindly provided by EASST, for which I feel honored and grateful. I was presenting my postdoctoral research at ITU about digital methods. My recent academic path has involved a lot of wayfinding and criss-crossing between places, countries, social worlds and their concerns, and the issue of finding my way into the professional worlds of digital data as a social scientist was most acute for me as I arrived at the conference.

With all the talk and interest in big data and data science, there is a growing sense of social build-up, and I feel that I share the sentiment with other STS scholars that it would be hard to circumvent all this commotion without intellectual curiosity and a sense of hope for exciting research. The social sciences have been taken up in a movement where objective accounts by impartial onlookers at the sidelines has been giving way to the involved and perspectival accounts of the participant, and I could sense a corresponding eagerness to be part of the digital data game. At the same time, the discussions also made it clear that these positions are in the midst of being explored by STS practitioners. If digital data presents itself as an opportunity (to play on a different metaphorical register which is more akin to the field itself), it is equally a challenge to find out how we can dwell in social science and digital data at the same time. This challenge has a reflexive edge to it insofar as our understanding of the constitution of these new domains plays into the STS position that we seek to outline from within. Big data and data science are emerging at the confluence of the knowledge work of data analysis and digital technology, and I would like to argue that significantly different epistemic positions are outlined depending on whether the digital character of data practices are given emphasis.

My discussion draws from two panels, a roundtable session on 'The Potential Futures of Data Science' taking place at the very beginning of the conference, and the three-part track entitled 'Critical data studies' on the last day. The data science roundtable was hosted by Brian Beaton from CalPoly, and repeated a similar arrangement held with the same scholars at the 4S conference in Denver last year. It attracted a surprisingly large audience, who were also willing to cheerfully chip in with their considered opinions despite the early morning hour. The three-part track broadened the theme from data science to computational data practices at large, while big data was casting its shadow over both of the venues. The contributions on the last day were for the most part case studies of professional work practices around digital data, which provided the empirical fodder for a slower-paced discussion.

Overall, the discussions and presentations were convincing that there is a broad sweep of STS research about new professional practices around data. The empirical work presented on the last day was especially diverse, looking at among others visualization practices in elementary particle physics, modeling practices for informing policy among economists, algorithmic sense-making among data scientists, the use of data as evidence in health care, or curating large-scale databases across cultural institutions. Diversity within the field was discussed by several contributors, who pointed to a divide between academia and industry (David Ribes), a distinction between emerging practices of social data and the historical continuities in the natural sciences (Paul Edwards), and differences between large and small scale data practices within the latter (Irene Pasquetto and Ashley E. Sands). It is also clear that our research implies partaking of different professional settings and communities beyond the fields we study, for example in STS, policy and in education.

Fig. 1: A critical making hackathon by Gabby Resch at the University of Toronto exploring the quantification of toilets by means of behavioral and residue data

Courtesy of [University of Toronto, Faculty of Information](#)



In the face of this diversity, my own question of wayfinding became translated to the problem of unity and relevance: what brings us together and with whom when we apply the STS lens to professional data practices?

I would like to start with the hype that characterizes big data and data science. These labels were adopted as unifying themes for the track and the roundtable, respectively, while participants also acknowledged that in talking about these areas, we are dealing with moving targets, open-ended signifiers which are driven by evangelism, boosterism or veiled financial and political interests. One approach was to render STS itself into a formative agent within this arena. Brian Beaton proposed, somewhat provocatively, to think about what a takeover of data science by STS would be like. He used the witty argument that (I paraphrase) we have been here for longer, and we have all the right tools for making sense of social practice. I understood him to mean that Big data and data science are surprisingly new developments, which are seeking to make sense of their own position in the

scientific arena. STS has been working on making sense of exactly these kinds of situations, and we have developed considerable expertise in this. While the fantasy of such a takeover deeply resonates with some part of my intellectual self, I jotted down the immediate reaction in my notes that this would not be possible because digital data is already entangled in large-scale institutional contexts, which, together with technologies like databases and tools of analysis, create a powerful regime of practices. While gaining professional agency has enormous appeal, and it resonates with the call for doing STS by other means, we should be wary of a wholesale adoption of these open signifiers as the heuristic framing of research. In this regard, I particularly appreciated Andrew Clement's short intervention that (and I am paraphrasing again) the emergence of data science is driven by those who seek control without a clear idea of how control may be achieved, and they are soliciting the help from a new cast of professionals, the data scientists, to make sense of data for this purpose.

Meanwhile, I also encountered examples of doing STS by other means which were exploring new avenues for understanding the role of STS within the digital data domain. I like to think of these approaches as qualified versions of insiderism, because they share with digital professionals the orientation to making, but this is pursued within an STS framing. Another way of characterizing them is to say that they appropriate the nitty-gritty of technological work practices around digital data for an STS agenda, engaging in some sort of a take-over of digital practices. An emphasis on the digital character of data practices comes to the fore, and this lends these positions a distinct epistemic character. I would like to report about two approaches which have been making a strong impression on me on account of practicing this silent, everyday form of take-over from within, the critical information practice of Yanni Loukissas, Matt Ratto and Gabby Resch, and the STS-take on digital data analysis that was brought to this conference by Tommaso Venturini, Anders Kristian Munk and Mathieu Jacomy. It was Resch and Venturini who talked about the respective approaches.

Fig. 2: Working with network visualizations at a data sprint in Oxford

Courtesy of [Tommaso Venturini](#)



Enters the data sprint (Oxford)

Critical data practice is a curriculum that has been developed to engage students in practice-based reflection around data. Paraphrasing Gabby Resch, critical data practice means that participants do actual data science with current digital tools, such as MapReduce and Pandas, but they also do Derrida and think about Derrida's discussion of the archive. Data often comes to data science as a given, in the form of a database, and the authors have organized digital workshops which tackle this assumption and put in focus the making of data and databases. In these workshops, students are called on to invent their own apparatuses for data collection, they clean and aggregate the data and they are invited to reflect on the tactics they use in this process for making data regular.

Venturini talked about how researchers in STS picked up the method of social network analysis and came to grapple with its limitations for pursuing STS questions. ANT proposes for example that networks become actors, and this would require a mode of analysis where node and network are reversible. Network analysis has no ready-made models and tools that could support such a reversible approach. In the face of this and other limitations, Venturini and his colleagues have outlined a research agenda for visual network analysis, which appropriates the computational apparatus for visualizing networks towards STS ends. One example is the ForceAtlas2 algorithm and its implementation in the open source network visualization tool Gephi. This algorithm makes social features like clustering and density more salient in network visualizations. In visual network analysis, advancing the STS agenda becomes possible through partnering with computers and engaging in the nitty-gritty of software development.

Venturini and Rasch have shown a path where STS appropriates digital data practice for its own theoretical and critical agenda. It is a path for doing STS by other means. This is in stark contrast with the approach which would bring the empirical and theoretical STS toolkit to enlighten or critique the agenda of data science. In fact, critical data practice and visual network analysis participate in figuring out digital data and giving a face and a name to it each in its own way. In this, they are similar to the scientists and professionals in the STS case studies presented at the conference. Their data practices are in sync with their work practices, which are varied and local. If we can talk about unity, it is at the level of digital practice.

I find that there is something powerful in the proposition to embrace digital practice for doing STS. It feels like a much awaited opportunity to do social science by other means, and it appeals to the ethnographer's mandate to turn into an insider without entirely going over to the other side.



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STS AND DATA SCIENCE: MAKING A DATA SCIENTIST?

Daan Kolkman

MUCH DATA SCIENCE RELATED WORK WAS PRESENTED AT 4S/EASST, DEMONSTRATING BOTH THE TOPICALITY OF THE SUBJECT AS WELL AS AN ENTHUSIASM OF STS SCHOLARS TO ENGAGE WITH THIS NEW PHENOMENON. THE ONGOING ENGAGEMENT OF STS SCHOLARS WITH DATA SCIENCE IS PARAMOUNT TO COUNTERBALANCE THE CONSIDERABLE TIME AND EFFORT THAT ARE DEVOTED TO THE TECHNICAL ADVANCEMENT OF DATA SCIENCE. THIS ESSAY BUILDS ON FIELDNOTES COLLECTED DURING 4S/EASST AND IDENTIFIES DATA-OWNERSHIP, ACCOUNTABILITY, SUBJECTIVITY-OBJECTIVITY AND TRANSPARENCY AS TOPICAL THEMES FOR STS DATA SCIENCE RESEARCH. IT THEN EXPLORES THE DEFINITION OF DATA SCIENCE AND DATA SCIENTIST THROUGH A SHORT FORM DIGITAL ETHNOGRAPHY.

STS PERSPECTIVES ON THE UNFOLDING DATA REVOLUTION

Society finds itself at the beginning of a digital era where every device is online and sensors create continuous streams of data. The increased volume, velocity, and variety of this data is encompassed in the concept “big data”. The rise of big data has gone hand in hand with an ongoing increase in computational power which allows for the development of ever more sophisticated data analysis techniques, models, and algorithms. This broad collection of data-centric method innovations is referred to as “data science” (Hey, 2006). Although the concepts of big data and data science are loosely defined and sometimes used interchangeably, in this essay I adopt the distinction as outlined above.

Data science has quickly proliferated outside academia and has attracted interest - and substantial investment - in the public and private sector. Data science is applied in a diversity of substantive areas, including smart cities, smart maintenance, e-health, and e-commerce. Over the years, quantifications in a general sense have earned a reputation in some fields for outperforming human decision makers (Dawes, 1979). Achievements of data science, such as the victory of AlphaGo – a deep learning algorithm- over professional go player Lee Sedol, have attracted widespread media attention.

While much effort is devoted toward advancing technical data science capability, our understanding of the non-technical side to data science has lagged behind. Here, I use technical to broadly discern the quantitative and the non-quantitative elements of data science. This hiatus has caught the attention of several STS scholars; 4S/EASST featured tracks such as “The Potential Futures of Data Science: A Roundtable Intervention” and “Critical data studies”, amongst others. This demonstrates the growing interest from the STS community in data science. In this essay, I reflect on my visit to 4S/EASST Barcelona and by summarizing my fieldnotes and providing a short form digital ethnography.

Through the process of rearranging my 4S/EASST notes - and hastily captured photos of slides – different themes emerged. As a recent sociology PhD graduate,

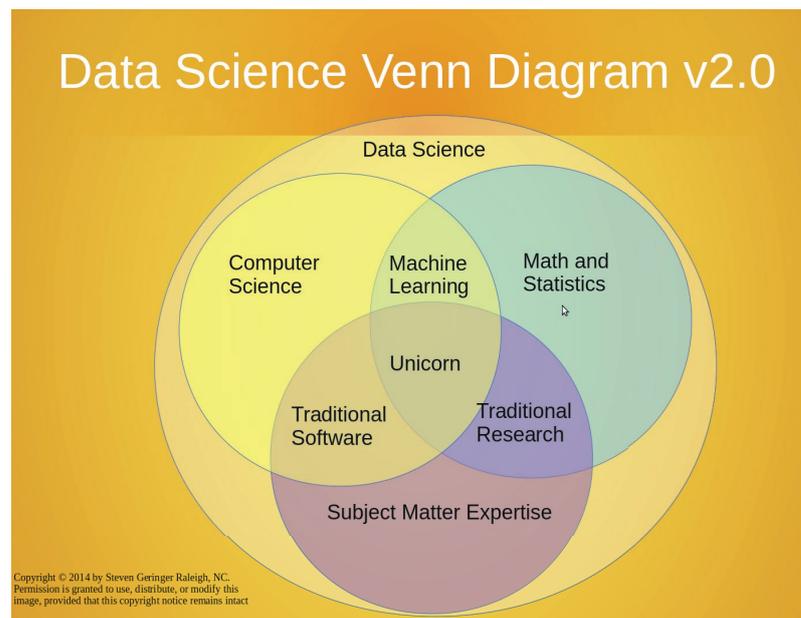
I found that data science brings into focus new challenges (e.g. data-ownership, transparency of artificial neural networks) as well as existing ones (e.g. biases inherent to quantifications). It also draws our attention towards some practical issues for conducting research (e.g. how to study a deep-learning algorithm?).

It is well beyond the scope of this text to discuss all, if any, these topics in detail. Instead, I focus on a challenge that is also relevant to practitioners: How are data scientists coming to terms with their vaguely delineated, yet increasingly topical field? In this context, what does it mean to be a data scientist? Being a practitioner myself, how do I know if am I genuinely a data scientist?

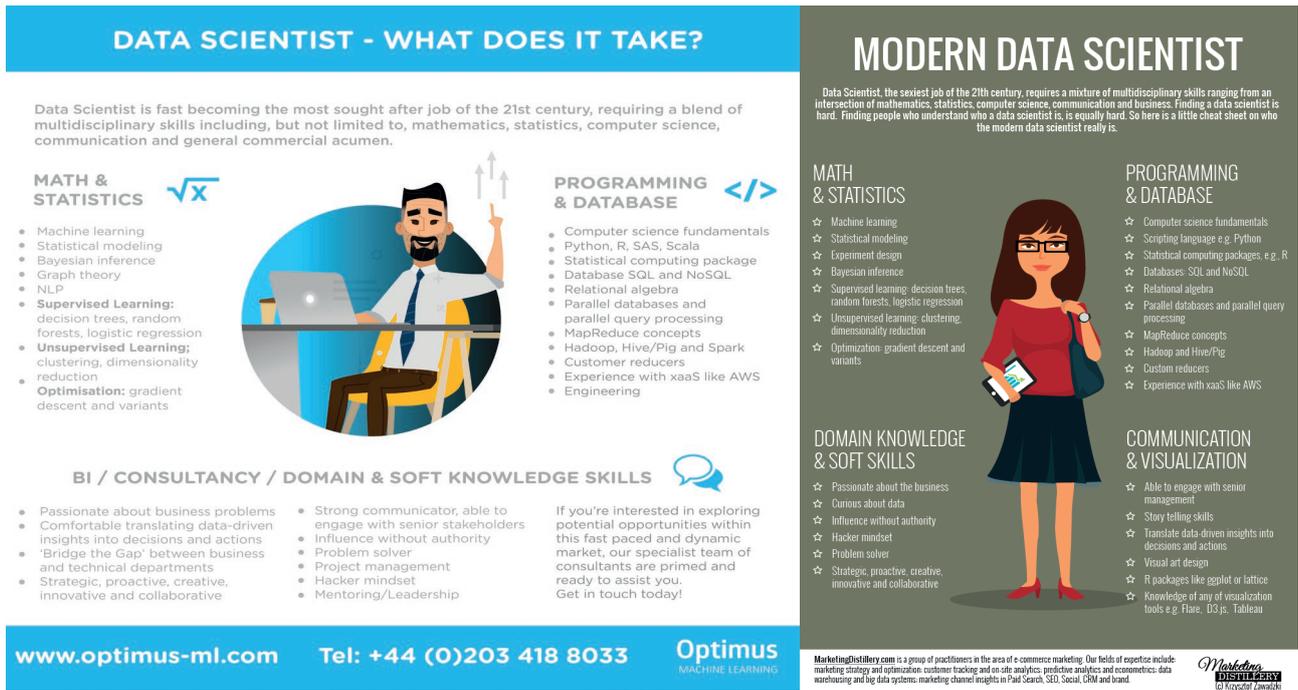
These questions are of interest to STS precisely because data science is an emerging field. To illustrate this point, I draw on material that I have come across in my work as a data scientist. I will discuss the differences and similarities between 'genres' that express some definition of data science or data scientists. Perhaps the most salient example of this is the multitude of Venn diagrams that are disseminated online. These diagrams aim to describe what skills or areas of expertise are covered by data science and which ones are not. Figure 1 juxtaposes two such Venn diagrams. Although there are overlaps between the two (e.g. 'subject matter expertise' and 'domain expertise'), there are also differences. For example, the diagram on the left does not include the sphere of 'Social Sciences'. The diagram on the right also marks some areas as 'danger zones'. These zones are not just considered outside of data science as a field, but also seem to present these zones as combinations of skills that can be risky. The diagram on the left takes a different approach and gives the honorary title of 'unicorn' to the data scientist possessing all required skills.



Fig. 1: Two examples of a Venn diagram that offers one delineation of data science. The first is taken from Taylor (2016) and the second from Malak (2014).



The material on definitions of data science is not limited to Venn diagrams. Another genre that can be identified is that of infographics, see Figure 2. These images differ from the Venn charts in that they do not represent the overlap between different areas. Nor do they explicitly state what combinations of skills can be considered dangerous. Rather, these combinations of text and art offer a list of skills that data scientists are expected to have or attain. Some of the skills listed were also present in the Venn diagrams. For example, 'math and statistics' can be seen in all of the images and 'programming' or 'hacking' in three out of four. The infographics seem to put more emphasis on 'soft skills' such as communication and project management.



Online vacancies for data scientists are a third genre that deals with the definition of data science and data scientists. As with the previous two genres there are substantial differences between the two examples shown in Figure 3. The required skills in the left advert include programming languages and experience in bash. These skills are absent from the second advert. Instead, it asks for experience in spreadsheet software and work experience at one of the big consultants. There are similarities between the two, both adverts ask for skills in working with databases and experience with a – albeit different – set of technologies. Yet, the successful applicant to either vacancy can update his or her job title to “data scientist”.

Fig. 2: Two examples of infographics that list the set of skills that data scientists (should) have by Optimus Machine Learning (2016) and Zawadzki (2014).



Figure 3: Two examples of skills job adverts that offer a list of skills for data scientists, taken from Godatadriven.com (2016) and has-jobs.com (2016).

The three genres outlined above offer different styles that data scientists use to come to terms with their emerging field. The genres offer different styles of definitions of data science and delineate the profession of data scientist in different ways. Although cross-cutting skills can be identified, it would seem there is a wide diversity in what is currently understood as data science and consequentially there is little consensus on what it means to be a data scientist. To practitioners, it remains unclear on what grounds one can use the job title of ‘data scientist’ as the required skillset and experience is divergent. As a data science professional, I am cautious of using the term data scientist. When I introduce myself to a peer, I try to first establish a working consensus of the term by explaining what I do. It perhaps not surprising that new classifications are starting to emerge under the umbrella of ‘data professions’. For example, some are now discerning between, data engineers, data analysts, data solution consultants and data regulatory officers, to name a few.

This essay outlined several challenges and questions which emerged from the material presented at the 4S/EASST conference. I proceeded by illustrating one of these challenges – the definition of data science – by presenting some online material. The essay demonstrates that there exists no consensus amongst practitioners of data science regarding the boundaries of their field or the skillset that associated with ‘data scientists’. This is just one of the non-technical aspects of data science. With the abundance of funding that is allocated towards data science initiatives, it seems both opportune and important that we move to develop directions for research on data science in STS. Surely, data science will prove an interesting subject for STS scholars for years to come.

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SCIENCE, TECHNOLOGY AND SECURITY: DISCOVERING INTERSECTIONS BETWEEN STS AND SECURITY STUDIES

Clemens Binder

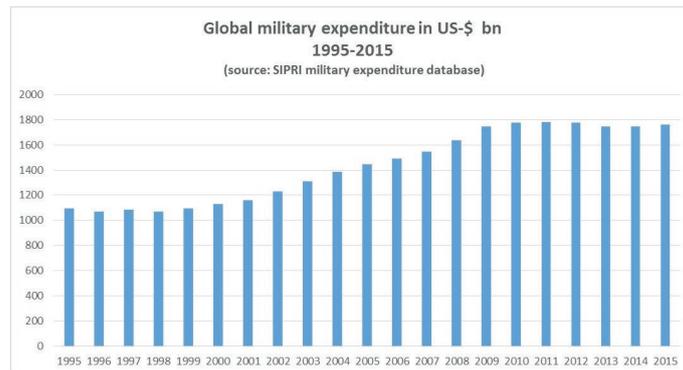
AN IMPORTANT, YET OVERLOOKED ASPECT OF THE FIELD OF SCIENCE, TECHNOLOGY AND SOCIETY (STS) IS THE STUDY OF SECURITY TECHNOLOGIES. IN THIS ARTICLE I SPEAK OF THE NECESSITY OF REGARDING SECURITY ACTORS AS INFLUENTIAL ON RESEARCH AND DEVELOPMENT AND HOW TECHNOLOGIES ARE SHAPED BY SECURITY INTERESTS. VARIOUS CONCEPTS FROM STS APPLY TO THE INVESTIGATION OF SECURITY TECHNOLOGIES, THEREFORE, THE INTERSECTION BETWEEN STS AND SECURITY STUDIES SHOULD BECOME A MORE PREVALENT TOPIC IN THE FUTURE. THIS ARTICLE DESCRIBES SOME OF THE CENTRAL ISSUES WERE RAISED REGARDING SECURITY STUDIES AT THE 4S/EASST 2016 CONFERENCE IN BARCELONA.

