EASST
Review

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COVER ILLUSTRATION

Riot police on the campus of the University of Amsterdam after breaking up a student protest on 21 June. Credits: Folia / Toon Meijerink

EDITORIAL

EASST Review Editorial

Dear EASST Review readers,

The last two issues of EASST review have focused on the theme of Research Cultures. For this issue - the first of 2024 – the editorial team decided to be led by your concerns: earlier this year, we put out an open call inviting you to share your ideas with us. This has brought us pieces on topics that turned out to connect in surprising ways: among others we have a thoughtful contribution arguing for "liveable futures" instead of the often-heard talk of sustainability, by Anne Beaulieu and her team, a discussion of nuclear waste governance and how it points at a "democratic deficit" by Lee Towers, a dizzying (in a good sense) event report by Britta Acksel and colleagues, a piece by Tanja Bogusz et al. showing us why marine worlds matter to STS, and a reflection by Willemine Willems and colleagues on the possibility of science communication as theatrical dialogue.

We also mark the passing of Adele Clarke, with an In Memoriam by Isabel Fletcher, who reflects on Adele's work and activism centered around North-American medicine and women's reproductive health. Lastly, we have an update from the organizers of the upcoming 4S/EASST gathering in July, with some news about the conference and reflections on the challenges of accommodating so many STS-ers in one place!

We cannot consider livability, science-society dialogue, and democratic processes outside the current context of the war in/on Gaza, and the discussions it has raised across society as well as the academic landscape. As critical STS researchers, students, and educators, we cannot remain silent in light of the destruction of educational infrastructures and disregard for human lives, and must at the same time be aware of the effects it has had on revealing the cracks in our academic institutions. Indeed, in recent months the brittleness of academic freedom has been painfully laid bare, with student protest camps on campuses around Europe being violently removed and, in Germany, considerations by members of the Berlin Senate to re-introduce disciplinary expulsion for students expressing political opinions in universities (a measure originally developed to repress student movements in 1968). Furthermore, the German Minister of Education has explored ways to prosecute and cut the funding of academic staff who had signed a letter in solidarity with their demonstrating students. The impact that different initiatives are having in forcing universities – initially reluctant to do so – to take a position on the conflict show that academic communities are key actors in politics. We follow these developments with concern as we wish for our STS communities to offer spaces where dialogue, openness, and critical reflection are encouraged and not repressed.

Last but not least, we take this as an opportunity to proudly introduce our new editorial assistants (yes, two!) Paria Rezayi and Adam Dinsmore, who together have taken care of the copy editing of the contributions for this issue. Paria has a background in linguistics, focusing on academic writing, pragmatics and discourse analysis, while Adam is a PhD candidate at the University of York's Department of Sociology, studying the various ways that 'the elite' are constructed in political discourse.

We look forward to seeing you at the conference in Amsterdam next month, at what is promising to be the largest STS conference of all time. We plan to take

this opportunity to find out more from you, the readers, what you value about EASST Review, and what else we could be doing to improve on what we offer to the community already. The autumn issue will be dedicated to events at the conference, so if you wish to write something about the conference, do drop your friendly EASST Review editorial team a line with your ideas at easst@review.net. For those going, we wish you safe travels to Amsterdam.

The EASST Review editorial team

Jose Canada, Roos Hopman, Stefan Laser, Richard Tutton.

News from the Council

NEWS FROM THE COUNCIL

With 2024 being a conference year, the work of the Council has taken on a new level of intensity as we build towards the joint EASST/4S meeting, *Making and Doing Transformations* in Amsterdam in July. This is shaping up to be one of the largest STS conferences of all time. We can't wait to see you all again.

This year also marks a pivotal moment for EASST Council as we will be holding elections for seven Council membership positions. This includes two positions reserved for early career colleagues: one for someone no more than seven years post-PhD, and one for a current PhD student.

We will also be electing a new President for the Association this year, as Maja Horst has decided not to seek a second term. Maja has done a fantastic job of being President since 2022 but other commitments at her home institution mean that she is unable to continue in this role. We are confident that we speak for everyone in the wider EASST community, when we say thank you so much Maja for all that you have done.

At the general meeting to be held during the conference on Wednesday 17 July, 1330-1500, we will be initiating a nomination process for colleagues who are interested in joining the Council. Elections will take place online in the autumn with newly elected members taking up their positions at the start of 2025. We strongly encourage suitable candidates from all parts of Europe to consider joining, and members of Council would be more than happy to talk to you about what is involved.

The general meeting will also provide an important opportunity for all EASST members to learn about the decisions made by Council, to hear updates from editors at *EASST Review* and *Science & Technology Studies* journal, a financial report from the treasurer, and to express your views about future initiatives.

Council wants to use the occasion of this conference to talk about the future of conferences more widely, building on conversations that have already taken place. To this end, we have secured a time in the programme on Wednesday 17 July at 17.15 (see the programme for venue details). We hope that you can join us at that time and contribute to building a sustainable future for our academic conferences.

Last, but not least, we will also be recognizing and celebrating the achievements of scholars in our field at the conference, in a joint awards ceremony with 4S on Thursday 18 July at 15.00. You can learn more about the winners of the EASST Awards on the following pages.

See you in Amsterdam!

EASST Council: Sarah Rose Bieszczad, Andrea Núñez Casal, Michela Cozza (Secretary), Maja Horst (President), Nina Klimburg-Witjes, Sarah de Rijcke (Treasurer), Antti Edward Silvast, Brice Laurent, Richard Tutton, and Assunta Viteritti.