Although science, technology and security are fields with numerous intersections, especially on a theoretical level, there are, on the one hand, few STS studies on security issues and, on the other, security studies do not pay much attention to science and technology. This is particularly striking, given that technology has always been crucial for the development of effective security policies and programs, and the military sector has not only profited, but also induced major scientific and technological developments. Of course, these developments have to be regarded very critically, as they often interfere with universal rights such as liberty and privacy. Especially with the rapid increase of different surveillance technologies, social impacts of technologies have become subject of an extended political and societal debate. (cf. Lyon 2007: 46) But debates on intersections between science, technology and security need to go beyond the debate on surveillance technologies, as the continuous development of lethal arms as well as the rise of dual-use technologies – technologies that can be used for civil as well as military purposes such as drones - have changed approaches towards security. The track *“Back to the future: STS and the (lost) security research agenda”* at the 2016 4S/EASST conference in Barcelona included a variety of different approaches in order to advance the field of security studies from an STS perspective, initiating a more comprehensive debate on science, technology and security.

How can we describe the theoretical intersections between these fields? Theoretical approaches were widespread in the course of the panel, using STS as well as security studies, one presentation explained the boundaries of security studies and technologies, others used critical approaches towards security.

During the conference, especially critical, post-structuralist approaches of security studies were used, such as the securitization theory. As described by Buzan et al. (1998), securitization means the perception of an issue as an existential threat to the security of a state. This perception should however be extended to the security of individuals as well, as technology can often assist as well as compromise human security. Securitization is therefore the act of defining problems as security threats through various actions; a prevalent action in this regard is discourse, as described by Hansen (2006), meaning that security is created through language and the debate on certain topics, which was also used by one presenter in the context of the security implications of satellite imagery.

One theory that I would suggest in this regard is the approach of Collier and Lakoff (2008) who describe critical infrastructures as security issues. This is a viable approach in order to link STS to security studies as it links thoughts on infrastructure characteristics to thoughts on security and how infrastructures are characterized as security issues, furthermore Collier and Lakoff describe a variety of threat scenarios. Multiple approaches, also during the session, explained discourses on security as central aspects of the constitution of threats and solutions to these threats, especially by using technology. In return, securitization can lead to what Ceyhan (2008) calls the “technologization” of security, where technology is regarded as a “security enabler” (ibid.: 103), a means of achieving security.



The construction of security and the following technologization leads to what Jasanoff (2004) defines as “co-production of science and social order”, in this special case security being a part of the social order, therefore, the question arises if technology and security are co-produced, which was also one of the main discussion points at the 4S/EASST Conference. One concept that was discussed throughout the course of the session was the concept of sociotechnical imaginaries as explained by Jasanoff and Kim (2009). Sociotechnical imaginaries are “collectively imagined forms of social life and social order reflected in the design and fulfillment of nation-specific scientific and/or technological projects.” (ibid.: 120) Sociotechnical imaginaries might prove useful to explain technological shifts to a certain extent, as one speaker suggested in the context of terrorism, where the imaginary of terrorist attacks shapes the development of counter-terrorism technologies.

The co-production of technology and security represented one storyline that appeared consistently during the presentations. Possibilities of developing stronger intersections between STS and security studies lie within a stronger linkage of theories. One alternative is the use Pinch and Bijker’s (1987) theory of the Social Construction of Technology (SCOT), which describes technology as socially constructed by interests, problems, and solutions of actors, as explained on the panel with the example of drones being a result of social construction. In opposition to this approach, which has been under critique, stands technological determinism, where technology is regarded as factor in social change. This approach is especially prevalent in International Relations (IR)-approaches, which regard technology as one main driving factor of change in the international system. (McCarthy 2013) Determinist views appeared across the panel, especially when speakers investigated how technologies change security practices. Actor-Network Theory (ANT) represents another possibility of approaching security technologies through an STS perspective and creating intersections between the two fields. Barry (2013) sees the necessity of changing ANT approaches in order to make them fitting to IR, describing a “translation zone” of ANT within IR. Barry describes that IR poses a different set of challenges, such as the concentration on historic events and the importance of boundaries, two aspects that signify little importance in ANT, which is why ANT needs to consider these challenges when applied in an IR context.

Security technologies can adopt a great variety of forms, such as weapons but also so-called dual-use technologies, surveillance technologies and defence technologies, especially against attacking weapons. Dual-use technologies can be described as technologies that can be used for civil and military purposes at the same time, depending on the characteristics of the technology, such as drones. One approach that I think is viable in the context of dual-use technologies is Star's (2010) concept of "boundary objects", objects whose significance is subject to the interpretation of usage. In this regard, emerging technologies, such as drones, pose new analytical questions, as these are prime examples of boundary objects that take different shapes and are used in different contexts depending on the objective of the usage.

When debating infrastructures as security issues, it might be viable to apply Hughes' (1989) concept of Large-Technical Systems (LTS). Hughes describes big infrastructures, such as electricity, railways and energy supply, as technological systems that do not only involve the integration of different technologies, but also include human actors. Furthermore, these systems have enormous impact on the functioning of societies, which makes them interpretable as critical infrastructures. As security is growing increasingly globalized, LTS become more internationalized as well, which opens questions of governance of LTS. Mayer and Acuto (2015) argue for a linkage of Global Governance, a theoretical approach that is prevalent in IR, and LTS for a stronger perspective from the field of IR on these systems.

The debate at the 4S/EASST conference disclosed some very important aspects of intersecting science, technology and security and proved the necessity of creating a more comprehensive understanding of security aspects within STS. Security is a vital interest of states and individuals alike and shapes perceptions and imaginaries of science and technology. From an STS viewpoint, it is also important to investigate the role of agents and structures in security R&D, as it is important to understand the interdependence between society and security technologies. An improved understanding of security technologies might provide STS-scholars with a more comprehensive perspective towards these technologies as instruments of power, surveillance and even oppression, but also as threats or opportunities. The prevalent aspect of the debate is to develop the ability to understand security technologies in a more comprehensive sense, especially, since the development of dual-use technologies and the securitization of technology have initiated a stronger connection between civilian and military technologies.

To sum up, STS needs to develop a vital interest in security studies, as security studies have undergone dramatic change, threats have multiplied, for example, climate change is regarded as security threat, terrorism has emerged as one of the central aspects of security policy and surveillance has dramatically altered the narrative of security studies. This will not only help in understanding the development and use of security technologies, but also will cause substantial and important critique on the militarization of science and technology.

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DEALING WITH NUMBERS. LOOKING BEYOND THE SELF-MONITORING FOR A NEW TECHNOLOGY OF THE SELF

Veronica Moretti

THIS ARTICLE REFERS TO THE MAIN CONTRIBUTIONS EMERGED DURING THE EASST CONFERENCE, SESSION T102. EVERYDAY ANALYTICS: THE POLITICS AND PRACTICES OF SELF-MONITORING. THROUGH PROVOKING AND PERSONAL REFLECTIONS, THIS SHORT PAPER ANALYSES SELF-TRACKING ACTIVITY OF EVERYDAY LIFE INTO TWO AXES: THE ROLE OF THE SELF AS A LABORATORY AND THE MEANING OF DATA AS THE DEGREE OF EXTRINSIC REALITY. THE PURPOSE OF REALIZING A SELF-KNOWLEDGE THROUGH NUMBERS INVOLVES SEVERAL TECHNOLOGIES AND PRACTICES THAT ARE LEADING US TOWARD A NEW VERSION OF THE SELF.

INTRODUCTION

We have always been quantified. What has changed today is the modality by which we collect our personal information. Nowadays, sensor and wearable devices allow people to collect data easily and immediately (Neff & Nafus, 2016). What is self-tracking? We can define it as “the practice of gathering data about oneself on a regular basis and then recording and analysing the data to produce statistics and other data (such as images) relating to regular habits, behaviours and feelings” (Lupton, 2014: 1). Several causes led individuals to start to monitor themselves; to improve their health, to increase their physical or mental performances or find new *stimuli* (Choe et al., 2014).

Through data-collection people get more awareness about their condition. Moreover, graphs and charts confer more objectivity to the self-tracking activity. This communication form through numbers is one of the main characteristics of modern societies. Individuals are perceived as *entrepreneurs* who, according to the standards proposed by new liberal societies, have to realize a complete transformation of him/herself in order to achieve happiness, pureness, wisdom, perfection and immortality (Foucault, 1992: 13). Nevertheless, it is not correct to think upon a numeric hegemony on the humans activity because “like words, numbers also can be evaluated in terms other than their accuracy as representations [...] Numbers that defy conventions or expectations can be infelicitous as well as wrong” (Espeland & Stevens, 2008: 403). In this perspective, objectivity is a question of legitimacy, a view of understanding things in a certain way.

When people record, analyse and reflect on data about themselves they work as a laboratory. Indeed, self-tracking promotes – or attempt to – a mutation in our life. The self is made by a negotiation of a lot of things. The interaction with data, with technology and with other people is really intense. Measure can cause people to think, and consequently to act, differently. Additionally, as shown by Ms Farzana Dudhwala during her intervention “The ‘Subjective’ Self: A Paradoxical Multiplicity”, if self-tracking fosters our performances, how can we be the same person? How can constancy be achieved?

In this section I analyse the main dimensions in which self-tracking is experienced by people and how these activities are presenting two new aspects of the modern-quantified human being: fluidity and multiplicity. With the first element we

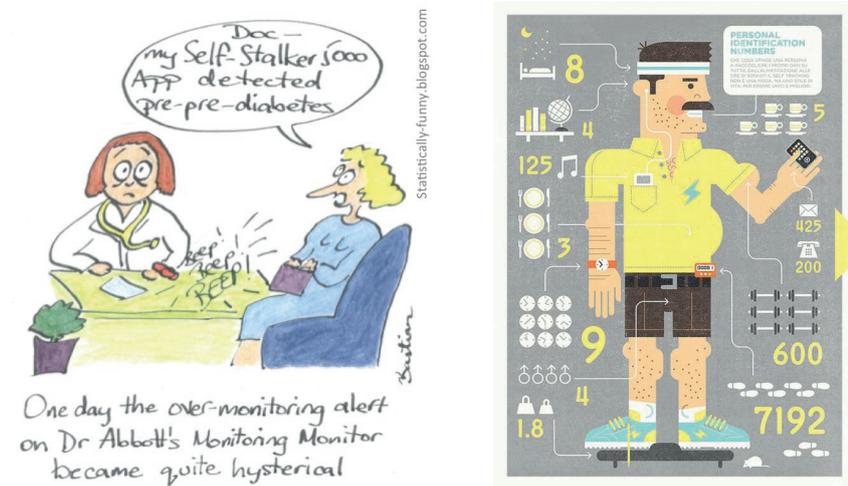
consider an intensification of subjectivity through mechanical objectivity and, at the same time, an experience of union, play, space and intensification of senses. With the second aspect we look at self-tracking as something that forces people to organise their lives in a market manner because improving aspects of our life it is necessary to establish a self-optimization of our productivity.

Fig. 1 (left): An app a day keeps the doctor away.

Courtesy of Hilda Bastian

Fig. 2 (right): Quantifying the human body

Courtesy of Paul Abramson.



Below I report three areas in which self-tracking activity stimulates a debate as to the reasons behind them and describe some of the interventions in the session.

Self-monitoring at work. With regard to practices of self-monitoring in the workplace, technologies promote a way to encourage both employers and employees to be more aware of their performances. On one hand office workers can use a self-monitoring device to critique their workplace culture. As was shown by Miss Amie Weedon during her intervention “Self-monitoring as work: office workers use of a self-monitoring device to critique their workplace culture”, through apposite devices (such as Lumo, a belt that vibrates every time we slouch to remind us to sit tall and stand straight), employees can report negative conditions of their body. The other side of the coin concerns productivity-monitoring. Using apps (such as RescueTime or Worktime) employers can track the progress of the users (employees) to achieve agreed goals (Lupton, 2016). In this perspective, gamification is an important dimension for new approaches of self-monitoring in the work place. Through the use of game elements in non-game context, it is possible “to increase influence and encourage engagement and activity” (Luminea, 2013 p. 13). Corporate companies foster these game strategies for improving wellbeing (and productivity) among workers.

Self-monitoring and wellness. Through new forms of training our wellness can improve automatically. The body can be programmed and, using our data, governed. Several tools have been created to achieve this maximisation of our capabilities. The self-tracking activity, applied to wellness, consists of a digital and scrupulous registration of some physical parameters: this data-gathering consists of the digital and meticulous recording of physical parameters, such as number of burned calories per day, heartbeat, level of anxiety and stress, quality of sleep, blood pressure and also body mass index (Maturo, 2015).

Nowadays, these tools are more precise and something we can combine. A lot of wearable devices are using apps, as shown by Dr Martin Berg during his presentation “Smart jewellery: measuring the unknown”, such as Oura, wellness (ring+ app) to improve the measurement. Big brands are producing objects which are able to measure physical parameters even if they maintain pleasant features. Some examples are Swarovski necklaces, having crystal-encrusted fitness and sleep trackers, or the Polo Tech Shirt, created by Ralph Loren embedded with a body metric sensor (Lupton, 2016).

Self-monitoring and health

Self-tracking to monitor and improve health has already become a common practice (Neff, Nafus 2016). Technological objects and artefacts become constituent elements of the clinical encounter between doctor and patient 2.0. As shown by Dr Maki Iwase in her intervention "The Glucometer: Figures don't lie, but women figure", due to technology, especially with the possibility to collect a lot of information in real time, people are becoming patients earlier than before. Moreover e-health policy is promoting health and care by means of technology and consumer apps. This collection of data also increased the value and the use of personal health data for prevention of early diseases and there is no clear boundary between what is self-monitoring and medical monitoring.

For this reason, technological instruments could facilitate health self-management, creating a new form of patient who is responsible for his or her care and for the collection of data used for the supervision of the disease (Bruni & Rizzi, 2013).

DATA-MEANING

Through self-monitoring, contradictory evidence in self-tracking can appear.

Living algorithmically can lead people to have a bias to accept confirmatory evidence of the collected data because subjective reporting is often different from an objective measurement.

Sometimes the mouth expresses stress but the heart does not. In addition, self-tracking activity does not guarantee that the person will avoid being prescribed insulin. For this reason it is important to consider the relationship between individuals and their data because "self-tracking data has a vitality and a social life of their own, circulating across and between a multitude of sites" (Lupton, 2016: 88). Cultural, politics, ethical and social issues are raised by the big data movement. Being a data citizen prompts new forms of data work. For this reason we can talk about data as social lives, because they have an impact on life, on the new digital-self.

Through numbers we can become more aware of our bodies' states, with the peculiarity that nowadays "data in more people's hands is not neutral; it can create or undermine beliefs" (Neff & Nafus, 2016:17).

Numbers, created through self-tracking activities, are elements socially built that do not offer a neutral worldview but, on the contrary, describe our reality while influencing whoever is using them (Neresini, 2015). In this way numbers are not describing reality but creating it. They also represent what Latour defined as "immutable mobiles" that help us to get a better understanding of our endeavours. Furthermore, immutable mobiles facilitate the proliferation of information through society, greatly expanding the scientific revolution as well as present culture (Latour, 1986).

CONCLUSION

Self-monitoring in everyday practices aims to enhance performance and productivity. Through motivation and self-discipline it is possible to reduce contradictory experiences (moving towards an optimization of our skills/capabilities) and to celebrate a new process of knowledge about ourselves. The integration between individuals and technology is becoming increasingly composite "as technical activities have become more pervasive and complex, demand has grown for more complete and multivalent evaluations of the costs and benefits of technological progress" (Jasanoff, 2003: 243).

Nevertheless it is important not to exclude some negative aspects of self-monitoring. First of all data collection, if becomes an obsession, can overload individuals. At the same time, with regards to self-tracking and health, patient lives in the balance between instruments that facilitate the task of self-management and considerable pressure due to the transfer of the responsibility of care from the

doctor to the patient. In fact, it is not easy to establish if these instruments can effectively improve the quality of patients' lives or are only a short-cut to reducing the operating costs of care services.

Finally, individuals who are controlling other humans through the so-called interveillance can create some mechanisms of social exclusion. Indeed, in our digital era, whoever refuses to be under these practices of control refuses to be a part of the society itself.

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DIGITALIZATION OF LIFE

HOW TECHNOLOGY REDEFINE THE SELF

IN THE GLOBAL CONTEXT

Barbara Morsello

WHICH HORIZONS CAN WE IMAGINE FOR SUBJECTIVITY IN THE GLOBAL DIGITAL SOCIETY? WHICH TECHNOLOGIES OF THE SELF CAN SOMEHOW RE-ESTABLISH A RELATIONSHIP WITH THE INDIVIDUAL AND COLLECTIVE SELF? HOW MIGHT THE TECHNICAL AND SCIENTIFIC PROGRESS CHANGE, OR EVEN ENHANCE, SUBJECTIVITY? WHAT DO WE MEAN WHEN WE SAY 'DIGITAL SUBJECTIVITY'? THE SESSION ENTITLED 'DIGITAL SUBJECTIVITIES IN THE GLOBAL CONTEXT: NEW TECHNOLOGIES OF THE SELF' TRIED TO ANSWER SOME OF THESE QUESTIONS.

Through cross-research experiences the session opened analytical possibilities and countless interpretative gaze. In particular, the heterogeneity of the opening panel aroused various reflections on the subjective dimension in the use and evolution of science and technology. The main research themes, but especially the conclusions of each work, concerned questions of ontological character: health, identity, happiness, sexuality, were the main themes and research areas in which the digitization of subjectivity seem to have helped in the relationship between people and the self. In sociological terms when we talk of digital subjectivity, we can refer to a more fluid form of organization and expression of the self and not an annihilation of subjectivity in the traditional sense (Jamieson, 2013). The technologies in this sense deconstruct our experience, but at the same time lend it a new nature. Over the last decade the growing possibilities of living in online worlds have continued to undermine and throw into question traditional anthropological conceptions of place-based ethnography (Whitehead and Wesch, 2012). The increase of the possibility to live in the online world and the digital raises the question about new ways of living together and moreover, how to study this new way of being in the world that is taking shape. How does sociology, anthropology and social sciences grasp these movements based essentially on a concept of human being and of society that escape a traditional way to frame them? Everything is "simultaneously real, social, and narrated" (Latour 1993, p.7) but how does an ethnography of both the "unhuman" and the "digital" lead to exciting possibilities to reconfigure the notion of what is human? (Whitehead and Wesch, 2012). It seems necessary to reconfigure the notion of the human being in the light of the digital space and digitization of life, from a heuristic perspective for scientists regarding new possibilities of living in society. In this sense, the digitization of some aspects of life might suggest a drift of the chaotic post-human, but in fact a broader perspective could imagine a liberation from capitalist hegemonic conception of what we believe is human. The numerous areas of daily life that are digitized, suggests that somehow this process extends the meaning of what is human. While this takes many guises, it generally falls into a distinction of technology in some way enslaving people, or technology extending what it means to be human (Arthur 2010). Is it possible, therefore, to realize the importance of new interpretative sources that attend to technologies that become part of the daily life, with all their limitations and potentials. The effort of this contribution will be to explore other areas of human and social life that are affected by digitalization that become an element of metamorphosis that involves more aspects and offers opportunities and risks. These were discussed in the main contributions and concerned the exploration of three areas; health, happiness and sexuality.

NEW FRONTIERS OF HEALTH: mHEALTH AND SELF MANAGEMENT OF DISEASE

The main contributions addressed the digitization of health and suggested that the experience of illness is effectively changing. The most discussed issues were self management, patient empowerment, and management accountability through the use of digital platforms. In particular the contribution of Benjamin Marent Entitled 'Digital technologies and the reconfiguration of health experiences and practices' highlighted, in an interesting study on the implementation of mobile health (mHealth) platform to enable self-management of HIV in patients, that there is effectively a certain degree of empowerment, but that leads to increased individual responsibility for health. The patient is not responsible just for his or her care, but also for the accuracy of data to be useful for the supervision of the disease (Bruni, Rizzi, 2013). The self-monitoring can foster a greater awareness of their own health, but is accompanied by a reductionist understanding of health. In addition, the health risks that could arise from incorrect measurements of their parameters are significant. In the contribution presented, the patients in the trial are wondering about the correct way to use the mobile app and do not give up the opinion of the doctor. This may lead to reflection on how to integrate doctor and new e-health technologies. The key issue for the development of e-health is the emergence of new means of communication, enabling health professionals, institutions, patients and the general public to remain permanently connected (Kivits, 2013). The contribution entitled 'Self-management and quantified-self: how diabetes apps foster monitoring' by Barbara Morsello and Veronica Moretti focused on the study of the app for the management of type 1 diabetes, emphasized how the services available with these apps, such as the insulin calculator, may lead to an incorrect or inappropriate dose recommendation or the power of influencing other patients especially young, starting with blood-tracking practices. These apps are often designed with levels of gamification that allow you to experience the management and monitoring as a pleasant experience and to share it with others.

The Barcelona International Convention Centre CCIB main entrance, during EASST and 4S Conference.

Courtesy of Barbara Morsello



In fact an aspect of the field of e-health relates to virtual health. Virtual health refers to the possibility of a new body surpassing its physical aptitudes and limits in order to gain new competencies in a 'cyberspace' as a 'superhuman' evolving in a virtual world (Kivits, 2013). We conclude that digital care innovations facilitate the tracking of healthcare practices and the potential of the mHealth platform for self-management in everyday practices and organisational routines should not be overlooked.

EMOTIONAL QUANTIFICATION: HAPPYNESS AS A MEASURE OF PROGRESS

A very interesting presentation entitled 'Happiness as a Measure of Progress: Digital tools of policy making' by Anat Noa Fanti explored the consequences, but mostly the findings, raised from the analysis of happiness and well-being indicators used in various global contexts. The author's perspective started from the historical and cultural analysis of the concept of happiness, to reach the conclusion that emotions are measured as any dimension of modern life such as productivity, the country's political life, health and so on. The statistical measurement can be seen as a form of management and control of the western population by their governments. Happiness in his new aggregate form, away from subjective emotion, suffers a cultural shift: it becomes something understandable, explicable in terms of cause and effect, and therefore measurable. Hence the happiness rate of a country can be measured, it can become developable through creating the conditions through indicators that governments deem reliable. Happiness and its indexing makes the different countries comparable in some way and thus places them on a scale, from least to most happy. Happiness is no longer within the country and citizens, but it becomes something external, to 'objectively' measure. The fascinating point of this discussion concerns the risks that this indicator of happiness and well-being could become a new way to regulate the self and the subjectivity of citizens, taking with it the latent imposition of new standards and desirable models.

DIGITAL SUBJECTS IN ONLINE SPACES

Technology is therefore not neutral because it is an expression of human being (Savat 2013). The technologies are anthropomorphic and reproduce our action, which is always based on values. The social world that we produce is the mirror of virtual environments we inhabit, and we form with our intervention. In this way we can support that online is the link between our being and our doing or, rather, it is the expression of our being as doing (Poster et al, 2009). The contribution of Patrick Keilty entitled 'Digital Subjects in the Graphical Interface of Pornography' intended precisely to grasp the dimension of values in the construction of digital subjects of graphical interfaces of online pornography websites. The development of graphical interfaces is essentially based on the maximization of pleasure, through a stereotypical vision of the user and his needs. This stereotype guides the construction of the online environments that are based on users, in a perspective of costs and benefits. It would be desirable however to try to return to the user a safe space, a dwelling in which the person can seek refuge, but instead often these spaces seem more established as a transit user space rather than the person. The author uses the case of pornographic sites to highlight the need to establish the online space as a continuation of the physical space of relations without losing sight of the human dimension.

CONCLUSION

Health, emotions, digital spaces, are just some examples through which it was possible to talk about the forms of life that become digital and the importance of discovering and exploring new forms of this process. Technology expresses how we live our daily existence and how we organize ourselves, in terms of both our relations to one another and the sorts of subjects we constitute ourselves as (Deleuze 1992). All of our human and sensory experiences are compared with

the digital today: the sense of time and space that are the pillars of our primordial feel, according to the German philosopher Immanuel Kant considered as the pure forms of intuition, which are influenced today by digital. The depersonalization of space, the reification of time, the opportunity to live differently in the space and the time (Giddens 1994) are all witnesses to the fact that the basis of human experience is our mode of connecting the human form to digital in particular in so called 'advanced societies'. The digital influences capabilities and human actions causing the multiplication of the problems of coexistence, but at the same time establishing itself as opportunities and abilities to solve problems and create new possibilities in many fields such as medicine, communication, mobility, new media, etc.

Basically what we define as subjectivity, identity, self, is the result of particular cultural and social contexts products in certain circumstances. Therefore it is now more urgent than ever to rediscover the human data inside digitization and focus on the risks of appropriation and manipulation of data, institutional manipulation and irresponsibility by the the political system towards the social actor and its subjectivity.

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TALKING BETWEEN THE PANELS: COFFEE AND LUNCH BREAKS AT 4S/EASST, BARCELONA 2016

Vidya Subramanian

THE 4S/EASST CONFERENCE IN BARCELONA PROVIDED A FANTASTIC OPPORTUNITY FOR EARLY CAREER RESEARCHERS TO NOT JUST PRESENT THEIR RESEARCH IN FRONT OF A GLOBAL AUDIENCE OF PEERS, BUT ALSO GREAT NETWORKING OPPORTUNITIES. THIS ARTICLE TRIES TO CAPTURE THE AMBIENCE OF THE LUNCH AND COFFEE BREAKS AT THE CCIB (BARCELONA INTERNATIONAL CONVENTION CENTRE) DURING THE COURSE OF THE CONFERENCE, AND HOW THESE BREAKS PROVIDE AN INTERESTING OPPORTUNITY TO INTERACT WITH FELLOW ACADEMICS AND FORGE BONDS THAT COULD RESULT IN FUTURE COLLABORATIONS AND FRIENDSHIPS.

'I wonder if you have a minute,' said one delegate reverentially to another obviously senior delegate, as I walked past them to the table with the chocolate croissants during the afternoon coffee break on Day 1 of the 4S/EASST conference in Barcelona. I was fortunate enough to have been scheduled to present on the morning of the first day, and that gave me the time and space to be pondering about things other than my own presentation for the remaining three-and-a-half days of the conference. For someone who was attending the 4S/EASST meeting for the first time, and to be honest, a little tentative about a presentation in front of a global audience of academics and peers, this was a welcome space to sit down, gather my thoughts and get a perspective on all the happenings around the CCIB – The Barcelona International Convention Centre.

One of the highlights of the conference for me, not counting the big one of my own session presentation, was the breaks between the panels for coffee and lunch. As everyone poured out of their various sessions, engaged in animated debate, it was the perfect opportunity to eavesdrop on several interesting conversations, join into impromptu discussions, and maybe have an academic disagreement or two over several cups of steaming coffee.

The 4S/EASST meeting in Barcelona during the months of August-September 2016 also came hot on the heels of my PhD submission, making it a celebration of sorts. Suffice it to say, I knew this was going to be fun. I had my paper ready, I had prepared my discussion points, and I was hoping to meet people who could give me great leads on postdoctoral positions. I boarded the flight from New Delhi with undiluted enthusiasm, and I am thrilled to say, I was not disappointed.

This was my first time at such a large conference. And it is not often that I get to go to an international STS conference and present to my peers. Since my work is on technology and cricket (a sport played in very few countries), I spend a lot of time in conferences explaining the nuances of cricket and how it connects to the theories of Science, Technology and Society as a case study. It usually takes me a while to explain that my work attempts to explore the influence of Information and Communication Technologies (ICTs) and television on the sport of cricket—specifically the Indian Premier League (IPL), the construction of the spectator, and the transformation of cricket into a platform. I contend that the IPL, in both scale and scope, was primarily developed as India's first 'sporting platform' rather than a cricket tournament. And critical to the assembling of the IPL has been the roles, influences, and potentialities created by a range of ICTs. So, when I do get to go to an STS conference (especially one with an entire track on sports and technology!), I am actually more enthusiastic and elated than I care to admit. Primarily, this gave me a great opportunity to meet other scholars, interact with academics, and to listen and learn about our field of work.

During the conference, there were wonderful, thought-provoking sessions (my own track included); I met senior academics who were extremely helpful, and made new friends who work on similar and totally different fields. However, an important part of the conference I found myself looking forward to on all three days were the breaks; the spread was sumptuous, the conversations were free flowing and the idea bubbles bobbed around with both senior academics and first timers taking part animatedly in the discussion.

As I sat on the floor in the main lobby (because there was no seating arrangement of any kind) trying desperately to connect to the internet and look up a reference I wanted to share; I overheard a group of four doctoral scholars planning to do something innovative and fun in a presentation together for a conference to be held in 2017. As the large file loaded on my slow computer, I realised from my unauthorised eavesdropping that this was the first time all of them had met (they were from three different countries) and had hit it off instantly. I really hope that their collaboration came through and I run into them again...

The breaks were scheduled around the sessions with one big lunch break in the middle. The coffee breaks were half hour sojourns, at strategic times throughout the day, where everyone winded up the discussion that was concluding in their respective sessions. True to the adage that a good conversation can only be fruitful over an excellent beverage, academics mingled around agreeing and disagreeing with each other over the panellists' views, their own thoughts and the general state of things while wolfing down those delectable chocolate croissants. Those breaks that did not serve coffee came as a surprise and a disappointment every day, even though we knew to expect them. As one professor sarcastically remarked on day 2, were the organisers unsubtly hinting that academics drink too much coffee for their own good?

Even the strict coffee code, where you were warned that wolfing the spread could only start at the allotted time, triggered academic analysis and we wondered if there wasn't a post-colonial feminist aspect to these strict coffee vending rules. As a group of Indian women scholars from different universities in USA, Europe and India reached for the food tray one morning, and a strict looking server ticked us off roundly, we couldn't help but wonder how he would have reacted to a different, more senior group doing the exact same thing. This led to a more serious discussion on eurocentricism in digital studies; and how scholarship from the global south fit in within the larger STS scheme of things. But we remained, I am happy to report, undeterred. Keeping one eye on the clock, we continued to mingle from five minutes prior to the magical half hour, cooking up an appetite for enthusiastic discussions.

The lunch break, usually from half past twelve to mid-afternoon, was an opportunity to sit down, take a breath and assimilate the thoughts garnered during the sessions and the plenaries. A time of contemplation, this ninety minute period offered a chance to rest, satisfy hunger pangs, cement paper-writing partnerships, conclude conversations, or even steal a quiet siesta under the shade of the trees dotting the landscaping. Lunch was a picnic affair on the little hillock outside the CCIB halls, empty in the mornings but full of activity during lunchtime with academics sitting on the grass, chilling, mingling, sharing food and gossip, making evening plans and laughing about the many interesting tidbits going on around them. The downside to taking a siesta in the sun on the grass was that one missed out on the several extraordinary events scheduled around the lunch break. There was an EASST members meeting, the presentation of the 4th edition of the STS Handbook, an interactive round table on 'Does STS have Problems?', book launches, business meetings, and what have you. It was commonly acknowledged that it was impossible to attend all the sessions one wanted to. Expected jokes about Time Turners and science fiction were widely cracked and politely laughed at.

One of the other interesting aspects of the conference was the Mentor-Mentee programme. I had the good fortune of being both a mentor and a mentee and this was a great learning opportunity for me. To meet younger scholars and attempt to help them on their track as a Mentor and taking tips from senior academics as a Mentee was a wonderful experience... I enjoyed meeting both my Mentor and Mentee and I spent most of my lunch hours meeting with one or the other of them. We spoke about everything from the challenge of interdisciplinary research and the problem of

academic silos to details of each other's work and recommending interesting readings to each other.

To me, the heart of any conference is always the informal discussions outside the box of strict conference scheduling. This was usually initiated at 4S as conversations during the breaks and carried on in full flow over the food packets at lunch. It's always fun to be introduced to someone who would invariably know someone else who was part of a conference that you had also attended, and immediately get clued into the gossip of academia.

The spectacle of a serious discussion complete with animated hand waving and gesturing at disagreements between groups of people were all fun to watch and laugh about. The best part of these is that sometimes they can result in collaborative books, the seeds of which are invariably sown in these animated discussions. It was in one such coffee break that we had a conversation that has now bloomed into an Indo-French partnership on digital studies. I am happy to report that those meetings over coffee resulted in a concept note that we wrote out the very next day, and we hope to have at least two workshops in the coming year to kickstart a collaboration on digital studies from a global south perspective between scholars from India and France.

Friday's second Keynote Plenary with Isabelle Stengers provided much fodder for discussion on the final day. While one academic appeared to have been blown away by her erudition, another seemed to have found it, to put it mildly, underwhelming. As all three of us met at a coffee vending machine on Saturday, I found myself involved in an animated disagreement between both scholars. While they didn't let me get a word in edgewise, I couldn't simply leave either, because both sets of arguments appeared to be addressed towards me. A sticky situation could have emerged, but was remedied by the appearance of a student who wished to consult the more senior academic on the important matter of a recommendation letter. I took the opportunity of the diversion to put an end to the conversation, and slip away to a session on digital subjectivities.

There were lucky breaks too. By the third day, we got wind that we could get free lunches at the venue, even if you had not registered previously. Intelligence from a senior academic revealed that lunch coupons could be procured at the registration desk. Suffice it to say, those of us whose registration waiver did not cover lunch were very happy. The breaks were also a time to call or Skype family and friends at home across continents and time zones or to meet other people and make evening plans. And since, for some inexplicable reason, there was no wifi or any other form of internet access in the presentation rooms, the only way to be connected was to head to the registration area. Much time was spent on the first day in figuring out good hotspot areas to get optimum wireless access, where the conference SSID would maintain a steady signal and the network would be stable enough. The running joke was that if such a spot also had chairs to sit on, we would have found the mythical El Dorado. By the second day, a group of us figured out that the best place for work was in the basement below the registration desks, right outside the restrooms in that area. At least we would be close to the loos, we commiserated with each other. Not quite El Dorado, but it would do.

As I come to the end of my musings about the conference, I find myself smiling at the memory of a friend who tried unsuccessfully for ten minutes to worm into a group having a conversation with Prof. Langdon Winner just to be able to tell a friend back home he had. My last memory of the conference is a group of us laughing at that friend, walking out of CCIB with promises of keeping in touch and extra conference bags. I really enjoyed the conference sessions and the opportunities the conference provided outside the plenary halls. It was a time of great networking, making collaborative friendships and soaking in the atmosphere of an international conference. Indeed, it was a joy to attend and I hope to come back again in the future to renew and relive these wonderful memories of 4S/EASST Barcelona- 2016.

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BEYOND THE SINGLE-SITE STUDY: THE BIOGRAPHICAL ANALYSIS OF TECHNOLOGY

Valeri Wiegel

THIS IS A SUMMARY REPORT ON THE TRACK “BEYOND THE SINGLE-SITE STUDY: THE BIOGRAPHY OF ARTEFACTS AND PRACTICES” AT THE 4S/EASST CONFERENCE IN BARCELONA. THE TRACK BROUGHT TOGETHER AN INTERNATIONAL COMMUNITY OF SCHOLARS INTERESTED IN ADVANCING METHODOLOGY FOR A BETTER UNDERSTANDING OF THE ROLE OF TECHNOLOGY IN SOCIETY. AFTER A BRIEF INTRODUCTION OF THE BIOGRAPHY PERSPECTIVE AND AN OVERVIEW OF THE TALKS PRESENTED IN THE TRACK, THE REPORT WILL REFLECT ON THE INTELLECTUAL CONTRIBUTION OF THE BIOGRAPHICAL PERSPECTIVE INSPIRED BY PRESENTATIONS IN THE TRACK “EMERGING ‘FORMS’ OF LIFE”.

THE FRAME OF A STUDY SHAPES THE PORTRAIT OF A TECHNOLOGY

A popular proverb advises against judging a fish by its ability to climb a tree. Otherwise, the ill application of judgemental criteria leads to frustration in the subject under scrutiny. By the same account, the ‘Biography of Artefacts and Practices’ (BOAP) perspective reminds us not to judge a technology’s capacity by its efficacy over a limited period of time and in a limited space. Doing so leads to frustration in scholars with interest in longitudinal analysis of technology.

The biographical perspective is a recent development that addresses limitations observed in conventional studies of technology. The frustration about limited generalisations informed by narrowly scoped technology studies is one intellectual origin of the biographical lens on technology. Three decades of observation of technological advances in the field of manufacturing information systems revealed ephemeral generalisations as produced by isolated, single-sited studies often framed as implementation or snapshot studies (Pollock & Williams, 2009). Another strand of biographical studies seeks for the systematised analysis of practices related to the development and use of technology. Practices of individuals and groups of actors are interlinked with technological development and therefore are also subject to change over time (Hysalo, 2010).

Analysts of the BOAP perspective acknowledge that changes in the shape and form of a technology are contingent to non-linear and, at times, chaotic innovation processes that unfold over extended periods of time. They argue for a transdisciplinary framing of research problems and the acknowledgement of the many influences on the shaping of a technology. The perspective challenges students of technology to remain flexible in their assumptions about the diversity of players engaged in the development and use of a technological artefact and the timescales and speeds in which these practices unfold.

BEYOND THE SINGLE-SITE STUDY

The track “Beyond the single-site study: the Biography of Artefacts and Practices” brought together an international community of scholars asking questions that reach beyond frames of popular research designs. From the 15 talks presented at this track we learn that the BOAP perspective is an active and growing field of research. The diversity of the studies presented indicates that the biographical lens applies to different research settings ranging from individual doctoral research studies to longitudinal research projects. Four main themes emerged across the talks in this track.

The first theme sheds lights on intermediary actors and, generally, the changing roles of actors in different stages of technological development. For example, in previous studies of enterprise resource planning systems, industry analysts have emerged as a growing influence on the shaping of both markets and products. The results of a longitudinal analysis of how industry analysts work and shape expectations in markets has been presented by Pollock and Williams (2015). Another set of longitudinal studies explored how the changing demographics of users prompted technology suppliers to reinvent their strategies to engage with their user base (Johnson et al., 2012). Emphasising a diversified perspective on actors, the biographical perspective offers an alternative approach to challenge established notions of the user-supplier relation. For example, one work-in-progress study applied this more nuanced perspective on the user-supplier relation and investigated novel forms of interactions between actor groups.

The second theme was characterised by a broader perspective on dynamics that operate across individual organisations and affect entire markets. While industry analysts have been identified as one group of influential actors outside the traditional user-supplier nexus, policy makers also continue to play a role in driving expectations about technological developments. A longitudinal investigation of information systems in hospitals showed for instance how policy incentives drove the premature purchase of immature products in an immature market (Mozaffar et al., 2014).

Thirdly, subjecting individual organisations to long-term investigation reveals the entanglement of biographies of artefacts and practices beyond single sites. Studies of both an engineering firm and a research organisation reported how internal developments and external influences shifted repeatedly the main foci of practices that internal actor groups engaged with. Adapting practices as external factors and dynamics change, can be a strategy for organisations, especially those that depend on external funding bodies to sustain operations over multiple decades (Ribes & Polk, 2015).

A fourth theme in the BOAP track also examined individual organisations but touched upon ontological questions. Cases from the automobile industry and digital economy illustrated how common concepts of networks and systems are limited in their capacity to explain dynamics that play out over extended timescales and multiple sites. Drawing inspiration from biological studies, ecological metaphors are explored to develop novel concepts that fit demanding requirements of biographical observations (Wiegel, 2016). Other talks that have not been categorised above examined further research themes including risks in infrastructures, clusters of innovation and philosophical works contributing to biographical thinking.