EASST Awards 2024

Amsterdamska Award 2024

EASST received 6 nominations for the 2024 Amsterdamska Award. After careful consideration, the Award is granted to:

John Nott (The University of Edinburgh) and **Anna Harris** (Maastricht University)

for the edited collection *Making Sense of Medicine: Material Culture and the Reproduction of Medical Knowledge*, published by Intellect Books in 2022**.**

Committee's comments

The outstanding edited collection is an original exploration into the materiality of medical knowledge reproduction. The book's creative structure, with interconnected nodes that bear links to multiple topics and concepts surfacing in different materials and chapters, sets it apart from more traditional edited collections. The book goes beyond what is expected from good-quality edited volumes in that it brings together various perspectives and uses various illustrations, all in a productive manner. It promises to be useful for a large public in STS and beyond.

Freeman Award 2024

EASST received 5 nominations for the 2024 Freeman Award. After careful consideration, the Award is granted to:

Andreas Birkbak (Roskilde University) and **Irina Papazu** (IT University of Copenhagen) for the edited book *Democratic Situations*, published by Mattering Press in 2022.

Committee's comments

This year - 2024 - has been marked out a singularly significant year for democracies across the world as so many important elections will take place, which are likely to shape the course of the rest of the decade. Democratic Situations makes a timely contribution by its exploration of the relationship between STS thought and democracy. The book looks anew at how ideas from political theory have come into STS circles and how STS topics are now so central to political debates.

Ziman Prize 2024

EASST received 11 candidates for the Ziman Prize. After careful consideration, the Award is granted to:

the core team of the CreaTures (Creative Practice for Transformational Futures) project,

from Aalto University, **Tuuli Mattelmäki** (Principal Investigator/coordinator), **Andrea Botero**, **Markéta Dolejšová** (lead on our laboratory), **Julia Lohmann, Kirsi Hakio, Gaurika Singhal, Savannah Vize, Namkyu Chun, Jarkko Mutanen** (project manager);

from University of Sussex, **Ann Light** (lead on research gathering and analysis), **Lara Houston, Kit Braybrooke**; from RMIT University, **Jaz Hee-jeong Choi** (lead on engagement), **Cristina Ampatzidou, Ralph Horne**;

from Utrecht University, **Joost Vervoort** (lead on evaluation), **Lucas Rutting**;

from Superflux (creative partner), **Anab Jain, Jon Arden, Nicola Ferrao**;

from Kersnikova (creative partner), **Jana Putrle Srdić, Simon Gmajner, Sandra Sajovic, Jurij Krpan, Klemen Kristan**;

from Hellon (creative partner), **Kirsikka Vaajakallio**;

from Zemos98 (creative partner), **Felipe Gonzáles Gil, Rosalía Gutiérrez**;

from Furtherfield (creative partner), **Ruth Catlow, Charlotte Frost**;

from OKFI (NGO partner), **Tarmo Tokkanen, Teemu Ropponen, Susanna Ånäs**;

from Sniffer (NGO partner), **Ruth Wolstenholme, Iryna Zamuruieva**.

Committee's comments

CreaTures is a large-scale project with multiple public engagements spanning the EU but also reaching into the Global South (Colombia). Focused on transformational futures, a wide variety of research activities and initiatives are developed and undertaken with the aim of facilitating links across groups who would otherwise remain disconnected; enabling new and creative ways of thinking about prospective futures; and developing timely strategies towards emergent social and environmental crises.

IN MEMORIAM

Adele Clarke, 1946 - 2024

by Isabel Fletcher

Adele Clarke, feminist science and technology studies (STS) scholar and women's health activist, died on January 19, 2024 in San Francisco at the age of 78. In the course of a long and distinguished career, Clarke made important contributions to feminist STS, the history and sociology of medicine and qualitative research methods. In recognition of this impressive body of work, she received the 2012 Bernal Prize for Outstanding Contributions from the Society for Social Studies of Science.

Introduction

Like many people I came to Adele's work through reading what is probably her best-known publication *Disciplining Reproduction: American Life Scientists and the 'Problem of Sex'*. This prize-winning book, based on her PhD research, was an important milestone in both the history of medicine and the social study of reproduction. I read it as a Master's student in STS and, although I do not work on reproduction, I found it an exemplary account of the growth of a new disciplinary specialism.

I never met Adele in person but did briefly collaborate with her when I was asked to interview her for a series of interviews with founding figures in STS developed by colleagues at the University of Edinburgh (Mazanderani et al., 2018). As I have written elsewhere this was important to me because it combined my academic interests in the history of twentieth century medicine with my feminist politics (Fletcher and Clarke, 2018: 236-7). Throughout this process, I found Adele to be a generous and patient collaborator who, whilst being careful to maintain her high standards, was also very approachable and willing to take considerable time to share her experience and knowledge with a novice researcher.

Studying science technology and medicine with rigour

Adele came to academia from a background in women's health activism, and this shaped her career in important ways. She described her central research interest as 'STS-inspired reproduction studies' and with a range of collaborators she published on topics such as pap smears, RU486 (Mifepristone) and clitoral anatomy, as well as contributing to the women's self-help manual Our Bodies, Ourselves. She insisted on the importance of the social study of medicine – preferring the name science technology and medicine studies (ST&MS) rather than STS – because it is both an area of practice that has become increasing dominated by science and technology, and also the place where most people encounter it in their everyday lives. Her understanding of the importance of technoscience in American medicine was formalised in concept of 'biomedicalization' (Clarke et al, 2010). This concept was an important and influential account of the major changes that have taken place in the constitution, organisation, and practices of contemporary biomedicine since the mid-1980s.

Adele saw herself as rooted in STS, but she had issues with conventional accounts

of the field. The segregation she saw between feminist STS and other forms of STS worried her, as did the absence of academics of colour. For her, STS is part of a progressive political project of 'imagining alternative and better worlds' (Fletcher and Clarke, 2018: 239). Analysing interactions between science, technology and gender – and later race, post-coloniality and indigeneity – is a key element of this project as it allows us to understand how science and technology travel and are adapted in different contexts.

Acting on her convictions, Adele was involved in what we would now describe as initiatives to decolonise STS, first by increasing the participation of scholars of colour in the 2001 Society for the Social Study of Science conference and secondly by supporting the establishment of the journal East Asian Science, Technology and Society. When we spoke, in 2016, she was enthusiastic about the development of scholarship in Asia and South America, and predicting that Africa would be the next important site of innovation in STS.

Finally, Adele was also an expert in research methods. Her PhD supervisor, the sociologist Anselm Strauss, developed Grounded Theory and, through her further development of these methods into an approach, Adele labelled Situational Analysis, she later contributed significantly to interactionist sociological methods (Clarke, 2005; Clarke et al. 2017). Adele's methods expertise meant that she was deeply concerned with the rigour of social science research and argued for better training in STS for new entrants to the field, especially in its key "theory-methods packages" (Fletcher and Clarke, 2018: 230-1) in order to maintain this rigour.

A WELL-LOVED COLLABORATOR AND COLLEAGUE

As well as her choice of research topics and innovative teaching, Adele's activism also influenced how she conducted research. Throughout her career she worked with a wide range of collaborators. She clearly enjoyed the process of collaborating and valued the relationships it sustained: throughout our interview she was careful to acknowledge her co-authors, colleagues and those who had inspired her work (Fletcher and Clarke, 2018). Through her mentoring of many less-established colleagues, Adele has also created a network that is well-placed to take forward the approaches that she pioneered in post-colonial STS and beyond.

Whilst writing this piece, I read obituaries describing Adele's 'refreshingly nonlinear' career (Caspar, 2024), but also some very moving shorter online in memoriam messages from academics at all stages of their careers as well as those from outside academia (ForeverMissed, 2024). All these accounts show how Adele was highly valued as a colleague, mentor and friend. All the communities she belonged to have lost an important and loved member who will be hugely missed, even by those of us who only knew her briefly.

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Isabel Fletcher is a qualitative social scientist whose research is based in science technology and innovation studies, but also incorporates approaches from sociology, food policy and inter- and transdisciplinary research. She has two main research interests: 1) interactions between food system actors (policymakers and industry) and nutrition research and the effects of these interactions on everyday eating, and 2) the ways in which interdisciplinary research is used to address complex social problems, such as unhealthy diets, or the negative environmental impact of food production.

Isabel is currently co-investigator on the UKRI- funded TRAnsforming the DEbate about livestock systems transformation (TRADE) project (PI Professor Dominic Moran, UoE Global Academy of Agriculture and Food Systems). She also leads the Policy Unit of the Wellcome-funded Living Good Food Nation Lab project (PI Prof Mary Brennan, UoE Business School). Finally, she co-convenes the Food Researchers in Edinburgh (FRIED) research network and organises its online seminar series.

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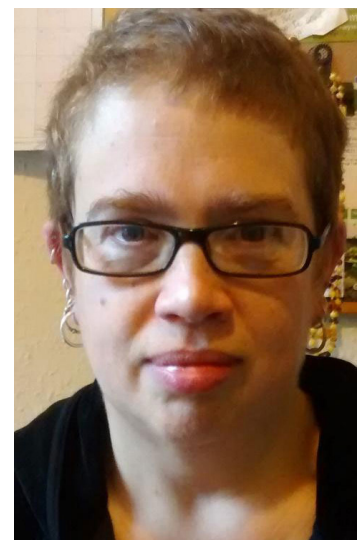
STS Events

EASST-4S 2024 CONFERENCE UPDATE:
MAKING, DOING & TRANSFORMING

by Teun Zuiderent-Jerak, Michiel van Oudheusden, and Evelien de Hoop on behalf of the EASST-4S conference committee.

We used to feel that we belonged to a small, somewhat marginal field at the fringes of academia. Mostly overshadowed by the dominance of the life sciences, technologies, and medicines we studied, we thought of ourselves as bugs, parasites, and/or idiots. With the help of Serres, Deleuze and Stengers we felt relatively comfortable at these margins, but then abstract submissions closed for this year's quadrennial EASST-4S conference. It turns out that more people want to present their work at this year's conference than a large Dutch university is able to host! Over the last few months we have been puzzled, inspired, surprised, and occasionally overloaded by the breadth and quality of your submissions. We have come to realize that STS no longer matches the self-image it grew up with. We may still feel like bugs, parasites, or idiots looking for frictions within our fields

of study, but it is clear that STS has grown expansively. This multitude certainly poses organizational challenges. However, it is also a cause for celebration that would not have come together without decades of valuable intellectual-institutional work.

One of the pleasures of serving on an EASST-4S conference committee is the chance to read through so many wonderful abstracts. After this year's review process, we are already excited about the conversations that will take place in Amsterdam in July. We want to thank all program committee members for their work over the past few months, which involved reviewing open and closed panel submissions, as well as proposals for workshops and roundtables. We also wish to thank the Making & Doing committee for reviewing the enormously creative submissions to the program, and the open panel convenors who did much of the evaluation work for individual abstracts – a difficult task, given the quality of submissions. We hope that this collective academic labor will ensure that this year's EASST-4S is a truly collective effort curated by scholars from across the field. Finally, we want to thank all who submitted abstracts for your patience. If your abstract could not be included, we ask for your understanding.