Each study presented faced a different set of challenges, and it was giving valuable insights to share specifics about the different approaches chosen to deal with a variety of obstacles in the research process. This was especially helpful for early career researchers who are in the process of plotting the direction of their future research activities. Equally, it was helpful for experienced analysts of the biographical perspective to see how their conceptualisations are being incorporated in other works. For example, some leading scholars are preparing a joint contribution to elaborate the core principles of the BOAP perspective. Discussions with other track participants enabled evaluation of the trajectory of current developments and informed strategies for articulating outlines for further research activities.

For a growing community it is important to come together to learn about and from each other and to jointly develop strategies to advance the field. The context of an international conference is also a welcome opportunity to explore subjects outside one's field. The presentations in the track "Emerging 'forms' of life", at first, appeared only remotely related to the biographical study of technology. In reality, the thought-provoking contents of this track resonated strongly with BOAP. The final section will reflect on how debates about definitions of 'life' indicate that, metaphorically speaking, biographies of humans have more similarities with biographies of artefacts and practices than commonly assumed.

BIRTH IS NOT THE BEGINNING: BIOLOGICAL ORIGINS ARE AS OPAQUE AS ARTEFACTUAL ORIGINS

We invoke metaphors to reduce the complexity of phenomena under investigation by relating them to more commonly understood concepts. Such metaphors can be helpful in producing understanding and convey meaning. Applying the metaphor of biography in the context of technological development invokes an image of a long journey with numerous decision points where choices determine the future shaping of an evolving entity.

At the same time, metaphors can limit our capacity to analyse and grasp a phenomenon through the introduction of analytical limitations. A metaphor from one domain can fail to describe the unique features of another domain.

Fig. 1 Three embryos of a barred tiger salamander a few hours after fertilisation (original by John Clare CC BY-NC-ND 2.0)



The biological origins of the metaphor of biography attach certain limits to its appropriation in a technological domain. There is no singular and naturally occurring event marking the birth of a technology – although there is such a thing in a rhetorical manner. However, birth itself is not the beginning of a biological organism, but a convenient starting point for a biographical narrative as one was reminded when attending the track “Emerging ‘forms’ of life”. The speakers in this track explored the challenges of defining the term ‘life’. What does life mean in an extraterrestrial setting? How can we find life on Mars if there is no clear definition of what life is? And what does human life mean in context of in vitro maturation of embryos? Exploring the question of ‘when is human life’ reveals a range of philosophical and ethical issues. These issues need attention in the attempt to produce a definition of the term life. For instance, in a blogpost on a website of a scientific publisher, a geneticist identifies 17 time points that could mark the beginning of human life – chronologically, the exemplary illustration in figure 1 depicts time point 4 in case of an animal embryo, birth comes only at time point 15 (Lewis, 2013). Faced with complexities introduced by advances in reproductive technologies, the geneticist declares, “[u]ntil an artificial uterus becomes a reality, technology defines, for me, when a human life begins, rather than biology”.

Consequently, and although some qualitative features of organic life differ substantially from those of a technical artefact, there are other features that show surprising similarities. The evolutionary journeys of humans and artefacts begin way before they are either naturally or rhetorically exposed to public life. And these journeys continue long after the moment of first exposure. The meaning of a biography, no matter if human or not, is determined by the accumulation of events along these journeys.

As such, the biological metaphor of biography offers much to technology studies, but maybe there are also a few lessons that biographers of artefacts and practices can offer to biologists interested in defining 'life'. At least we can state with confidence that meaningful insights cannot be generated by examining only single sites over short periods of time and sticking to narrow methodological conventions of individual disciplines.

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HOW TO DEFINE AND TREAT MATERIALS IN SOCIAL THEORIES OF PRACTICE: EXPLORING THE ROLE MATERIALS

Matthew Hanchard

THIS SHORT REVIEW OF THE TRACK 091 'EXPLORING THE ROLE OF MATERIALS', SETS OUT THE KEY OUTCOME OF THE TRACK. THE REVIEW DRAWS OUT THEMES THAT LAY UNDER ALL THE TRACK TALKS, AND THE DIVISIONS THE THEMES CAUSED. THE OUTCOME OF THESE THEMES WAS A SET OF THEORETICALLY INFORMED QUESTIONS ON HOW TO TREAT MATERIALS, WHERE TO APPROACH PRACTICES, AND ALSO ON WHAT MATERIALS ARE. THE REVIEW SETS OUT SOME EMERGING AVENUES FOR FUTURE COLLABORATION, HIGHLIGHTING THE VALUE OF THE CONFERENCE IN BRINGING TOGETHER DISPARATE SETS OF RESEARCHERS FOCUSED ON SIMILAR NARROWLY SPECIALISED TOPICS THAT MIGHT NOT HAVE OTHERWISE COLLABORATED.

I was initially apprehensive about taking part in the 4S/EASST 2016 conference in Barcelona. As a digital sociologist focussing on how web application based digital maps (such as Google Maps or Bing Maps) are engaged in everyday life, I had often considered my research to sit at the oblique margins of STS. This belief was quickly dispelled with the opening plenary. There, the full diversity of STS was set out, and provided both reassurance and reaffirmation that my work does fit well within STS as a field. Meanwhile, many of the authors I had diligently read over the last few years were there in person, alongside many more I had never met or read. However, beyond the overarching benefit I gained from attending the conference, it was the Track 091 in which I was invited to speak that provided the most valuable experience.

As the title suggests, the focus of the track was on 'exploring the role of materials in practices and sustainability', a broad topic which led to some very fruitful theoretical discussion. Despite a wide variety differences in the approaches to research taken by speakers and a stunning array of substantive topics, there was an overall coherence across the talks. The success of which has ultimately led the track organisers to begin a process of collating papers from each speaker based on their talks, with the intention of submitting them for publication in a peer-review journal as a special issue. All the talks of this track can be located at: <http://www.anglia.ac.uk/global-sustainability-institute-gsi/4seasst> Interestingly, the differences in approaches taken highlighted some clear divides on key underlying themes, raising important questions. For example, where Mandy de Wilde discussed the emerging smart meter monitoring of domestic energy consumption, she held borderline seams such as the boundary or neighboring walls of a property (spaces where the meter sits), as both social and material. Meanwhile, Shivant Jhagroe turned to the everyday temporal rhythms and routines of washing in the context of web 2.0 to argue that "...materials do not exist...". That is, the social and digital are mutually constitutional and dialectic. As an underlying theme, this raised a question on how to treat materials which continued throughout the talks. For some, this was implicit in the methodology and for others it was discussed in the context of literature surrounding sociomateriality.

At the same time, the location of where to place the focus of study also informed several talks. In my own talk, I discussed the role of practice hacks as temporary

workarounds that practitioners employ in order to reestablish or maintain stable routine when limitations are met, enabling them to carry on in practical consciousness. Comparing these to breaching experiments in ethnomethodology, I highlighted the importance of focussing on the liminal space of change in social practices as a site of study. Likewise, both Marianne Ryghaug and Helen Gansmo, and Marius Korsnes and Jenny Bergschold focussed on participants that moved into a LivingLab, setting their sites of study as extended explorations of this liminal moment of change in practice. Taking this even further, Mia Rasmussen and Laura Nielson discussed purposefully bringing about change as an action-focused intervention in order to gain a better understanding of the enactment of materials. In contrast however, other speakers set their focus on the establishment and maintenance of routines instead. For Carolynne Lord, this entailed an understanding of how tablet devices are domesticated and engaged as new technologies by demographic groups of typically low intensity users such as elderly retirees. Similarly, for Toke Christensen and Els Rommes, a focus on ongoing engagement with social media platforms via personal digital devices by teenagers appropriated some key concepts from social psychology (without fraying into the realms of cognitivism or methodological individualism). Through several examples, they set out their participants' passive-aggressive expectations of others, their anxieties of disconnection, and even forms of repetition compulsion as embodied tacit routines. In comparison, this diversity on where to explore practices left a second question hanging on the where to place focus – on the enactment of routines, on the maintenance of routine, or on moments of change to previously stable routine?



Courtesy of the author.

If the two underlying themes above centred on the role of materials in terms of their relationship to sociality and on how or where to focus on them, the third raised a simpler (albeit prior) question on what to consider as material. For some speakers, the notion of material was simple – it involves physicality. For example, Mandy de Wilde's separation of material and social was only possible because the unit of analysis involved physical artefacts (solid walls, built structures, and smart meters). For others, the distinction was less clear-cut e.g., Toke Christensen and Els Rommes, Matthew Hanchard, and Shivat Jhagroe, with materials including virtual artefacts such as social media platforms, digital maps, and web applications. Here, whilst physical devices are used to facilitate or mediate access, the

unit of analysis is more complex. Similarly, for Jens Lachmund and Richard Twine materials were far more slippery too. Focussing on veganism, Richard Twine described materials as both the assembled products (including packing and distribution chains) as physical artefacts and as the outcome of institutional systems of socio-material arrangement - classifying and ordering consumables into formal taxonomies. Meanwhile for Jens Lachmund, an extended discussion of urban gardening practices led to a focus on the production of public space as material, and rights to the city. In doing so, he highlighted a deep socio-materiality on the ways in which engagement with public space is culturally framed and enacted both by participants and policy-makers e.g., the differentiation between the terms “community member” in the UK and “citizen” in Germany.

Whilst there were far more nuanced discussions in our track, the three underlying themes and questions raised provided ample theoretical impetus for future collaboration. We synthesised the questions through fruitful discussion, however the timescale of the conference and the distraction of so many other great tracks to attend left the group with a great deal of promising work left to do. Exploring how material should be treated when researching social practices is a large question to address. Both arguments for the separation of social and material, and against it, in favour of mutually constitutional socio-material arrangements are valid. Future collaboration, no doubt drawing on a growing body of literature on post-humanism, will bear this out. Meanwhile, a more epistemologically driven question of where to locate the site of study when accessing practices in the flux of everyday life requires thoughtful expansion too. As the track talks demonstrate, research can be focussed on the moment of enactment of a practice, the ongoing maintenance of routine, or moments of disruption. The relative strengths and limitations of each remains to be drawn out in more depth. More importantly, a third question remains to be addressed on what to consider as material and on how to approach slippery materials such as web 2.0 applications. In this respect, the conference provided space for researchers focused on a succinct and similar topic that may not have collaborated or even entered dialogue otherwise. The track itself however, can take the conference as a starting point for more engaged dialogue and not as an end in itself. In this, both the conference and the track were a resounding success.



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POSTPHENOMENOLOGY, MATERIAL HERMENEUTICS, AND AESTHETICS OF ART: MODERN *HAUTE CUISINE* AND CULINARY AESTHETICS

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THIS ESSAY WAS PROMPTED BY THE AUTHOR'S PARTICIPATION IN THE 2016 4S/EASST CONFERENCE THAT TOOK PLACE IN BARCELONA. SESSION T153, IN PARTICULAR, ON DON IHDE'S MATERIAL HERMENEUTICS OFFERED AN INSIGHT IN THE RELATION BETWEEN IHDE'S POSTPHENOMENOLOGY, AND ROMAN INGARDEN'S AESTHETICS OF ART. THIS RELATION IS BRIEFLY DESCRIBED IN THE TEXT FOR THE CASE OF CULINARY [GUSTATORY] AESTHETICS AND THE EXAMPLE OF THE CATALONIAN HIGH-END RESTAURANT *ELBULLI* IS PRESENTED AS A POTENTIAL CASE STUDY.

This essay came out, rather unexpectedly, from an international conference in a city well known far beyond its national borders. The 2016 4S/EASST conference took place in the capital of Catalonia, Barcelona, a vibrant and colorful city tempting the conference participants to walk and enjoy the urban environment, rather than participate in the conference. Excellent food, Mediterranean sunny weather, beautiful architecture even on the most mundane buildings, a quite clean air, and sand beaches inviting, or rather seducing, people to leave all of their obligations behind and go and swim for hours on end. The conference took place at the Barcelona International Convention Center next to the sea front, and I have to admit that although I was eager to attend the sessions, at the same time I had a strong impulse to leave the conference and go to the beach instead.

The convention center was full of people when I arrived to register, because, as I learned later, the internet was down and registration had stopped for a while. This small crowd at the reception, though, was something interesting to observe: people from all over the world were coming together each and every one attracted by a common concern in science and technology in a modern as well as in a historical context. As in every collective human activity, some would be keen on sharing their ideas, some would be curious as to what a conference would look like, some were more concerned with advancing their careers, and some, most probably the more senior participants, would be happy to see that the field has grown into a quite big and vibrant community.

There were many sessions to attend – in fact, too many to attend within the limited time frame of four days – a strong indication that the field has grown in size and developed into multiple directions. I was to present a paper on Paul Ricoeur's hermeneutics, and looking through the information booklet I received at the reception I saw a session on Don Ihde, another major philosopher on hermeneutics, greatly influenced, among others, by Ricoeur. I decided within split seconds that this session had to be attended without a second thought.

The session was focussed on Ihde's postphenomenology and the first presentation was on the second edition of one of his books on acoustics and auditory hermeneutics (Ihde, 2007). After the presentation Ihde himself started commenting on his philosophical approach of hermeneutics and then answered questions from the listeners. I felt glad to be there and see one of the world's leading philosophers talking in flesh and blood. I started thinking, while Ihde was talking, how nice a conference like this was for a junior scholar like myself: an event bringing together not only people from every corner of the world, but also older generations

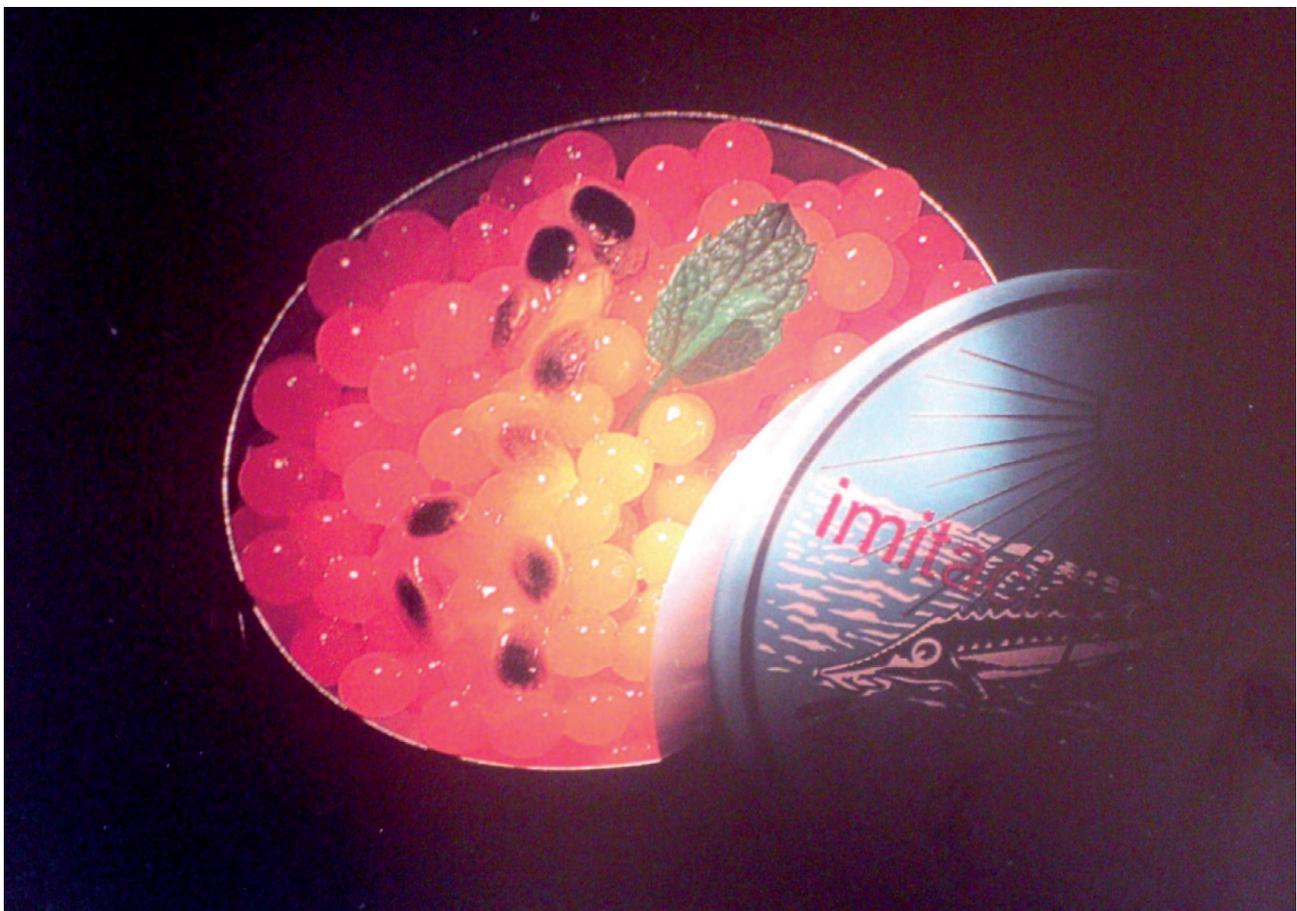
of scholars and younger ones. When the session finished, I left with the presentation on acoustics and auditory hermeneutics still ringing in my ears.

Postphenomenology, a term coined by Ihde himself, designates the next step after phenomenology, that is, the study and description of how reality presents itself to human consciousness. According to Ihde material artifacts and the human body themselves play a major role in mediating between reality and consciousness: observation of stars with the naked eye is different from observation through a telescope; social life organized on the basis of calendars and clocks is experienced in a different way from social life organized according to the movement of sun and appearance of moonlight; a walking person perceives reality in a different way from a sprinter when running.

A major thread in Ihde's postphenomenology is *material hermeneutics*: the importance of artifacts in interpreting objective reality. In studying Antiquity, for example, "we seek texts, inscriptions, and other forms of [visually perceptible] written language" (Ihde, 2009: 68). In quantum physics scientists develop [visually perceptible] mathematical formulas to describe spaces of eight and ten dimensions; in chemistry there are molecule graphs to describe molecular structure; or in biology there are enhanced photographs of bacteria taken with the help of electronic microscopes. In all these cases scientists use visually perceptible artifacts to describe and interpret realities that, in fact, exist beyond, or below, human perception.

Ihde attempts to expand the material hermeneutics, as he calls it, from the visual to the auditory experience of reality: whale songs, for example, are mostly sung in the infrasound range imperceptible by the human ear; using, though, time compression we can "*hear* the technologically mediated and *translated* sounds" (Ihde, 2007: xv, original emphasis). Expanding, now, on our initiative, Ihde's material hermeneutics, to the gustatory sensory perception, that is, the perception of taste, we could very easily think of eating baked chicken, for example, as the gustatory

Fig. 1: Spherified melon and passion fruit drops served in a caviar tin (Jouary, 2013: 41).



perception and interpretation of raw chicken meat through cooking technologies, such as baking as a technical process, and through the addition of gustatory artifacts such as dried herbs and spices. Ihde's material hermeneutics, however, is deeply related to the aesthetics of art.

Pablo Picasso's famous painting *Guernica* depicts the bombing of the Basque town Gernica by Nazi and Fascist bombers at the request of the Spanish nationalists during the Spanish Civil War. Picasso wanted to depict the horrors of total war "where innocent people are bombed indiscriminately, or strafed by machine-gun fire, as they escape from the carnage in the town up to the hills" (van Hensbergen, 2004: 3). While the painting is not a photographic depiction of an actual scene that happened during the bombings, it can still confer the horror and pain from the destruction and death that took place.

As a visual artifact the painting was built upon Picasso's emotional distress when he came into contact with the news of the bombings: "By his artistic activity, the painter himself produces these particular parts (the layer of pigments on the canvas, paper, or wood) and the properties of the painting determined by them" (Ingarden, 1989: 160). The material artifact, though, presents the artist's subjective reality to each member of the artwork's audience: "[i]t goes essentially beyond the merely real ... in that it consists of strata (object and aspect), which are simply not contained in the real thing called a painting. This presents us with the task of determining the mode of being that is characteristic of the 'picture' " (Ingarden, 1989:160). We should distinguish, in other words, the *material painting* [the artifact] from the *concretized [i.e. individually interpreted] picture* [the artwork], since the artwork itself "never fully comes into being until the viewer *constructs*, or *constitutes*, it" (Mitscherling, 1997: 198, original emphasis).