New additions

For the STS Making & Doing program alone, we are glad we could accept a record of close to ninety submissions. This includes twelve film contributions to be screened at the Vrije Universiteit's on-campus cinema. To add to the vibrancy and sense of collective coming together, we are also organizing a Forest Festival event on Thursday afternoon/evening in the Amsterdam city forest (Amsterdamse Bos) a short walk (or bike ride) from the university. A complementary ticket for this event is included in your registration. Be prepared to discover some Dutch STS treasures along the route.

Artist's impression of the EASST-4S Forest Festival in the Amsterdamse Bos. Image: Chaos Art

A collective effort and experience

The program will be staggered to avoid overuse of toilets, elevators, stairs and coffee spots. This means sessions will not all start and end at the same time. This is one of several changes we have had to make to accommodate the increased number of participants. Whether the increased size of the conference contributes positively to the experience will strongly depend on our ability to mobilize collective intelligence and wisdom. Fortunately, there are many ways of doing so, and many scholars in the field have been kind enough to lend us their valuable experience. There will be early morning academic coaching sessions on Presenting and Connecting at Academic Conferences. There will also be plenty of meet-ups on

specific STS topics and sub-fields, to ensure that all nodes within the conference network get the chance to discuss their interests in depth. We will post short videos each morning to the conference website, in conference rooms, and on social media to share our impressions of the previous day. We hope these will make the event feel like both an individual and collective experience. If you have further thoughts on how to strengthen the community feel do not hesitate to let us know at conference@easst4s2024.net.

A key challenge for this year's committee has been to maintain the spirit that made us feel so at home in STS when we were starting out, for which we call on all your support. Collectively, we hope to transform ideas about what an academic conference can be, and to nurture a sense of community and inclusion in the field now and for years to come.

VOLUNTEERING

One way that you can contribute is to join our wonderful team of volunteers. Information regarding volunteer registration is available on the conference website (go to: https://www.easst4s2024.net/volunteer-info/). With just a few weeks to go, the joy of anticipation is picking up, and Amsterdam's weather gods seem to be saving all the good weather for July!

Teun Zuiderent-Jerak, Michiel van Oudheusden, and Evelien de Hoop on behalf of the EASST-4S conference committee.

Beyond fun: Experiments in epistemic dizziness

by Britta Acksel, Jonna Josties, and Maxime Le Calvé

Event: Epistemic Dizziness. Science & Technology Studies Movement Workshop
Location: Excellence Cluster: Matters of Activity, Humboldt University of Berlin
27. - 29. September 2023

Introduction

What if we take dizziness not as a threat to orientation but as a means for epistemic enhancement? In our EASST-supported STS Movement workshop in Berlin, guests and contributors from across Europe dived into this question by sharing knowledge and embodied inquiries that deal with various experiences of dizziness— doctors in intensive stations, sailors on ships, and early career STS researchers in concept whirlwinds. The workshop built on a one-and-a-half-year project that sought to connect STS research to an experimental notion and approach: epistemic dizziness.

1. Encountering Epistemic Dizziness

Figure 1: Balancing exercise to train for dizzying times by Anderwald & Grond. Digital field note, Maxime Le Calvé, 2023.

In a quiet moment of the workshop, participants find themselves standing in a circle, each person balancing on one leg with their eyes closed (Fig. 1). Under the guidance of Ruth Anderwald, the room fills with a sense of focused concentration. This exercise, a balance training technique borrowed from a psychobiologist who trains astronauts to enhance their inner ear functions, metaphorically encapsulates our exploration of dizziness—not merely as a physical sensation but as an epistemic tool. Here, we go beyond negative connotations with disorientation to understand dizziness as the discomfort provoked by an unpredictable motion or contradictory sensory input. Dizziness can also be a source of enjoyment and play: as Caillois (1961) noted, a whole category of games features vertigo-inducing activities, to which he gave the poetic name 'ilinx'. We were here to explore this phenomenon, and the conditions under which dizziness can become an affirmative experience, not only through its physiological and sensory impacts, but also through its implications for emotions, orientation, and epistemic processes.

We aimed to harness the disorienting yet enlightening potential of dizziness to open up a deeper engagement with our perceptions and understandings of the world around us. Attendees experimented with the sensation of dizziness as part of a broader discussion on the challenging dynamics between body, mind, and environment in knowledge producing activities. This embodied exploration gave participants a richer grasp of the various ways we navigate and conceptualize our continuously shifting reality.

In particular, we wanted to underscore how disorienting spaces can reshape our practices as STS researchers, foster relational networks, and influence public participation in technoscience. We invited a group of colleagues who had already joined us on this adventure at a previous panel to explore the potential of experimental transdisciplinary practices alongside the artist researcher duo Anderwald+Grond, the biologist and social anthropologist César Giraldo Herrera, and the anthropologist and performance studies scholar Joe Dumit.

This article elaborates on the notion of epistemic dizziness, and shares insights drawn from the various positions presented during the panel and the workshop, as well as the exercises that we engaged with.

2. EXPLORING EPISTEMIC DIZZINESS

In 2022, Latour and Schultz presented a sociological diagnosis of "our times" in their book "On the Emergence of an Ecological Class." In a nutshell, they conclude that our position is especially challenging because we find ourselves uncertain about what to engage with, especially when we attempt to define our place in the world (Latour & Schultz 2022). As anthropologist Anna Tsing (2018) reflected in an earlier paper — academics working in science and technology studies learn, research and teach in "terrifying times." Our questions are difficult and ambivalent, and can seem even more complicated due to the competitive proliferation of metaphors and concepts among STS scholars. In short, becoming an STS scholar often means experiencing epistemic dizziness.

The notion of epistemic dizziness applies to those moments when research causes feelings of conceptual vertigo in researchers. Feminist STS literature was early to emphasize optimistic assessments and the necessity of "staying with the trouble" (Haraway 2016), or of sticking with "disconcertment" (Verran 2001). A related concept is "epistemic dissonance," which holds that combinations of distinct epistemic positions are only productive if they generate disruptive, "dissonant" moments (Farías 2015, 273). Similarly, we propose epistemic dizziness as a reassessment of challenging moments in the production of knowledge. We want to emphasize that instances of uncertainty can be affirmative moments, if approached and supported in the right way. As ethnographers, historians, and philosophers rolled into one, STS scholars are aware that the means to turn epistemic dizziness into a generative space for thought (Bachelard 2021) are present in many other knowledge worlds.

We organized a panel and then a workshop to explore practices developed across these domains to care for dizziness, rather than avoid it. Our invited speakers have addressed this topic in their work from various anthropological and artistic research perspectives. Biologist and anthropologist César Giraldo Herrera presented his field research among seafarers. Through his lecture and mirror exercises, we learned about the interplay of different body rhythms. The body rhythms associated with being on a ship coordinate in a way that makes it possible to move through the novel environment (Giraldo Herrera 2024). Bodily rhythms thus interact with the rhythms of other organisms (in the sometimes surprisingly poetic language of biology, these are called processes of polyrhythmic alternation). According to an ecological theory of perception, dizziness or nausea arise from disturbances to body rhythms. These rhythmic disturbances can be coped with through a range of bodily practices, which are often ways to move *with* the environment. However, even seasoned seafarers experience sea sickness, and this sensation becomes part of the landscape of their familiar sensorial existence.

Ruth Anderwald and Leonhard Grond have been exploring the complex nature of dizziness for a decade. Their lecture, "The Compossible Space of Dizziness: Wonder and Curiosity on Unstable Grounds" presented dizziness as an unpredictable or illusory motion experienced physically by individuals (Fig. 2). This artistic research, developed in and through multidisciplinary confrontations and cooperations (Feyertag, Grond, Anderwald 2020), examines dizziness as a multifaceted phenomenon that encompasses physiological and sensory experiences, as well as emotional responses, orientation challenges, and processes of understanding and knowledge formation. The notion of "compossible space" denotes the space for change and renewal created by dizziness through decomposition of the given. Their work integrates somaesthetics, somatic learning, and contributions from other contemporary artists. Taken together, these approaches illuminate the dynamic and generative possibilities of dizziness, highlighting its role in fostering creativity and exploration.

Figure 2: Ruth Anderwald and Leonard Grond lecturing at the ExC "Matters of Activity" Dizziness –A Resource. Digital field note, Maxime Le Calvé, 2023.

3. Exercising Epistemic Dizziness

In several influential papers and chapters on pedagogies in the STS classroom, Joe Dumit has suggested that knowledge from artistic practices, including Deleuzian takes on experiential cinema and perception (Dumit 2014) and the use of improvisation manuals to develop choreographic scores, engages students in radically stimulating learning environments (Dumit 2017). This approach to knowledge making in STS is also championed by the sociologist John Law, who has suggested that the critical reflexivity gained by science studies should be applied to embodied and theatrical forms of knowledge making – a thread that has found its culmination with his pioneering text on the Baroque as a mode of knowing (Law 2016). Joe's lecture prompted us to ask two questions: How can scores and mind-body exercises help theoreticians and ethnographers to transform anxieties into livable public spaces? And how can we make room for discomfort as a catalyst for inventiveness in STS practices?

Joe Dumit is, among other things, known for his work on movement and performativity. We had him beamed from California to Berlin to guide us through some of his current research practices. He gave us instructions on how to perceive the world around us from an anti-ableist perspective. We had prepared sticks of willow for participants to use as perceptive devices. Joe asked us to alternate between talking sessions and "touching" sessions using the sticks. After this exhilarating task, we sat and drew our experiences on large sheets of paper (Fig. 3). This playful approach highlighted the performative flow between making and speaking, which can make us more sensitive to the world and to others by displacing the illusion that things are similar for all of us. Joe's score disrupted the idea that the most important parts of our scholarly interactions rely on words.

Overall, the exercises encouraged reflection and questions, but also provided an open space in which participants became more attentive to their own bodies. A joyful atmosphere took hold of the group and was sustained over the course of two days – one participant told us afterward he had never laughed so much at an academic event (and that the "sticks" exercise had a lot to do with it).

Now that we were attuned to an affirmative perspective on epistemic dizziness, the editorial part of the workshop provided an opportunity to go deeper into each other's field work and research experience. As we discussed each participant's written work, we reflected on our unease and took inspiration from others facing analogous vertigoes. These reflections required courage but also prompted humor. We considered technology researchers learning to juggle ecological futures and greenwashing (Matthew Eisler), and the grand claims of startup entrepreneurs (Jonna Josties); neurosurgeons learning to cut into brains while ethnographers learn to sketch their way through highly technical terrains (Maxime Le Calvé); curators delving into topics of life and death who need to dismantle their experiments as their contracts end (Martin Grünfeld); and social scientists confronting their parents' notions of imperialism on a field trip "back home" (Efe Cengiz).