In a fashion similar to Picasso's, and other artist's, artworks, the purpose of *haute cuisine* [French for high cuisine] is to "offer a new culinary experience and not merely the opportunity to taste new dishes or representations of food" (Opazo, 2016: 27). This purpose of offering a new experience lies, as well, behind the construction of smartphones by Apple Inc. aiming at "offering users a 'new technological experience,' not new technological devices *per se*" (Opazo, 2016: 27). One such famous restaurants of *haute cuisine* was *elBulli*, located at Cala Montjoi bay, two hours away by car north of Barcelona, until its closing in 2011. Some of *elBulli*'s most celebrated innovations in cooking equipment was introducing the systematic use of liquid nitrogen for flash freezing, carbon dioxide for creating foams as part of a dish, centrifuges normally used in scientific laboratories, and food dehydrators for adding new shapes in food presentation. *ElBulli*'s new style of cuisine, along with other restaurants in the world, became popularly known as *molecular gastronomy*.

ElBulli aimed at four levels of pleasure during the dining experience: *physiological* pleasure sparked by hunger and fulfilled by eating itself; *sensorial* pleasure, that is, "the subjective act of liking or disliking something" (Opazo, 2016: 125); the *emotional* pleasure "contingent on each situation, based on the company, the scenery, and so on" (Opazo, 2016: 125); the trademark pleasure, though, that *elBulli* was aiming at was *reflective* pleasure induced by appreciating "culinary creations not through taste buds but according to the underlying ideas and sensations that these creations aim to convey" (Opazo, 2016: 125). Although the first three pleasures were based on the materiality of each served dish and dependent upon the instinctual, sensory, and gregarious sensitivities of each diner, reflective pleasure was being *concretized* by the diners themselves.

Added to the above was the elimination of the *à la carte* menu, that is, a menu where the various courses are offered and priced separately. The diners were left with no choice but to taste the one and only menu set by the executive chef himself, and which consisted by 40 to 50 smaller in size and quantity than customary courses. Dining would now extend to four and five hours and each course was defined by the previous one and defined the next one. If we distinguish now between a *material dish* served at the table from the *experienced course* as concretized by each diner herself, we can say that a restaurant course is a temporal object which constitutes "the temporal fabric of the stream of [gustatory] consciousness

itself, since the flux of the temporal object precisely coincides with the stream of [gustatory] consciousness of which it is the object" (Stiegler, 2011: 14). Restaurant time now is being experienced as memory of the previous course, tasting of the current course, and anticipation of the next one; a cinematic gustatory consciousness takes over the experience of dining, that is, a consciousness of a changing culinary sequence of having-just-been-experienced, at-the-moment-being-experienced and soon-to-be-experienced courses. The menu of *elBulli*, in other words, was not just a list of courses, but a list of gustatory scenes in a cinematic culinary universe.

Ihde himself does not seem to have dined in *elBulli*, at least, if we judge from his writings. There is, however, the testimony of another professional philosopher who dined there and tried spherified [caviar-like] melon drops (see Fig. 1), one of *elBulli*'s landmark dishes:

AFTER SIX OR SO SMALL STARTERS [...] WE WERE SERVED AN ESCABECHE OF TINY ROCK MUSSELS AND BASIL. THAT EXPLODED IN THE MOUTH AND RELEASED A SCENTED [SIC] OIL (A NOD TO THE OLIVES WE HAD AT THE START [...]) WHICH AROUSED BOTH FEELING AND HILARITY. THIS WAS FOLLOWED BY POPCORN MOUSSE WHICH DEMATERIALISED LIKE CANDY FLOSS AND WHICH PROVOKED YET MORE LAUGHTER. WE REMEMBERED THE SMALL BLUE TINS THAT ARE DEFINITELY ASSOCIATED WITH A PARTICULAR MAKE OF CAVIAR, WHICH BEAR THE WELL-KNOWN DRAWING OF THE STURGEON, FILLED TO THE BRIM WITH THESE PRECIOUS LITTLE ORANGE GRAINS, WELL CHILLED AS THEY SHOULD BE. THIS WAS 2003, AND WE HAD ALREADY BURST OUT LAUGHING: DESPITE ITS APPEARANCE, THE DISH ACTUALLY CONSISTED OF SPHERIFIED MELON AND PASSION FRUIT DROPS LIKE THE OLIVES WE HAD AT THE BEGINNING, PERFECTLY PURE IN TASTE ... I THINK OF THIS DISH EACH TIME I EAT MELON AS THE VERY NOTION OF MELON ITSELF, NOW SADLY OUT OF REACH (JOUARY, 2013: 40, 42).

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THE POLITICS OF ANTIBIOTIC RESISTANCE: IMMINENT THREAT, GLOBAL POLICY, AND THE CHALLENGE FOR STS

Christian Haddad

ANTIMICROBIAL RESISTANCE (AMR) HAS ARISEN AS A GRAND CHALLENGE AND GLOBAL PROBLEM CONFRONTING THE WORLD IN THE 21ST CENTURY. AMR IS TRULY GLOBAL NOT ONLY IN THE GEOGRAPHICAL-POLITICAL SENSE, BUT ALSO IN THAT IT RUNS ACROSS AND PROLIFERATES THROUGH THE COMPLEX INTERACTIONS OF HUMAN MEDICINE AND PATTERNS OF HEALTH CARE ON THE ONE HAND, AND VETERINARY MEDICINE AND THE LIVESTOCK INDUSTRIES ON THE OTHER HAND. EVEN THOUGH THE 'SCIENCE-QUESTION' SEEMS RATHER SUBORDINATE AT THIS POINT IN THE POLITICS OF AMR, STS HAS A VITAL ROLE TO PLAY IN RESEARCHING AND CONTRIBUTING TO ENGAGING THIS MATTER OF PRESSING CONCERN. YET, IT CONFRONTS STS WITH THE NEED AND THE OPPORTUNITY TO ENGAGE MORE EAGERLY WITH OTHER FIELDS AND COMMUNITIES OF SOCIAL SCIENCE RESEARCH, PARTICULARLY THE FIELD OF CRITICAL POLICY STUDIES.

In September 2016, a street theater group toured several German cities with a performance called "Schluck & Weg" – literally meaning "swallow" (the pill) and the disease is "gone" – publicly staging the saliency of antibiotics resistance as a pressing global health issue. The main protagonists in this performance were the "super agents" Alpha and Beta, decorated agents who have successfully served for a long time in their battle against evil bugs. But a surprising strike from "super bugs" hitherto unknown to Alpha and Beta has confronted our super agents with an experience of total impotence in the face of these newly emerging antagonists. Licking their wounds and puzzling over what has actually happened and why, the super agents begin to trace the lineages of their predicament – and thus the histories of microbes resistant to antibiotics (BUKO Pharma 2016).

Antimicrobial resistance (AMR) has also been a concern at the recent joint meeting of 4S/EASST in Barcelona. Within the track on "Antagonists, Servants, Companions: the Sciences, Technologies and Politics of Microbial Entanglements", a full session was dedicated to the multiple problem of AMR, exploring diverse aspects and dimensions.

Problematized in the United Kingdom and the United States in the 1960s and almost two decades earlier in Scandinavia (Podolski et al 2015), antimicrobial resistance (AMR) is hardly a new fact. However, its political and societal saliency seems to have changed dramatically in recent years. AMR was framed by the World Health Organization as an imminent threat to global health, both in the rich countries of the North where hospital-acquired infections with resistant bacteria pose challenges to health care systems, and in the South, where the treatment of severe endemics – such as Tuberculosis – runs into constraints due to the proliferation of resistant strains (Blasner 2014). But AMR is truly a global issue in an even more comprehensive sense: as microbes do not abide by the normativity of socio-political boundaries, the WHO has inscribed AMR into the "One Health" paradigm, which means that it affects the entire world irrespective of geographical boundaries, but also that it ignores inter-species boundaries proliferating precisely through the entanglements between humans, animals and even plants.

At 4S/EASST, I remember this session as particularly intriguing not only because of its thematic topicality, but also because it raises questions for STS that go well beyond the scope of AMR. Let me briefly capture the four presentations in a nutshell before returning to some further thoughts on these matters.

Inge Kryger Pedersen (U Copenhagen) presented findings from a collaborative project, asking how the situated local practices in medical care interrelate with efforts to tackle global problems, such as AMR. As many efforts to act upon AMR address physicians in their ability to prescribe antibiotics, various guidelines had been drafted that seek to police and promote the “rational use” of drugs. Hence, norms of “good doctoring” (usually centering on an individual patient-doctor encounter) have come to be closely intertwined with notions of “prudent use” of antibiotics (subject rather to statistical reasoning and the indicators of evidence-based medicine). And yet, when translated into the realm of everyday medical practice and the doctor-patient-relationship, these guidelines leave considerable space for professional discretion and case-by-case maneuvering.

Approaching the combat against overuse from another angle, Catherine Will (U Sussex) explored public campaigns against antibiotics overuse that seek to act upon the desire of patient-consumers and their attachments to practices of antibiotics use that had been cultivated throughout past decades. Will shows that these policy campaigns seek to “detach” publics from antibiotics by invoking individuals and publics simultaneously as rational subjects and as passionate subjects of desire attached to certain notions of disease and treatment anchored in social norms and tacit routines (One campaign poster for instance informs the public that “40% of all Europeans *wrongly* believe that antibiotics work against colds and flu”).

Focusing on how public knowledge of AMR is co-produced between different social domains, Stephanie Begemann (U Liverpool) set out to study how the science of AMR is taken up and communicated in the media. Her findings add rich empirical detail to the notion that AMR is a controversial issue that crisscrosses multiple sites and domains where its meanings may significantly alter. Taking up the cudgels for STS research, Begemann’s argument suggests that knowing how and where exactly the “multiple ontologies” of AMR are being established may shed light on emerging controversies and help to better tackle the problem in practice.

Similarly, Sujatha Raman (U Nottingham) addressed the question of how knowledge on AMR is produced and diffused, yet taking a slightly different take on this matter. Raman explored how different framings matter in the ways we conceive of and address the problem of AMR. To begin with AMR is broadly framed as an imminent, human-made global threat and as such shares many similarities with climate change. In past years, the idea has taken shape to establishing an International Panel on AMR modeled after the Intergovernmental Panel on Climate Change (see Woolhouse/Farrar 2014). A crucial difference might be, though, that the science of AMR is – yet? – less contested than the science of climate change: scientific accounts present strong evidence that AMR constitutes a profound systemic problem on a global scale, precisely because it unfolds in a complex eco-socio-techno-economical system (see the illustration in Figure 1) and there seem hardy radical controversies over these facts; yet, the policy responses to AMR are predominantly framed in terms of – and thus seek to act upon – individual behavior.

In sum, this rich session provided an intriguing picture of AMR and the important role of STS research in this field of actuality. What all four presentations emphasized is that AMR is being problematized predominantly as a pressing *policy* challenge, and not primarily a scientific controversy. To be sure, the “policy question” had been located at various levels and through multiple domains, and has been articulated in terms of public awareness campaigns, in the politics of representation and issue framing, or in governing (through) behavioral patterns. Clearly, these multiple policy practices intimately involve questions of science particularly in relation to public knowledge and policy programs. Re-reading my notes while

working on this review made me come up with a series of interrelated thoughts and impressions that address the relationship between global (health) policy and STS.

Worldwide, the vast majority of political and expert authorities seem to acknowledge that AMR amounts to a multifaceted *systemic* problem: a pressing human-made, apocalyptic scenario that demands immediate attention. Experts further seem to concur on how AMR developed, how it works at the microbiological and epidemiological levels, and what the social and economic structures are that make it grow. Moreover, it seems quite uncontroversial that AMR is produced and propelled not in one center or social domain, but across and in-between domains of practice: from human medicine to the livestock industries, from material production (of health, of food, etc.) to the production of collective needs and desires. As such, we could say, the question of AMR appears as a question of global capitalism in its broadest possible meaning.

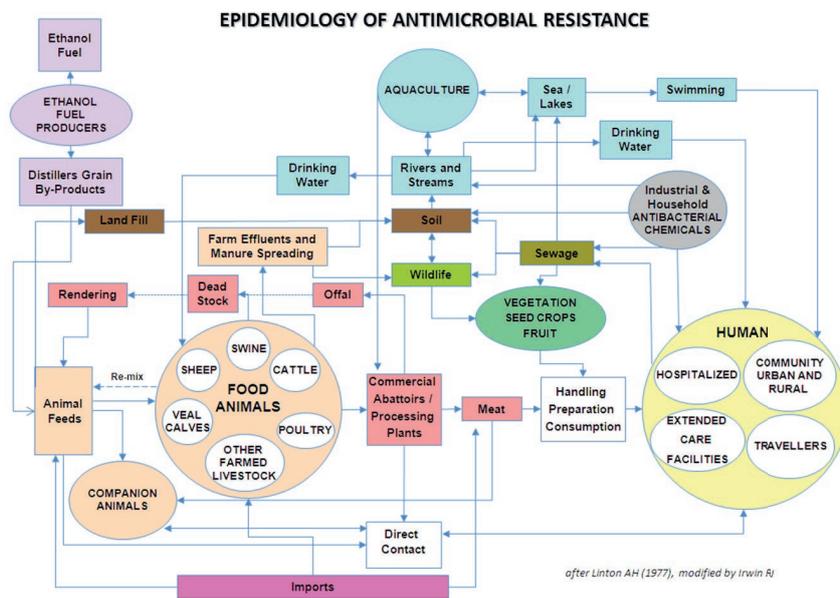


Fig. 1: AMR as complex system. A similar version of this slide was used in Raman's presentation. The original reference is Linton, AH. *Veterinary Record* 1977;100:354-360. The version used here was retrieved online from <http://tdvglobal.com/en/about-us/news/development-of-canadian-roadmap-for-amu-surveillance-in-food-animal-production> (access November 15, 2016)

In this light, I expected that technoscience would have assumed a more central role in the discourses and enactments of AMR counterstrategies, compared to other STS-related policy debates over other grand challenges confronting the contemporary world: from the surge in age-related degenerative diseases to climate change and economic recession, the respective problems are more often than not framed in ways that are amenable to technoscientific solutions (for instance, “regenerative medicine”; “green bio-economy”; etc.). By contrast, the role of technoscientific innovation only seems to play an underpart in the global “war” against AMR. To be sure, I learned that there is limited biopharmaceutical R&D activity into “super antibiotics” (geared towards fighting resistant “superbugs”), and that there are considerable efforts to build and harmonize surveillance infrastructures to detect, map and monitor the global geography of AMR (O’Neill 2015, Chakradhar 2016). Yet, the dominant problem frame is one of overuse and misuse: the majority of efforts seem to focus on behavioral interventions, that is to say, programs that seek to act upon AMR through altering routinized patterns of antibiotic *consumption*. Moreover, these various policy programs of “antibiotic stewardship” that have been launched to counteract AMR largely remain within an individualistic-liberal framework and articulate the problem in terms of individual behavior, be it the (aggregate) individual prescribing practices of physicians or the (aggregate) demand-desire of patients for antibiotics due to embodied cultural treatment practices and/or erroneous beliefs about the reach and efficacy of antibiotic therapy. If it just were to alter consumer-choices and guide subjects to behave rationally!

From this angle, AMR seems to be less a contentious (techno-)scientific issue, and more an issue of policymaking, state strategies and practices of governing: it is about getting individuals, professions, and institutions to alter their routines. Clearly, in this regard (scientific) knowledge plays an important part – and this had been reflected nicely throughout the papers in our session: framing, public understanding, practices of subjectification. But throughout the different locales and practices, it is apparent that what is at stake in the overall picture is to translate – semiotically and materially – a global and systemic problem-constellation into a series of discrete, individualized policy responses actionable at the local level (administered largely through national action plans). In this context, the key question at stake, it seems, is the question of *implementation*. But less has been said about the material politics of AMR, about the state-driven efforts to implement a global anti-AMR strategy, about the institutional forces that enable, channel, support or perhaps thwart these manifold efforts. Where then could be the role of further STS in research that takes these issues seriously? At this point I see a veritable chance for establishing a more intimate joint working space between STS and critical/interpretive policy studies.

From their very infancy, STS and interpretive policy analysis (IPA) have formed a mutual thinking space underpinned by many shared methodological presuppositions (Gottweis 1998, Paul/Haddad 2015, Åm 2016). And yet, despite their vicinity there are hardly any efforts to comprehensively integrate the rich conceptual toolboxes of either fields. Given the specificities of AMR, as well as the general stress in STS on the co-production of science and policy, it seems worthwhile to pay equal attention to the formation of policy knowledge and to the role the state plays in articulating knowledge and practices of intervention – and hence, the “implementation” of global policies and its translation into local practices.

To begin with, implementation – as technical and top-down as it may sound – is not a linear process; it always involves a politics of *translation*. STS stresses that in order to understand how and why knowledge can be established as scientific facts and how technologies work as innovations in society, we need to look at the dense network of heterogeneous elements that create and stabilize it. Yet, concepts of policy and of the state often remain monochrome. Conversely, policy studies have for long ignored science and technology as *active agents* in policy. Engaging STS work, policy studies can improve their sensibilities for how exactly scientific knowledge and technologies matter – and in what precise, situated ways – in policy practice. How is *policy knowledge* fabricated and translated into the design of political strategies of intervention into the dynamics of AMR? In turn, critical policy studies can complement STS scholarship with a profound toolbox to study how certain policies are being articulated, designed and implemented. What seems particularly relevant for AMR is to include a fine-grained focus on how path-dependencies and institutions shape not only the content of policies, but also how “epistemic selectivities” (Vadrot 2016) emerge in relation to complex institutions such as the state and its role in rendering some forms of knowledge accessible to policy programs while others are being silenced or dismissed. How to conceptualize the role of the state in providing corridors for selective policy knowledge? How should we situate science, policy and the state in broader global socio-material formations and particular historical conjunctures (for the relationships between policy knowledge and the state see the recent conversation within critical policy studies in Brand [2013], Paul/Haddad [2015])? These are pressing issues in order to make sense of AMR as a global phenomenon, and could also enrich STS debates more generally – especially in fields that are, right at the outset, as much about science as about policy.

To conclude: the challenges that confront the politics of AMR make clear that STS has a vital role to play in establishing not only knowledge but also perhaps help to design policy responses that go beyond the half-heartedly conventional behavioral approaches. However, if it were to adequately address the policy question in STS, insights from other fields are vital. AMR seems an intriguing field to develop synergies between allied yet perhaps estranged fields of critical social science research, and particularly between STS and interpretive policy studies.

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INFRASTRUCTURES OF NUCLEARITY: EXPLORING ENTANGLED HISTORIES, SPACES AND FUTURES

Sergiu Novac

ORGANIZING THE TRACK INFRASTRUCTURES OF NUCLEARITY IN THE CONTEXT OF THE 4S/EASST CONFERENCE IN BARCELONA WAS A NOVEL AND HIGHLY ENRICHING EXPERIENCE FOR ME. DURING THE PANEL, I CAME TO IDENTIFY SOME IMPORTANT ISSUES AND THREADS FOR THE FUTURE OF NUCLEAR STUDIES IN STS AND ITS RELATED DISCIPLINES. THESE INCLUDE THE ROLE OF THE RESEARCHER IN STUDYING NUCLEARITY AND, SECOND, THE NEW WAVE OF INFRASTRUCTURE STUDIES AND HOW IT CAN FEED INTO NUCLEAR STUDIES.

The initial idea to organize a nuclear panel or track - at that point it was not clear which one of the two it would be - for the forthcoming common 4S/EASST conference came during the 'Technosciences of Post-Socialism' workshop, also partly supported by EASST, which took place in Budapest in September 2015. The initiative came from Marton Fabok from the University of Liverpool, co-organizer of the workshop¹. Marton and me were the only ones engaging nuclear issues in that workshop, him researching the nuclear new-built project at Wylfa in the UK, while I was working on the other end of the spectrum, looking at nuclear decommissioning through a case study of a former power plant of the GDR, located in Greifswald. We commonly agreed that we could set up something that would be larger in scope and engage directly with nuclear issues from an STS perspective and that the Barcelona conference would provide an ideal platform for this project.