Figure 3: Drawing session on sensing with sticks led from California by Joe Dumit. Screen shot from Zoom.

CONCLUSION

Dizziness is not always fun, but our workshop showed that willingly (and playfully) engaging with it can transform the research practices of STS practitioners. Speaking about epistemic dizziness allowed us to reckon with the overwhelming experience of navigating STS in disorienting times – and prevent feelings of resignation. That does not necessarily mean developing more concepts to add to the pile (and possibly to our sense of vertigo). On the contrary, our approach is an invitation to recognize, reflect, and take in the richness, diversity, and scope of the knowledge that has already been accumulated by STS over the years. This may simply involve slowing down, taking a step back, or even pausing, so as to better dive into the dizzying scenes that constitute our research objects. This dimension of learning is too often undervalued. As STS scholars, it is our job to acknowledge and make visible the troubling fun of being overwhelmed, and the diffracted seeing that emerges from looking our dizziness straight in the face. This is not fun for its own sake, but rather something like the "serious fun" advocated by Donna Haraway, that opens fresh perspectives on familiar problems and whets conceptual creativity.

ACKNOWLEDGMENTS

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STS Live

Democratic Deficit of the Nuclear

by Lee Towers

Introduction: Democracy - thin or thick?

Liberal representative democracies, as seen throughout Europe and other parts of the Global North, have been critiqued by deliberative democrats and STS researchers for both general and specific reasons. Generally, Dryzek (2000; 2013) claims liberal democracy is 'thin' with respect to who participates, the scope of the issues it allows to be deliberated, and its overall authenticity or substantive outcome of the processes. More specifically, STS critiques have long argued that there should be greater participative deliberation over technoscience issues. For instance, Collingridge's (1980) thesis on the dilemma or difficulties of controlling technology argued that risks and problems were hard to predict for emergent technologies, while for more established technologies control becomes more costly and slow. Additionally, we have the inertia and lock-in problems of established technologies, which include adjacent infrastructure, educational programmes, and the general power dynamics of incumbent technological systems (Unruh 2000). Thus, whether emergent or established, there is a clear case for early and ongoing deliberation among those most impacted by technological systems (Genus & Sterling 2018; Cotton 2017). Finally, on waste specifically, STS scholars also explore questions of injustice pertinent to this essay. For instance, Hecht (Interviewed by Gille et al 2022) frames waste as residual, and examines what it means to govern residuals, why this governance often comes after the fact, and how this governance treats particular people and places as residual, or as waste.

In STS literature, waste has long been seen as fundamentally ambivalent or 'quintessentially indeterminate.' Indeed the field has often held 'multiple, apparently incommensurate values simultaneously' with respect to waste (Alexander & O'Hare, p. 419). A paradox here is that different epistemological approaches foreground or obscure certain aspects of waste, thus in a sense laying waste to knowledge itself. This ties knowledge to waste, knowing and unknowing, ignorance and occlusion (Alexander & O'Hare 2020) and thus Foucault's classic power/knowledge dialectic. This essay focuses on the nuclear, which has these waste/resource indeterminacy and power/knowledge dynamics through and through. The next section will consider nuclear waste/s and the knowing and unknowing aspects that surround these waste/s. I then consider the democratic elements of the UK's current approach to dangerous nuclear waste. Finally, I question why democratic processes are concentrated at this residual end of the nuclear, rather than the energy supply side. I contend that, if our democratic choices are limited to reactions to unfortunate consequences, this suggests a democratic deficit.

Un/knowing Nuclear Waste/s

The nuclear creates waste at both ends of its cycle – namely the *uranium fuel* and *energy production* ends – and at many points in-between (see Figure 1). However, as Hecht (2018; 2012) argues, the uranium end is obscured from view in the Global North, thanks to a colonial distribution of benefits and costs. For example, uranium mining has had devastating effects on colonised populations of Gabon (Hecht 2018) and the Navajo Nation (Voyles 2015). However, these impacts are largely absent from nuclear discourse in the Global North. They can thus be seen as processes of *unknowing* that obscure waste processes and impacts (Alexander & O'Hare 2020; Hecht 2012).

Mining

Choices about open-pit versus underground mining in Africa depended on the grade of the ore, the geology and extent of the deposit, and the costs of production in a given area.

Waste products

Waste rock was often left in large piles or used in building and road construction.

CRUSHED ORE

Milling and Refining

After crushing, a series of chemical processes turned raw ore into a form of uranium oxide, known as yellow-cake because of its color. Mills were located at the mine site; often yellowcake plants were too.

YELLOW CAKE IN 55 GAL DRUMS

Known as tailings, waste chemicals and materials were often processed into sludge. Disposal ranged from lined, sealed tailings ponds (best practice, but quite rare) to open-air piles or direct dumping into rivers.

Conversion

Plants in Europe and North America converted yellowcake to uranium tetrafluoride (UF_4) and hexafluoride (UF_6) gas in preparation for enrichment.

UF_6 IN STEEL CYLINDERS

Enrichment

Plants in Europe and North America enriched UF_6 to increase the proportion of fissionable uranium (^{235}U) in the fuel. Commercial reactors require 3-5% ^{235}U while bombs require 90% ^{235}U.

Weapons

Highly enriched uranium was used for the manufacture of atomic bombs.

Energy

Low-enriched uranium was pressed into fuel pellets or rods for use in reactors.
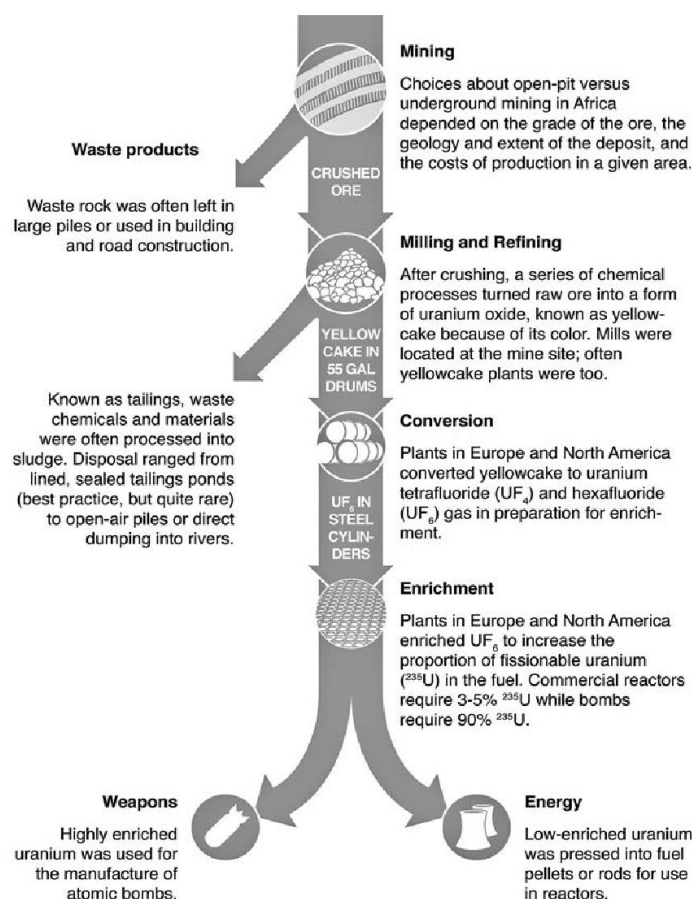
Figure 1: The Uranium Fuel Chain (Hecht 2012, p. 59).

At the other end of the nuclear cycle, our notions of waste are mediated by quite different processes of knowing and unknowing. Geological disposal facilities (GDF) are the conventional solution to waste produced at the nuclear's energy-production end. GDF's sit around 500 metres below the surface of the earth, where they contain/dispose of highly radioactive waste for up to 200,000 years. These subterranean facilities are thus crucial sites of knowing/unknowing about nuclear waste. Until 2019, the World Nuclear Association (WNA) considered GDF's to have been 'proven safe' (Ramana 2020). This assessment was downgraded in 2024, when the WNA declared that GDF's were now 'widely agreed to be the best solution for the final disposal of most radioactive waste' (WNA 2024). Nuclear waste management organisations in the UK and Finland agree (NWS N/D; Posiva 2023).

There are three aspects of knowing/unknowing regarding GDF's. The first is temporal – we cannot accurately model the social and environmental systems with which GDF's interact over a 200,000 year timescale (Vehmas et al 2023; Ramana 2020). Second, in the act of burying something there is an aspect of forgetting or putting the buried thing out of sight and mind (Skrimshire 2018). Third, it is not clear how we might communicate the dangers of GDF's over such a time scale, and to whom the message would be addressed. As a confession/warning to the peoples of the distant future? Or an injunction to the peoples of the present to stop creating this dangerous waste (Skrimshire 2018; Hecht 2018)?

Moreover, the categories governments use to represent the dangers posed by nuclear waste are ambivalent. 'Low-level', 'intermediate-level' and 'high-level' nuclear wastes are typically distinguished by their level of radioactivity. However, grey areas exist between different states' use of these categories, and between the component parts of certain types of nuclear waste. As Parrote (2021) points out, naming and classifying waste is not a neutral activity. Rather, they are acts