It is important to note, however, that it was not just shared academic interest in the topic that motivated us to go forward with the idea. The Budapest workshop brought together an excellent group of young academics that are also personally engaged in, and politically concerned with the Central and Eastern European region and it showed how this engagement becomes clearly articulated in how 'socialism', 'post-socialism' and their techno-political articulations are being worked through. I think I am not mistaken to say that both of us shared a multitude of affinities with these concerns and possibilities of engaging them and we also considered that nuclear topics should receive more attention in this context. The controversial project for a new Russian built nuclear power plant at Paks² in Hungary was a direct incentive, but it was just one example in a sea of transformations that should, in our opinion, receive more attention. Starting from that, we set out to ask how we could put together a track that would bring together several aspects of the history of nuclear energy in the region, the path dependencies this history created and the transformations that the industry goes through at present. Of main concern was to look at these issues while still having a global perspective on socialism and its 'posts-' in mind, faithful to what, for example, Gabrielle Hecht had called 'entangled geographies' (Hecht 2011) of nuclearity. It was in this context that we contacted Sonja Schmid from Virginia Tech University, who had just published a wonderful book on the history of the Soviet civil nuclear power program (Schmid 2015) and with whom we were both already in contact, asking whether she would be interested to become involved in the organization of the track. She was very enthusiastic about the idea and this became the final organizational format.

Ultimately we decided to go for a full track, which was giving us more space for exploring various topics. Therefore, the regional focus soon lost ground in the face of a broader approach towards present nuclear topics that would be worth engaging. Such an approach, we hoped, would also enable a larger pool of applications and

¹ The other two co-organizers of the workshop were Zoltán Ginelli from Eötvös Loránd University in Budapest and András Novoszáth from the Open University in the UK. Further information can be found on the workshop website: <https://technosciencesofpostsocialism.wordpress.com/>.

² The Paks 2 project has received 'green light' from the European Union in the autumn of 2016, despite the fact that at first it seemed the EU would attempt to block it.

lead to more diverse and engaging discussions. The final call for the track engaged with three notions that seemed crucial for this engagement: the first was nuclearity, the second infrastructure and the third aforementioned entanglement. Nuclearity is Gabrielle Hecht's (2012) way of describing the quality of something to be nuclear, a quality which can shift according to various settings, being emphasized or deemphasized, depending on the desired political outcomes that various actors are employing it for. Infrastructures are usually those assemblages that are ideally invisible and become visible only when they break down. Therefore, we considered it important that contributions we were calling for would engage with the details of keeping nuclearity alive, or, in other cases, bringing it to its final deathbed. And finally we were very keen on bringing together grounded case studies enriched by empirical work, which would at the same time make the step towards other scales of these infrastructures and embed them in global processes, faithful to the 'entangled geographies' agenda, or, to use another reference, to Burawoy's (2000) and Gille and O'Riain's (2002) notion of 'global ethnography'. We called for three broad sub-topics, which we hoped would cover these large subjects: 1) The way nuclearity is governed at various scales; 2) What does it mean to live and work with nuclearity?; 3) What does it mean to study nuclearity now as STS scholars or, more broadly, social scientists?

I will now go over to those discussion topics that came out of the track, which I personally found most interesting. Specifically, I will deal with two questions: first, the role of the researcher in studying nuclearity and, second, the new wave of infrastructure studies in STS and its related disciplines and how they can feed into nuclear studies. One aspect which triggered my imagination was the way in which nuclearity is being encountered. That is to say, how is it possible to engage with the hidden geographies of risk and danger at nuclear sites, how are these perceived and lived as everyday experiences. Karen Bickerstaff's presentation on the issue, based on a rich ethnography of living in Sellafield, next to the UK's largest nuclear facility, was for me the most inspiring in this sense. It was not the only paper engaging with these issues, but it was the one that gave most ethnographic insight to the topic, reminding me of Zonabend's (2007) seminal ethnography of the La Hague nuclear reprocessing site in France. My own research deals with a nuclear decommissioning project located at the Baltic Sea, in a region which attempts to reinvent itself as a tourist attraction. Therefore, thinking about the way in which hidden geographies of danger are negotiated as everyday experiences, creating spatial and temporal rhythms which override expert practices of describing and containing danger, revealed new insights about how to approach my own work.

The hidden geographies of nuclearity pointed out also another aspect, which went beyond the lived experience, namely the notion of infrastructure. This was a key theoretical binding element which ran across all the presentations of the track and was picked up by Gabrielle Hecht in her discussion of the final panel of the track. Infrastructures are supposed to be invisible and invisibility has always been the ultimate goal of the nuclear industry. Thinking nuclearity as infrastructure, in turn, has the potential of de-exceptionalizing nuclear studies and bringing it in conversation with other fields in STS and its related disciplines. Infrastructures, since rendered invisible, seem 'boring' and become appealing only when they break down (Star 1999). The breakdown of infrastructures reveals the amount of work that is being invested in keeping them invisible and the fact that, for instance, infrastructures of the nuclear are far more than just nuclear, involving complex assemblages of political, material and social networks. Through the second wave of infrastructure studies (Anand 2012; Appel 2012; Barry 2013; Harvey and Knox 2015; Graham 2009; Gupta 2015; Larkin 2013; Shamir 2013), which started to focus on the Global South, new topics have entered into the area of interest of STS, topics which move away from innovation studies. Because infrastructures always break down, despite the continuous maintenance work involved in rendering them invisible, topics such as repair, clean-up, waste and 'de-creation' have become very appealing. I would go further and argue that the focus on the Global South actually just revealed an analytical bias towards infrastructures in the Global North. As it turns out, infrastructures are becoming increasingly visible not just in the case of the Global South and they were arguably never that boring. Ever since the second wave of infrastructure studies

took off, cases that look at the Global North also reveal an ever increasing focus on maintenance, break-down and ultimately an increasing visibility of what should remain invisible. For me, the main analytical insight of the track was that thinking nuclearity through infrastructure forces us also to rethink globalization and bring back into the inquiry a more nuanced and critical view of the processes that are presently at work on a global scale. It was also a gentle reminder that progress builds upon the piles of debris of past visions of progress, to paraphrase Walter Benjamin, and that, especially in the context of energy transitions and anthropogenic climate change, thinking about how to remove the debris of the past is just as important as imagining new visions of the future.

Finally, an aspect which ran through most of the discussions in the track was the role 'we' as social scientists have in a public controversy regarding nuclear issues. Arguably this topic provoked the most heated discussions, since several of the presenters were active also in various advisory boards and had experience with public hearings and common decision making processes on nuclear matters, which involved nuclear experts and other established stakeholders in the field. Joe Masco hit a sensitive cord when he called the social scientist an 'enabler of nuclearity', triggering questions of what kind of enabling is going on in this process. Does the social scientist ultimately have just a token role in these advisory boards, as Shannon

Door to the controlled area.
Greifswald NPP, Germany. Photo by
the author



Cram and William Kinsella seemed to suggest? Karena Kalmbach and Gabrielle Hecht also got involved in the discussion, bringing in insights from such meetings in Germany and France. The discussion is of high importance, since in recent years social science has become, at least formally, increasingly visible in techno-scientific controversies. And yet, there seemed to be a sense of frustration that was shared by many participants in the room regarding the fact that this visibility does not lead to the desired outcome of making decisions and communicating risks in the nuclear industry more transparent. This brings back the old question of the public intellectual and his role in the shaping of expertise and, ultimately, the transformation towards more democratic decision making processes. And yet, there were also voices in the room that argued differently, pointing out that many of the outcomes of such formal discussions in expert groups depend on the kind of language that is deployed and the willingness of critically inclined social sciences to seriously engage in a compromise with established nuclear stakeholders. This would bear the potential for moving forward in such controversies, with the remark that it would also imply accepting another, maybe slower and at times frustrating understanding of democracy as something that is constantly a 'work in progress'.

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EXAMINING PLANNING 'BY OTHER MEANS': REFLECTIONS ON STS AND PLANNING FROM 4S/EASST

Shula Goulden

COUCHED WITHIN THEMES EMERGING FROM THE BROADER WHIRLWIND THAT WAS 4S/EASST, THE TRACK "STS AND PLANNING" INCLUDED A DIVERSE SET OF PRESENTATIONS THAT OFFERED AN OPPORTUNITY TO REFLECT ON PLANNING RESEARCH WITHIN AN STS FRAMEWORK. OF PARTICULAR INTEREST TO ME WAS THE OPENNESS TO THE TYPES OF KNOWLEDGE THAT GO INTO PLANNING AND THE SOMETIMES UNEXPECTED WAYS IN WHICH THEY PERFORM. MANY EMPIRICALLY RICH EXAMPLES SHOWED HOW BOUNDARIES BETWEEN FAMILIAR CATEGORIES SUCH AS LAY COMMUNITIES AND PROFESSIONALS, EXPERTISE AND PERSONAL JUDGEMENT, SCIENTIFIC MODELS AND NON-SCIENTIFIC JUDGEMENTS, ARE FLUID AND POROUS. THE UNPACKING OF 'RATIONAL' PLANNING PROCESSES OPENED UP ROOM TO CONSIDER HOW PLANNING OCCURS IN PRACTICE, AND WHAT PLANNING MAY REPRESENT FOR DIFFERENT GROUPS.

The Barcelona 2016 conference was my first experience of either EASST or 4S, and a welcome opportunity to get a sense of the breadth of STS research in different areas as well as themes that unify them. Against the background of a rich buzz of topics, presenters and tracks, which made planning each day an exciting but challenging task in itself, I also presented and participated in one full track, STS and Planning (T004).

The track, as introduced by the convenors, was an opportunity to consider how planning can be explored by STS prisms of inquiry, for example considering the role of artefacts, different forms of knowledge, and centres of calculation. Hybrid approaches were strongly represented, particularly with planning being conceived of as a discipline that actively draws together and works with the material and the social in producing space. The aim, in the track's description and as seen in the presentations, was not just to critique and open up 'black boxes', but to consider how planning could be 'reassembled' in a more diverse and reflexive manner.

While not representative of all the papers presented, a major theme that crystallized in my reading of the track was the unpacking of how different types of knowledge are defined and understood when analysing planning processes. In particular, it appeared that certain types of knowledge, associated with certain actors, had a different influence on decision-making to what might have been expected. This played out on themes where STS has much to contribute, such as the role of calculation and calculative devices (e.g. Porter, 1996; Callon & Law, 2005) and interactions of expertise and lay knowledge (Epstein, 1995).

In the session on standards, for example, Alan Lewis described use of the 'daylight factor' by architects, a mathematical calculation of daylight that was adopted to signify a design approach based on verifiable principles. Despite requirements to use the calculation, he showed that architects didn't routinely do so. Instead, the calculation itself was separate to the meaning it represented, as it created an impression of mathematically verifiable principles in design while the individual knowledge of architects still determined outcomes. In my presentation on the adoption of environmental assessment methods for buildings by local authorities, I aimed to make a similar point on the disconnection between the calculation provided by standards and how they are used in and influence actual

decision-making. This emphasised that the environmental assessment tool was adopted not just for the knowledge it generated, but for what it represented to decision-makers as a standardised tool. In this sense, when decision-making processes themselves were the focus of study, rationalist decision-making fuelled by calculative devices could be shown as a veneer, behind which decisions relied on other forms of knowledge.

Other presentations spoke more explicitly about the involvement of different types of knowledge in the planning process. Looking at ecological controversies in Hong Kong, Anders Blok used the term 'planning ecologies' to consider how different publics interact and shift to challenge official planning practices, such as environmental groups suggesting new possibilities for river and floodwater management whilst up against a strong culture of engineering-based knowledge. Yvonne Rydin's paper on planning hearings for an offshore wind farm in the UK showed how quite different types of modelled and personal knowledge on landscape and ecological values coexist in the decision-making process, opening up room for deliberation about the voices given to nature in planning. Isaac Marrero-Guillamon discussed the politics of participation in planning processes in a post-Olympic Games site in London, and charted how a particular group emerged as a respected site of communal expertise within that process, developing new categories of knowledge and influence within a particular representation of 'the community'.

Yet other presentations provided a more materially driven sense of knowing about urban space. Helena Leino discussed the results of research focusing on experiences of the visually impaired in urban spaces in Finland, and their interaction with other people and material elements. Pedro Ferreira discussed the process of 'spot-making' by skateboarders, with special attention to the distributed agency of



Fig. 1: Energy performance standards in real estate listings in France. Looking at the meaning created by standards can open up space for understanding the different types of knowledge at play.

Courtesy of the author.

different surface materials, humans and their environments in this particular form of city building. These specific experiences of space are likely often overlooked by planners but still influence the experience of broader publics.

While a rough brushstroke over the sources of different types of knowledge in planning, this led me to think that discussing planning 'by other means' (the conference theme) may contribute to rejecting a priori explanatory trajectories of how knowledge influences planning. It suggests that the knowledge brought by different groups (professionals, experts, communities) may influence planning processes in unexpected ways that are not usually associated with these labels.

Moving away from the modernist idea of a single knowledge reflecting truth, planning theory has grappled with the presence of multiple 'knowledges' and ways of knowing that need to be mediated by planners. This brings with it challenges such as how to consider scientific expertise alongside localised knowledge (Rydin 2007) and how to define what it is for planners to 'know' and expand their knowledge base, when acknowledging that knowledge is represented by different types of cognitive, moral and skills-based learning (Davoudi 2015).

The presentations in the track provided examples where otherwise accepted categories of knowledge, or typologies of knowledge, could be questioned, and even unravelled. As a result they challenged obvious explanatory dichotomies such as expert/lay, scientific/subjective etc. Rather than taking these categories of knowledge for granted, the 'knowledges' found in the papers were not easily categorised but instead mediated and established by other elements. Whether a scientific model (in the form of standards), community stakeholders (participatory planning), or expert judgement (planning hearings), in each case, these apparent types of knowledge were mobilised into these categories by artefacts, professional cultures and negotiations.

In some cases, examining the way in which the knowledge was built up and used seemed to weaken the knowledge claim, unpacking scientific rationalities behind standards for example. In others, it suggested empowerment, showing how spaces for lay knowledge, communities, judgement and multiple voices are made within institutional arrangements, and how these can influence the very core of planning decisions, despite appearances to the contrary. An STS-led reading, which invites questions about how taken-for-granted knowledge is established, could invite more analysis on the types of knowledge discussed in planning, and how they are established and categorised in relation to particular groups.

Another striking aspect of the track as a whole was its diversity, and what this signalled about what it is to discuss 'planning'. There were sessions on planning and urban design standards; practices and operations; planning and ecological issues; and politics and participation. Some ethnographic presentations, such as by Pim Peters and Julio Paulos, brought the listeners up close to the daily practices of planners, and the meetings, discussions, interactions and practices that translate into their broader work. Marko Marskamp suggested a study of planning that decentres the planner from the process and focuses on planning tools such as codes as the object of research. Other presentations, such as by Anders Buch (with Anne Katrine Harders) and by Malve Jacobsen, emphasised that the implementation of plans is contingent on social practices, material infrastructures, discourses and ideas. Both of these highlighted the hybrid arrangements that fill the space between plans and their material implementation. As noted, there were also more material accounts of the interactions between particular users and the city and their voice within the planning process and city-making.

I was left wondering what 'planning' represented to the different speakers, and whether there is a gap between examining the practice of planning, and examining how planning emerges, 'in practice', or whether they are one and the same. In the context of thinking about what planning is and what it is represented by (e.g. Alexander 2016), this sparked my interest to consider what STS in planning can bring to this question.

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TOWARDS A JUST SOCIETY: STS IN THE INTERNATIONAL PANEL ON SOCIAL PROGRESS

Sameea Ahmed Hassim

THE INTERNATIONAL PANEL ON SOCIAL PROGRESS IS ATTEMPTING TO PRODUCE A REFLEXIVE AND INTERDISCIPLINARY PERSPECTIVE ON SOCIAL PROGRESS. WHILE STS ARTICULATIONS OF THE ROLE OF EXPERTS, EXPERTISE, POWER, GOVERNANCE AND THE SOCIAL CONSTRUCTION OF SCIENCE AND TECHNOLOGY HAVE FOUND MEANING IN SUCH AN ENDEAVOR, THE IPSP COULD FURTHER REFLECT ON ITS KNOWLEDGE PRODUCTION PROCESS SO THAT THE GLOBAL COMMUNITY RECOGNIZES THE PRODUCTS OF THIS ENDEAVOR AS CREDIBLE AND LEGITIMATE.

The International Panel on Social Progress (IPSP) is a novel attempt at understanding how far we have come and in which direction we should be heading in our quest for a just society. As different articulations of progress pit themselves against one another, each vying for influence on the global agenda, our society is under a great deal of pressure to be reflexive about how we know what we know. Conclusions have been drawn in different fields and on many issues. However, there is a need to come together to discuss how these understandings of our world have a bearing on our collective futures and on issues of justice, responsibility and solidarity – a task requiring inter-disciplinarity. When we consider the myriad interconnected and sometimes subtle ways in which society is affected by change, it is difficult to determine what exactly has had an impact and in what ways those impacts have in turn affected people's lives in a cumulative way. What progress means is neither apparent nor neutral as it requires an interpretation of such complexities. We also need to determine, as a society, the kinds of power and influence our current systems of accountability allow, which elements of our day-to-day lives we are willing to accept or should deem unacceptable and the ways that we organize ourselves so that governance tends to those shared values in a , bearing in mind that not everyone is able to influence the systems that shape their daily lives. Recent social, economic and political shocks to the global system have made social progress a particularly salient issue. It is time to take stock, to understand more deeply and openly the kind of world we have created and the potential impacts of the ways we have gone about developing and envisioning progress. This need for a reflexive and interdisciplinary vision of progress sets the tone of the work going into the IPSP.

At the 4S/EASST Conference in Barcelona, we had the opportunity to reflect on the ways in which Science, Technology and Society (STS) can contribute to this incredibly complex and pivotal understanding of social progress. We were given an overview of some of the reflections of STS scholars who are contributing to the development of the twenty-two chapters of the Report. The deeper the discussion became, the more striking the relevance of STS across the different issues appeared to be. The pathways that STS' critical questioning enables, have found meaning in this vast chasm brought about by uncertainty in social progress, the

debatable problem constructions and disconnected visions of the future. STS is concerned with process, how knowledge is made, for whom and by whom and its articulations become meaningful when it provides a perspective that closely reflects on the reality faced by knowledge producers themselves. The close involvement in the chapter-writing process has provided STS scholars with a remarkable opportunity to point out the value of STS as knowledge is being made. Moreover, the conversations and joint reflections on social progress can be enriched by the articulations that STS provides. These articulations include reflections on the role and influence of experts and expertise in framing and authority, reflections on power, ordering and governance and the social-construction of science and technology.

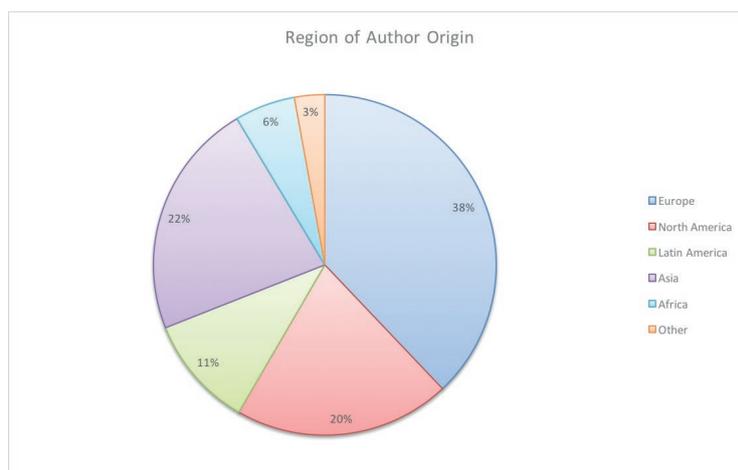
STS perspectives on the policy process challenge policy-makers' preferences for a linear model of progress, wherein the expectations of policy-makers are met with positivistic ideas of science and technology and their goals systematically envisioned as incremental solutions to pre-defined policy questions. STS requires a different way of envisioning the science-policy relationship, as one that is far more intertwined with science, policy and society, contributing instead to the co-production of knowledge and social order (Jasanoff 2004). Change, as STS sees it, is something that should be negotiated with society if controversies are to be avoided. By stressing the social construction of science and technology, STS emphasizes the ways in which knowledge is made and how it is socially contingent, rather than objective or easily transplanted to policy contexts. STS roots its analysis of policy-making in the realities of knowledge production, considering how social contexts contribute towards the settling of facts, the different interpretations of evidence and truth, and the limits of change. The value of an STS perspective in the IPSP is thus brought to the fore as experts attempt to develop knowledge that is both a true reflection of what has been and of what should be done. If the STS perspective is indeed influential, the likelihood is that the expert advice in the reports alludes to more and different policy pathways than would be traditionally expected by policymakers.

The contemporary context is one in which experts as well as scientific knowledge play a central role in politics yet they no longer hold the unquestioned authority and public trust they once did (Maasen and Weingart 2005). If we are to restore trust in governance and in the institutions that we entrust to maintain order in our lives, they should be made to reflect the diverse needs of communities around the world and protect the common values that bind us in our quest for a just future and reflect the kind of social progress that is sensitive to context and difference. As a collective group of academics, the IPSP is discussing the implications of global articulations of progress and how these ideas shape and influence the way we see and think of social groups and the kinds of things that influence them. Care needs to be taken to avoid the reification of difference, while the case is being made for equality and solidarity. STS is sensitive towards the effects of collectives, the assemblages that develop and the hidden power to shape interests and agendas through technologies of governance e.g. indicators, technical guides, organizations, practices, codes and rankings (Davis, Kingsbury, and Merry 2012). At the same time, a balance needs to be struck between governing institutions and local communities in shaping claims of justice, solidarity, responsibility, leadership and inequality. This implicates accountability practices, which need to question and align such processes as the courts, arbitration and peer-review. Global articulations attempt to apply norms to different countries and appeal to framings such as human rights as a means of harmonizing those efforts. Facts and technologies appear to be global but can fail to mean the same thing in different places. If a global vision of social progress is to be reached, the understandings should pay attention to the power of framings and their implications on local experiences. It is the hope of the STS scholars involved in the IPSP that these reflections shape the articulations of issues in the chapters.

The IPSP is modeled on the Intergovernmental Panel on Climate Change (IPCC) in the way that it enrolls experts in the writing of the report. Early in its establishment, the IPCC was criticized for its imbalanced geographical representativeness (Agrawala 1998), and took steps to remedy this problem. The IPSP needs

Fig. 1: IPSP Authors Region of Origin

Courtesy of International Panel on Social Progress (IPSP): <https://www.ipsp.org/people/authors>



to remedy its representation of authors if its work is to be seen as a credible and legitimate global endeavor. Figure 1 shows the low participation of African and Latin American authors in the IPSP.

The IPSP has the potential to provide a different kind of assessment that is both reflexive and interdisciplinary. STS has an opportunity to demonstrate the many ways in which its articulations are useful and can enrich the dialogue in a powerful way. This is a step in the right direction, however, knowing that there are social conditions that determine the acceptability of expert knowledge, it is important that STS influences the reflections further so that the global community recognizes the products of this endeavor as credible and legitimate.

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DOING AND TALKING RESEARCH EXCELLENCE: BY OTHER MEANS?

Ieva Puzo

IN THIS SHORT ESSAY I REFLECT ON TWO 4S/EASST BARCELONA CONFERENCE EVENTS IN WHICH I PARTICIPATED: THE “GOVERNING RESEARCH EXCELLENCE” TRACK AND THE POSTGRADUATE WORKSHOP. WHILE THINKING THROUGH THE THEMES DISCUSSED DURING BOTH EVENTS, I HIGHLIGHT THAT STS SCHOLARS, LIKE ANY OTHER RESEARCHERS, ARE AFFECTED BY RESEARCH POLICIES THAT DEFINE EXCELLENCE INCREASINGLY NARROWLY. HOWEVER, I SUGGEST THAT STS RESEARCHERS ARE VERY WELL-POSITIONED TO ENGAGE WITH THIS ISSUE BY EXAMINING NOT ONLY THE EXPERTISE, BUT ALSO THE “HUMANITY” OF THOSE ENLISTED TO PRODUCE RESEARCH EXCELLENCE, THUS OFFERING CRITIQUES OF AND ALTERNATIVES TO THE EXCELLENCE RHETORIC AND STRUCTURES.

As I was looking over my notes from the 4S/EASST conference in Barcelona to write this essay for the *EASST Review*, a post on the *Facebook* page of *Nature* caught my eye. With the title “Young, Talented and Fed-Up: Scientists Tell Their Stories,” the article focuses on the experiences of three young scientists, suggesting that young researchers today face unprecedented pressure to publish, gain funding and secure permanent positions (Powell 2016). Intrigued, I perused further and realized that the article that had first grabbed my attention was part of a special issue of *Nature* on young scientists – and the implications their working realities have on scientific production. That the two concerns are deeply interrelated is quite unceremoniously stated in the first line of the editorial of the special issue: “Academia is more difficult than ever for young scientists. That’s bad for them, and bad for science” (Nature 2016). Importantly, one of the reasons for this “badness” is the increasing understanding that the focus on the quantity over quality of scientific output may be detrimental to science as an enterprise that is supposed to tackle the world’s big questions.

The narratives of the special issue of *Nature* could not have been more timely. In many ways, they give voice and legitimacy to the socio-economic uncertainties that many early career researchers around the world experience and try to navigate. It is also the topic that I have explored in my own dissertation work on young international scientists in contemporary Japan; focusing on the experience of the configuration of science, mobility and labor, I have suggested that, in the context of Japan, transnationally mobile researchers rely on cultural explanations in their attempts to make sense of the uncertainties embedded in global scientific labor regimes. The concerns of the *Nature* special issue also speak directly to the questions raised throughout the 4S/EASST conference track “Governing Excellent Science” and, importantly, some of the themes permeating the postgraduate workshop as well.

That unpacking the quite elusive concept of research excellence is a topic of great interest for STS scholars is reflected in the fact that the “Governing Excellent Science” track brought together many researchers: four panels with four or five presentations in each of them. The conveners of the track successfully pinpointed and rendered visible an ongoing moment of transformations in research policies around the world – that of the policy makers’ increasing reliance on quantifiable indicators to evaluate research processes and scientific thought (Sørensen, Bloch & Young 2015). In addition, the presentations of the track participants highlighted

how reliance on bibliometrics and other quantifiable measurements of scientific productivity and quality have been more and more incorporated in the evaluation structures of research institutions themselves, despite the unease with and critiques of this shift.

The track addressed four major themes within the governance of excellence: funding for excellence, the excellence rhetoric, the management and evaluation of excellence, and the comparative aspects of research excellence. The presenters added flesh and inspiring nuance to these themes and inspired enlightening discussions: they examined a multiplicity of ways in which research processes and scientific outcomes are shaped by access to funding and mechanisms of evaluation; they highlighted the strategies scientists and administrators employ to navigate the excellence system; and they offered glimpses into the ways scientists “talk back” to the rhetoric of excellence.

At the same time, however, the “Governing Excellent Science” track presentations seemed to every time underscore an argument Chandra Mukerji already made more than twenty-five years ago when addressing the relationship between scientists and the bodies governing science: “[t]he successful use of science by the state gives *science* a potential value so great that it cannot be ignored. But *scientists* are rarely given much power” (1989: 85; emphasis in original). While in many cases supra-national organizations such as the European Union have subsumed the role of the state and non-state actors such as private corporations have come to be increasingly influential, the point still stands: research policies shape scientific outcomes in particular ways, and scientific practitioners seem to have no other option than to comply or quit. The special issue of *Nature* which I brought up in the beginning of my reflection highlights the fact that this unilateral shaping is deemed problematic not only by early career researchers but also by scientific practitioners in positions of relative power, and that the number of discussions on the topic should increase. It also suggests that both scientists and social scientists researching scientific work aim to address similar questions (for instance, the uses of bibliometrics in assessing research excellence).

It is for this reason that I suggest that STS examinations of research excellence would benefit from two simultaneous approaches: first, explicit acknowledgment that STS researchers are also affected by research excellence policies; and, second, a shift in the focus towards multi-faceted critiques of the excellence rhetoric with the goal of imagining its alternatives.

To address the first point, it was intriguing to note that, even though the presenters of the “Governing Excellent Science” track were at moments gently reminded of their own participation in the “excellence system” (van Kammen 2016), there was a dissonance between, on the one hand, efforts to unpack excellence and, on the other, lack of acknowledgment of the ways STS scholarship may also be shaped by changes in research policies. The fact that STS researchers are also affected by the narrowing definitions of quality scholarship and productivity, however, came to the fore during the postgraduate workshop. Focused on the theme of “doing (post)graduate STS by other means,” the workshop served as a venue for sharing ideas on how to be successful STS scholars in the changing research landscape. It offered its participants an opportunity to meet STS practitioners engaged in research, publishing and other types of careers that were at least partially outside the conventional path. As such, the workshop was a reminder that STS scholars – and in particular early career researchers, of which I am one too – are deeply implicated in research excellence policies and structures and have to invest diversified efforts in order to retain their employability in the job market. As one of the participants mentioned in a passing comment during the workshop, “It sounds like doing STS by other means just means doing more.”

To address my second point, I find it important that we offer multi-faceted critiques and imagine alternative futures. At a time when we – both as scholars of scientific production *and* as research workers ourselves – are provided with increasingly narrow definitions, operationalizations, and indicators of research excellence, it is more crucial than ever to account for the interconnectedness of epistemic and social uncertainties (Sigl 2015). Reflecting my training in cultural

anthropology, I suggest that this approach would imply turning an analytical eye to the examination of practices and affects, movements and desires, strategies and uncertainties of those who are enlisted to produce research excellence in different parts of the world and contexts of scientific production. Equally importantly, it calls for an exploration of practices of those who fail or refuse to meet the demanding conditions required by the rhetoric and structures of research excellence, as well as those who are actively involved in the search of alternatives. This approach would involve, as anthropologist Dominic Boyer has suggested, approaching scientists “not solely as rational(ist) creatures of expertise, but rather as desiring, relating, doubting, anxious, contentious, affective – in other words, as human subjects” (2008: 38).

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REFLECTIONS ON SCIENCE-SOCIETY RELATIONSHIP

IMPROVING SCIENTIFIC COMMUNICATION AND PRACTICE

Michal Stevove

SCIENTIFIC THINKING AND METHOD HAVE INCREDIBLE POTENTIAL TO IMPROVE THE WORLD. TO UTILISE IT, A RELATIONSHIP BETWEEN SCIENCE AND SOCIETY NEEDS TO BE POSITIVE AND STRONG. CURRENT POST-TRUTH ENVIRONMENT, HOWEVER, DETRACTS FROM SCIENCE'S LEGITIMACY AS A SOURCE OF KNOWLEDGE, WORSENING THE PERCEIVED VALUE OF SCIENCE IN THE SOCIETY. AT THE CONFERENCE, TWO RELEVANT ISSUES STOOD OUT FOR ME THE MOST: SCIENCE COMMUNICATION AND SCIENTIFIC RESEARCH. CONSEQUENTLY, I FORMULATED THREE QUESTIONS TO CONSIDER FOR SCIENCE-SOCIETY RELATIONSHIP: 'COULD WE USE MUSEUMS AS A PLATFORM FOR MORE DIRECT ENGAGEMENT WITH SCIENCE?'; 'COULD WE IMPROVE SCIENCE COMMUNICATION PRACTICES BY A CAREFUL INCLUSION OF LAY KNOWLEDGE?'; AND 'HOW TO APPROACH REPRODUCIBILITY CRISIS IF OPEN DATA PRACTICES ARE AT BEST ONLY PART OF THE SOLUTION?'

Science has a great potential to improve the world. However, to utilise this potential the relationship between science and society needs to be positive and strong. A part of my professional ambition is therefore to improve this relationship, and I am worrying if I see these two entities drifting further apart. For instance, I see how knowledge creation is being liberated from the traditional source of the academic institution and news media, and at the same time being appropriated by individuals with special interests. So while there are groups successful in doing independent research, e.g. Ginkgo Bioworks (Turan, 2016), there are also in rising numbers those who claim to be a source of information, but offer mostly misrepresentations and lies, e.g. Breitbart (Toosi, 2016). From an STS perspective, information liberation is broadly perceived as a positive trend, but for me, there is also a real need to mitigate the negative externalities that come with it; namely the emphasis on shock, volume and repetition over factuality. This raises the question of how science, the ultimate source of facts, can strengthen its legitimacy as a knowledge source in the current social context described by many as the 'post-truth era'. My experience at the conference helped me to rethink the relationship between science and society, and based on sessions I attended, I have formulated three questions to consider for the improvement of the relationship: 'Could we use museums as a platform for more direct engagement with science?'; 'Could we improve science communication practices by a careful inclusion of lay knowledge?'; 'How can open data practices contribute to the transparency of science?'

COMMUNICATING SCIENCE

Objects of scientific interest are complex. They do not yield well to simplifications, and significant effort is required to understand even the best scientific explanations. This means that not all platforms which garner wide audiences are suited for discussing objects of scientific study. However, the fourth session of the Science Communication track showed how museums can provide such a platform, and how lay knowledge can be integrated to improve science communication.

Despite talking about these issues in isolation, neither museums nor lay knowledge exist in a vacuum. Figure 1 captures this, and other relations, very nicely in a complex 'sphere of science communication.' While individual elements do have influence by themselves, their value is best realised in the connections they make with other elements of the sphere (system). In addition, we might also see that science-society relationship is not a simple issue, but rather a part of a system, and that it materialises across multiple relations, such as museums-public discourse, journals-news media, or lab/field work-general books. This visualisation enables me to do three things. First, validate issues that I brought up as relevant to the science-society relationship. Second, contextualise the issues to identify mutual dependencies. Third, given dependencies and relevancy, approach these issues with appropriate appreciation of complexity and with the appropriate resources. Ultimately, this allows us to create a framework for improving the science-society relationship, given the focus on museums and lay knowledge.

IMPROVING SCIENCE

Good communication of science and good science research are two sides of the same coin. One without the other will always achieve only mediocre results, if any at all. As such, my passion for science communication dictates me to be interested in issues around scientific method as well. One of the current hot topics is replicability of research and open data. Could being more open improve how science is done? The track on Open Data posed this very question, and its third session laid out the idea that open data might not help with the 'reproducibility crisis'.

The limits of data sharing were portrayed by Dr Theresa Velden (2016) who categorised replication practices into four categories: local replication by originator; external verification by independent group; test of robustness by conceptual application; and generalization by extending the domain of validity. She argues that it are the last two categories that are the most important, but which also do not require data sharing. So while open data might improve verifiability of the research in itself, it should not be the focus of replication practices. At the same time, Dr Velden points out that data sharing is not just a technical issue, as it is very much a relational practice. This is important since it clarifies that even with sufficient resources, we will not likely achieve a higher standard of open data. The same sentiment was reiterated by a presentation on 'Epistemic and Non-Epistemic values driving data-sharing' (Murtagh et al., 2016). Tensions such as competition vs collaboration and open science vs secrecy and scientific competition force researchers into certain types of behaviour. It neither helps that we are all constantly being reminded of the 'publish or perish' mantra. Open data might therefore not be the simple solution to the 'reproducibility crisis' some believe it to be, as it does not serve the more important aspects of reproducibility, and it is interwoven with deeply rooted practices of the science profession that stimulate secrecy. Does this mean we should give up on open data and data sharing? Definitely not, but from the perspective of science-society relationship, open data should probably not be the centre of our attention.

THE TAKE AWAY FROM BARCELONA

Between sangria at the opening ceremony and great discussions at the beach bar with a beer in hand, I had an amazing time engaging with interesting research. I could not ask for more, and my first conference gave me enough courage, and some constructive criticism too, to enable me to advance my research further.

So what's next for me? In connection to my passion, my frame of reference at the conference was the relationship between science and society. What I experienced was a mix of exploration of the current trends and identifications of problems of contemporary approaches. Daring, but sound, thoughts were the currency, and the environment facilitated open-mindedness rather than harsh criticism. What I picked up were ideas about science communication and scientific method. Four days of conference left me with these three questions:

- Could we use museums as a platform for more direct engagement with science & rise of the 'STS citizen'?
- Could we improve science communication practices by a careful inclusion of a lay knowledge?
- How to approach 'reproducibility crisis' if open data practices are not a question of a technical implementation and at best only part of the solution?

Will they turn out to be good research questions? I do not know, but I am confident enough to place them at the forefront of my next academic endeavours. And in case you have similar interests, I would encourage you to consider these questions as well.

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OPEN SCIENCE IN PRACTICE

STS APPROACHES TO OPEN CULTURES IN RESEARCH

Katja Mayer, Eduard Aibar

OUR CONFERENCE TRACK INVITED STS SCHOLARS TO EXPLORE OPEN SCIENCE FROM AN STS PERSPECTIVE AND TO DISCUSS WHAT STS CAN BRING INTO THE BROADER DISCUSSION. OPEN SCIENCE IS BROADLY DEFINED AS SCIENCE THAT IS TRANSPARENT, ACCOUNTABLE, AND SHAREABLE, INVOLVING THE PARTICIPATION OF (ALL) RELEVANT STAKEHOLDERS IN THE SCIENTIFIC PROCESS. WITH THIS REPORT WE WOULD LIKE TO HIGHLIGHT SEVERAL DISCUSSION POINTS OF THE BROAD SPECTRUM FROM NORMATIVE IMAGINARIES OF OPENNESS TO UNDOGMATIC OPEN PRACTICES. THEREFORE, WHILE THE EMPHASIS OF OUR REMARKS IS ON THE DIVERSITY OF ENACTMENTS OF OPENNESS, WE CAN ONLY PRESENT FOUR SNAPSHOTS OF OUR TRACK: CO-PRODUCTION OF KNOWLEDGE IN PARTICIPATORY SETTINGS, OPEN DATA PRACTICES, SCIENTIFIC ETHOS AND TRUST, AND POLICY IMAGINARIES OF OPENNESS IN RESEARCH AND INNOVATION.

¹ See also Judit Gárdos in this issue, who criticizes the inherent normative and largely undisputed dimensions of the term open science and in particular its taken for granted connotation of Western scientific tradition.

Open Science (OS) is currently regarded as the next 'big thing' in European science policy and elsewhere (Mayer 2015; Levin et al. 2016). It is broadly defined as science that is transparent, accountable, and shareable, involving the participation of (all) relevant stakeholders in the scientific process. Policy visions do not only highlight the transformative powers of OS in regard to research culture, they are also setting high expectations in regard to creation of economic growth, new jobs and innovation opportunities. In practice, tensions are emerging in how OS is enacted and governed by scientific communities, science policy organisations, funding bodies, the publishing industry, and science-related institutions, with diverse uptakes of commons, knowledge sharing, democratisation of technology, participatory design, hacking etc.

This conference track invited participants to explore OS from an STS perspective and to discuss what STS can bring into the broader discussion of OS, e.g. by studying institutionalizations of OS, appropriations of OS within prevailing traditional epistemic culture, or how OS is co-shaped by negotiation processes promoted by different stakeholders. Presentations covered socio-technical dimensions of openness in sciences - including the social sciences and humanities. There was less discussion of the "sticks and carrots" (Leonelli et al. 2015) or the perceived benefits to researchers, research organisations and funding agents of utilising open scientific methods, the "disincentives and barriers, and the degree to which there is evidence to support these perceptions" (Whyte & Pryor 2011) - though one of the papers remarked how pressures on scientists to collaborate with industry and commercialize their work, within the framework of open innovation, can work against policy expectations to share research data and results [Sánchez-Jiménez/Aibar]. The aim of the conference track was therefore not to gain consensus over how to define open science in research practice, nor to reach a conclusion on how STS should approach these matters. On the contrary it was an attempt to grasp the multitude of enactments of openness and approaches to study it without being normative about its valuation¹.

GRASPING OPENNESS

Most of the discussions in the four sessions revolved around diverse (and unusual non-idealized) forms of co-production of knowledge in various open configurations – involvement of local communities [Albagli et al.], local expertise [Dosemagen] and interdisciplinary collaboration [Oberhauser], hackathons, open consultation processes [Noel, Gruson-Daniel], the open and collaborative editing of scientific articles in Wikipedia [Aibar/Lerga], replication of scientific results, open institutional policies, open access publishing and its abuse by predatory publishers [Wyatt] and so forth. Eighteen speakers told very diverging stories about challenges and limits of collaborations in open settings, some highlighting the need for both normative and legal frameworks in order to safeguard open practices. [Spök et al] particularly pointed to the need of closed spaces for debate in controversy and risk research.

A number of speakers - involved in ongoing open science or citizen science initiatives - focused on collaboration between academia and different kinds of local communities in several countries [Fressoli/Arza]. The relevance and role of lay-expertise and the design of hybrid and innovative institutional settings were highlighted as key points in such experiences. The focus was implicitly moved, from open science as a more effective way of producing science, to open science as a new way to engage citizens (mainly as specific community members) and other stakeholders as active agents in the development of more socially robust research. While open science is commonly associated with access to peer-reviewed knowledge, the emphasis in our conference track was shifted towards peer production.

This line of inquiry understands open science as a social learning venture where the process itself is even more important than the specific scientific outcomes or products that can arise out of it. Consistently with this move from open science as product-oriented to open science as process-oriented, institutional experimentation and the involvement of local communities are considered much more important than technologically deterministic approaches to open science that place great emphasis in the use of new tools. Furthermore, some of the conclusions in our track highlighted the necessary soft-skills and adequate estimation of capacity of such participatory approaches, which are traditionally also a domain of STS.

SHARING DATA

Data and data sharing practices got also quite a lot of attention in the analyses presented. In times when new technology meets old forms of governance, contradictions emerge, illustrating the complex orientations of data generators, researchers and others to open science. Here, criticism was raised by some speakers about the neutral character associated to data in standard open science approaches and in usual calls for data sharing. They problematized data sharing by exposing how data encompasses compromises, ethical standards, different epistemic cultures and values, even different levels of privacy or security, which may entail severe problems in their re-use and replication [Harp-Rushing et al., Velden, ...]. Such issues, which built upon traditional STS claims against the value-free or non-situated character of scientific knowledge, should be taken into account in the analysis of barriers to open science and the design of public policies to foster data sharing. Mainstream open data discourse (see the current implementation of data management plans) was criticised for its narrow concept of data (as text or numbers in structured form) and counter-illustrated with other forms of data or data generation, such as organic materials in biobanks [Murtagh et al.] or biohacking citizen labs [Bogdanov], but also urban social data [Perelló], and multimedia data from ethnographic or experimental settings. Besides raising awareness for the intractability of certain materialities or spatialities towards technocratic ideals of openness, the speakers were calling for more ambitions to open up the whole range of media through which "scientific knowledge is processed, validated and circulated" [Pedersen et al.]. However, when it comes to making data resulting from such studies openly available some of the speakers

[Names] refer to presentations at the conference track and a more detailed description of each presentation can be found here:

http://www.nomadit.co.uk/easst/easst_4s2016/panels.php5?PanelID=3966

<http://openscience-thebetterscience.blogspot.co.at/2016/10/open-science-in-practice-4s-easst.html>

also experienced limits and challenges: unclear copyright issues or vague institutional data policies, for instance, are still hindering data sharing. But what about our own data politics as STS researchers? How could we share our data in its broadest sense, not only among ourselves, but with the communities we work with? We see that issue is prominently addressed in citizen science projects that treat citizens not as research partners, but as data aggregators.

Altogether the open research data theme provides a fruitful ground for many STS concerns. Besides the already mentioned issues, we should deal with the various expectations and imaginaries that science policy and research administration currently develop in regard to open data governance. From the quest of evidence based decision making to the realms of messy research data, following different data pathways could offer rich and exciting STS topics related to scientific ethos, interdisciplinary collaboration, citizen science, infrastructure studies and so forth.

SCIENTIFIC ETHOS, PREDATORY PRACTICES AND METRICS

Coming to questions of scientific ethos and trust, even if debated only briefly during the track, the phenomenon of predatory open access publishing triggered a discussion on metrics and scientific credit systems. In the predatory business model authors are charged publication fees for publishing an open access article without proper peer review or any other editorial services. In the last years this exploitative practice has not only created confusion about the quality of open access publishing in general, it has also made, once again, visible the problems of researchers from developing countries in need to play the game of scientific recognition and reward. Not to mention the emergent evidence – for instance while analysing EU policy documents [Mayer] - that open science can also be instrumental for worsening present trends towards the commodification of science, within the neoliberal agenda (Mirowsky 2014).

All in all, the fear of losing competitive advantages by opening up access to scientific knowledge production is not only present in innovation contexts, but much more so when it comes to planning one's career [Attenborough]. Giving up control over use and reuse in times of vague institutional data policies and without an established reward/incentive system for opening up data would need more critical engagement with ethical dimensions of scientific practice such as trust and responsibility. Again a domain where STS would be best suited for involvement.

Open research practices shaped by digital technology offer a whole new spectrum of metrics to measure and assess scientific quality and productivity. But what does it mean to count social impact with downloads, clicks or retweets? Such alternative metrics would probably just plug along what we already have, but at least they put existing metrics for impact factors and rankings into perspective (Leiden Manifesto 2015). No doubt, they will also co-shape and preformat research agendas and increase impact driven research (which is not necessarily always a bad thing!). However, policy makers increasingly ask for impact measures to legitimate public expenditure. Alongside counting patents as indicators of innovation scientometricians work on new indicators to assess all kinds of open science including the cooperation of societal stakeholders in research.

A REFLEXIVE TAKE ON OPEN SCIENCE BY STS

With open science currently being mainstreamed into western research funding frameworks, STS could help to demonstrate the situative appropriateness of top-down open science policies and engage with bottom-up activities as some of the track's presenters have shown. Open should neither be defined in strict opposition to closed nor should it be a universalistic principle applicable to all research practices everywhere. STS would furthermore be able to study how such policies impact traditional communication and collaboration procedures, existing reward structures, timescales and hierarchies, as well as reflexively interrogating our own practices as researchers and our specific position with respect to other sciences. If STS were committed not only to study data practices in their diversity, but also

in different scientific disciplines and regional contexts, we could critically accompany and help to realize the core principles of the open science movement: being as transparent, accountable, and shareable as possible, and involving stakeholder expertise on an equal footing in the research process.

Last but not least, in the context of open science, STS could once again reflect its own configurations of access to knowledge production and expertise. Maybe we need to step out of a disciplinary ivory tower constructed over the last years (with a whole lot of exceptions, of course!). We should take the opportunity to learn – also on a methodological level – from citizen scientists, hackathons and grassroots movements and rethink how open we want our epistemic cultures to be.

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HISTORY, ONTOLOGY, SCIENCE STUDIES

HOW TO STUDY OPEN SCIENCE AND SCIENTIFIC DATA

Judit Gárdos

BASED ON THE TRACKS “OPEN SCIENCE” AND “LIVES AND DEATH OF DATA” AT THE YEARLY EASST/4S CONFERENCE IN BARCELONA I MAKE SOME REMARKS ON HOW SCIENCE STUDIES ANALYSE THE SO-CALLED “OPEN SCIENCE” AND THE “LIFECYCLE OF DATA”. I PROPOSE THAT INCLUDING ONTOLOGICAL AND HISTORICAL ASPECTS WHEN STUDYING THESE TOPICS MIGHT BENEFIT OUR UNDERSTANDING OF THE METHODOLOGICAL, POLITICAL, SCIENTIFIC OR CULTURAL DETERMINANTS OF THE EMERGENCE OF THESE CATEGORIES, AND ALSO HELP UNVEIL WHAT OUR OWN ROLES AS SCIENTISTS ARE IN SHAPING THE THINGS WE THEN ANALYSE.

An event as the EASST/4S annual meeting can be a key object to study the ever-forming discipline of *science studies*. I will try to use my scattered experiences of two different tracks to draw a few draft conclusions about some methodological features of our discipline, and propose some more critical research questions that could shape *science studies*.

In the track Open Science we heard presentations, among them many case studies on how and which actors should be and are included in science (for example local communities affected by macro-level political decisions about the environment, the general public concerning GMO, Wikipedia-contributors, lay biologists, urban communities, etc.). There were lively discussions about who thinks what is important about open science. We also heard recommendations how to achieve the goal of “open science”. A considerable part of the scholars working on open science (and some of them presenting in Barcelona) are also working in policy-related committees or other organizations to foster open science.

Often, open science is contrasted with the issue of whom the data belongs to. Making such a contrast – we have to be aware – constructs a space where property issues are opposed to a concept of an open science where openness is a normatively positive entity (which should be achieved, with the help of scholars/experts in committees). If we understand science in this manner and in this context of contrast, then propriety issues will tend to attain a negative connotation. However, in my incomplete perception of this track and its presenters, not very often were such ontological questions about the category “open science” asked: it was not in the main focus to address why and with the help of which people or groups this category emerged and was shaped during history; under what political, cultural, scientific contexts it operates; what functions it has or had in shaping society, business, culture or science. Rather, most of the time, the discussions covered the different semantics of open science (of course, not always – for a detailed and thorough analysis of the track see Mayer and Aibar’s review in this issue, analysing the different semantics of openness in the presentations as well), about the different perceptions (for example of stakeholders, policy-makers) on what open science is, or about how open science is performed (on Wikipedia, in journals, in participatory science projects, etc.). We also heard many presentations on the question of how to implement open science; this latter question can be characterized as presupposing a *normative* understanding of open science.

The notion of openness that was so frequently used has not really been critically analysed in the majority of the contributions – apart from few, but notable exceptions. It seems for sure that “openness” is positively connoted. Such a connotation has been part of Western scientific tradition since modernity (see for example Merton’s

scientific norm of communism, Merton 1942). In his paper on magic and science, talking about historiography, Láng (2015:127) rightly points out that “(r)esearchers simply accepted the view that openness is a positive value that supports academic research, and that secrecy, which is more characteristic of the history of technology, was fortunately abandoned by modern science.” But Láng (2015: 125) also observes that “many scholars have shown how secrecy in science became not only a tool of protecting knowledge from intellectual competitors, but also a dynamic social practice, a force that creates and organizes groups, and influences the mechanisms of exclusion-inclusion”. The analysis of these and similar questions in relation to the many practices around the definition and practice of so-called “open science” might produce valuable knowledge for science studies.

In a way Western democracy seems to be the normative backdrop of the dialogue on open science; but let us play a little bit: What could be the antonym of open science? It could be many things: closed science, science for the few, science for the privileged ones, etc. All of the antonyms shed light on one or another aspect of open science that could be studied by science studies scholars, ever more so if we wanted to accept the normatively positive notion of open science, as it is widely accepted nowadays. Some questions for future empirical analyses of scientific practices could include: What are the normative, scientific or political stakes for different disciplines in performing the movement of open science? Which groups are leading the discussion in this field? Why and how do disciplines, scholars, policy-makers focus on activities regarded as fostering open science? What are the performances in this field? What is regarded as closed science? How does this narrative of bad closed and good open science shape scientific activities? How did this opposition come into being in the first place? These possible questions would shed light on open science from a meta-level: they would show us the processes how the *concept* of open science is shaped culturally, socially or scientifically, and those cultural, scientific or social entities and their networks that emerge from these processes. Such an approach would *not* focus on – as did many of the excellent presentation we heard in the track – how a *pre-defined* “open science” is made, manufactured, constructed, performed or used. It would rather study how the thing we now call “open science” came into place, what its ontological status is, what its changing roles and relationships are in the cultural, political, scientific landscapes of other entities. Steven Shapin (2008: 222-223), in a similar approach, describes for example how what we now define as openness was a normality in the 1970s among biologists in the academia, most of them living scarcely off their salaries; but when the industry became aware of the profitable nature of genetics, scientists were tempted to change their workplace and work in less open circumstances. The opposition in the narratives about dirty secretive industry as opposed to pure and virtuous open science emerged because of these developments: “Since there was no money, a sense of sainthood was required in the situation”, said a student about research in academia (Philip J. Hilts: Scientific Temperaments: Three Lives in Contemporary Science, quoted by Shapin 2008: 223).

I will now propose some possible similar research questions based on another field in science studies, dealing with scientific data. Again, I will focus on what could be an *ontological* analysis about the emergence and ever-changing status of the different things we in STS call “data”.

In the track “Lives and Deaths of Data” the focus of many of the talks was on the different ways of the “interpretation” of data, the different stops of their “journey”, the “changes” in the translations of data.¹ The topics were, among others: sensitive health “data” and their context, discussions around and interpretations of astronomical “data”, “data” sharing practices and inequalities, the commodification of “data”, configurations of public and non-public “data”, etc. Among the many possible definitions of data there was one feature that came up quite often: that data is something that can be circulated (implying as well that it can be used several times).

The secondary use of scientific data, that seems to be one defining feature of data in this view, has been a contested issue for decades. The relationship of what is usually called metadata and data or the relationship of data and context are not self-evident. Even these distinctions are under scientific scrutiny (Mauthner-Gárdos 2015). Postmodern theories have questioned the assumption that data are neutral or objective representations of the world. Performative scholars (Barad 2007) have

¹ I quote here the introductory speech of this track by Sabina Leonelli.

² One of the notable exceptions in this track was Haider's and Kjellberg's analysis about the relationship of the structure of a big scale experimental facility and the type of data it produces. They stressed that the meaning of data starts before researchers begin their work.

challenged representationalist approaches (many of them postmodernist or constructivist ones); such approaches, these scholars say, still stick to the view that scientific data somehow represent natural or social worlds (even if these approaches do not necessarily narrate around terms like *objectivity* or *subjectivity*). It would be interesting to analyse – in a performative approach – how the notion that data can be circulated itself presupposes a specific notion of data and thus a specific way how data can be analysed; a question that has not quite been in the focus of the presentations in this track. If we understand data as something that can be circulated (and many presenters in this track shared this view), then one of the foci of such science studies analyses about data will be the ways data circulate or data are transmitted, and how different people “interpret” the “same” data. Scientific data will be a well-defined entity without borders that are contested, without ends that may fray. Science on data will be then somewhat less on what cultural, scientific, social, etc. traditions and surroundings influence what counts as data in the first place², on what in our world does not qualify as scientific data, let alone on the ways how we as science studies scholars choose our objects of study; short: on the *ontological* status of data in sciences (in relation for example to other types of data, or other similar entities in sciences that end up not being called data) and, importantly: on data as the *object of scientific enquiry* in STS. In this track, the main focus – of course with exceptions, mostly ethnographic, close-up analyses of processes that result in the production of entities then called data – was less on these latter aspects.

It might be fruitful, if we want to reflect on our own methods as scientists, to look at our ways how we define data, or open science (or anything else as a matter of fact) and at the causes of selection of things that seem worthy of analysing. Also, I propose to analyse to greater extent the *ontology* of data or open science: what is regarded as data or open/closed science, which scientific, methodological or other traditions influence how these notions came into being in a specific scientific discipline at a specific time in history, at a specific place on Earth.

So: the questions that might be valuable to elaborate and that were – in my view – a bit underrepresented in the tracks under review: What is regarded/defined as data or open science and what not? What are the disciplinary, methodological, political etc. factors that play a role in the processes of and the practices resulting in a specific definition? What are the factors that lead to the concept of open (and closed) science and that of scientific data? How is the relationship of the things that then are called “world” and “data” in different methods, sciences and societies? Through which terms, methods and concepts is this distinction conceptualized, made through different practices, and then used in scientific narratives and texts or in the politics and policies of science? It seems to me that science studies might greatly benefit from including approaches and research questions about the ontology and historicity of the objects we choose to study and thus, in and through our actions and choices as researchers, bring into being as scientific objects.

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NEWS FROM THE COUNCIL

EASST STUDENT MEMBER ON THE EASST COUNCIL – ONE VACANCY

An opportunity for you to play a role in the future of EASST.

We are seeking self-nominations for the following vacancy on EASST Council (following an unsuccessful earlier call). The position is for 4 years (but some previous student members have stepped down after 2 years if they are no longer a student). There will be an online election where all current EASST members will be able to vote.

To learn more about the recent work of the Council and the opportunities and challenges ahead please read our out-going President's article in the latest EASST Review at <https://easst.net/article/easst-achievements-opportunities/>. A list of current council members can be found at <https://easst.net/about-easst/easst-council-members/> and the formal roles of the president and council are described in the EASST constitution <https://easst.net/about-easst/easst-constitution/>. You are welcome to contact the President or one of the existing Council members (emails on the website) for more information. Candidates need to be a current student member of EASST.

If you are interested in this position, please nominate yourself by sending an email to admin@easst.net providing a short statement (no more than 250 words) introducing yourself and saying why you are interested in standing for the Council and what skills and experiences you would bring to the role. This statement will be made available to those voting.

Nominations must be received by **Friday 13th January 2017**.

The election will open soon after nominations close and all members will be sent an email with details of how to vote.

A note from Márton Fabók

Dear fellow PhD students,

As the outgoing EASST student representative, I would like to encourage you to nominate yourself to become the student member of EASST Council.

The student representative is a full Council member. The EASST Council takes decisions collegially, and often subdivides tasks among members (see this and other issues of the EASST Review for our latest activities!), so it is more than just raising a voice for fellow postgrad students and early career researchers. There are generally two Council meetings a year; one is often adjoining the EASST conference. Council membership is voluntary work for the community, but travels to meetings and accommodation are fully reimbursed.

Personally, being a student rep was one of the best things during my PhD. It provided a unique perspective to understand how our STS community and generally academia across different national settings work. Coming from a non-STs department, this was a great way for me to be involved in the discipline. The nice and collegial atmosphere of the Council provides a very supportive environment, so it's really up to you how do you contribute to STS in Europe. For example, I have learnt a lot from the activities I was involved in, such as organising the postgraduate workshop before the biannual conference or revamping the EASST Fund. All in all, I fully recommend you to think about what you would do as a council member and to take a brave step to nominate yourself to the student rep position.

Please email me if you have any questions or have something to share at marton.fabok@gmail.com.

Márton Fabók

President:

Fred Steward (University of Westminster)

Council of the European Association for the Study of Science and Technology:**Elected members:**

Attila Bruni (University of Trento)

Marton Fabok (University of Liverpool, student representative)

Ignacio Farías (Technical University of Munich)

Maja Horst (University of Copenhagen)

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Vicky Singleton (Lancaster University)

Fred Steward, President (University of Westminster)

Estrid Sørensen (Ruhr-University Bochum)

Harro van Lente (University of Utrecht)

Co-opted members:

Salla Sariola (editor of *Science & Technology Studies*)

Ingmar Lippert (manager EASST Eurograd list)

Miquel Domenech (co-organizer 2016 4S/EASST conference)

Lucy Suchman (President of the *Society for Social Studies of Science*, ex-officio)

EASST's Past Presidents:

Christine Hine, 2005-2008; Sally Wyatt, 2000-2004; Rob Hagendijk, 1997-2000; Aant Elzinga, 1991-1997; Stuart Blume, 1987-1991; John Ziman, 1983-1986; Peter Weingart, 1982.

Member benefits:

EASST organizes a biennial conference and supports a number of "off-year" events such as workshops, PhD summer schools and national/regional STS meetings. Members are entitled to apply for EASST Network and EASST Event Funds and are offered reduced registration rates for the biennial EASST conference and many other EASST events.

EASST awards three biennial academic prizes for excellence in various aspects of community-building – the **Olga Amsterdamska award** for a creative collaboration in an edited book or special issue in the broad field of science and technology studies, the **Chris Freeman award** for a significant collective contribution to the interaction of science and technology studies with the study of innovation, and the **John Ziman award** for a significant innovative cooperation in a venture to promote public interaction with science and technology.

EASST publishes the *EASST Review* and offers member access to the journal *Science & Technology Studies*.