of power/knowledge that inform decisions about who works with certain wastes, and what is proper to remember. These processes are always iterative, and some classification systems lack the specificity needed to categorise some of the objects to which they are applied. Parrote (2021) describes four categories of waste used by the Canadian authorities. France has six. Belgium has three. Each state thus deals with the problem of classification in their own way. Further, the International Atomic Energy Association (IAEA) had four categories from 1970-1994, then six from 1994-2009, before adopting an intentionally fuzzy set of categories in the years since. The main problem for Parrote (2021) is that these inherently socio-political systems are typically compiled via technocratic, top-down processes with little recourse to open democratic deliberation.
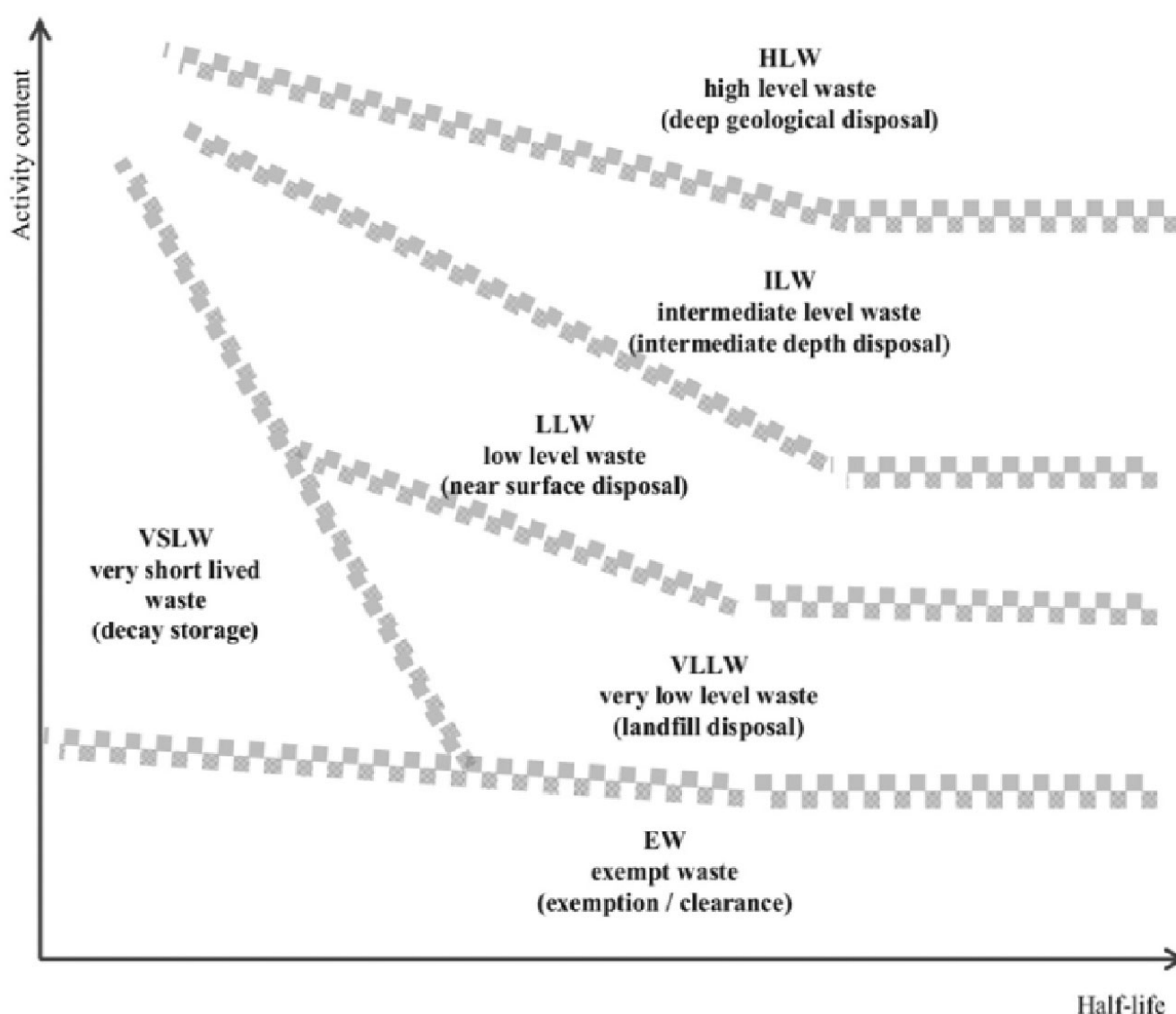

Figure 2: Various categories of nuclear waste and their associated 'solutions' (Parrote 2021, p. 8).

Then there is the special case of nuclear fuel and plutonium. Management of fuel and plutonium wastes falls in a grey zone, which has prompted the UK Government to hedge their bets. Although they claim that 'some radioactive' resources are 'not currently classified as waste' this might change in the future. Materials such as spent fuel, plutonium and uranium may then be stored in GDF's at some future date (BEIS 2018, p. 12). Within the nuclear industry, the wisdom of this wait-and-see policy has been questioned on grounds of cost, technical feasibility, and safety (von Hirschhausen 2022). Hyatt (2017; 2020) points out that

reprocessing of spent fuel from reactors seemed to make economic sense in the 1960s, because of concerns over the price/availability of uranium and fossil fuels at the time. However, changes in both the price and availability of uranium, and the problematic spent fuel from Magnox reactors, have since compromised this assessment. Unfortunately, the UK has stockpiled the world's largest store of this particularly problematic material over many decades, currently holding a massive 140 tonnes of plutonium (almost twice as much as France, which has a much larger nuclear sector). Hyatt (2017) therefore suggests a dual track policy that would see the UK begin disposing of the plutonium produced by their nuclear sector, along with other adjacent materials that are not converted into fuel. Underlying all these calculations is the clear 'use' value of radioactive materials for nuclear weapons, either by states or as the so-called 'dirty bombs[1]' said to be desired by non-state actors. Thus, for many theorists in this space, waste plutonium is a threat to the social good of peace (Von Hippel et al 2019; Winner 1980).

THE DEMOCRATIC ELEMENTS OF THE UK'S NUCLEAR WASTE POLICY

Finally, we have the process and politics of nuclear waste disposal. On the surface, these are highly democratic compared to other mega-projects that cost more than £1 billion. However, this is arguably only because of the failure *internationally* of so-called 'decide-announce-defend' (DAD) nuclear waste solutions, which are typically imposed on unwilling communities by nuclear experts with government backing (Cotton 2017). Nevertheless, in Canada, the USA, the UK, Sweden and France there are a variety of deliberative processes that are clearly irritating some within the industry. For instance, the former head of Finnish nuclear waste safety was reported to have said the only remaining task was to spell out the safety case to 'the less intelligent' (Ialenti 2020). Similarly, a senior industry actor recently claimed the sector had 'let too much democracy get in, adding that 'more rational' decision making would require 'hacking this nonsense' out of the way (Lehtonen (2022). Both of these claims allude to processes of knowing/unknowing. The Finnish statement is a classic if insulting formulation of the deficit model of public understanding, which frames the public as an undifferentiated and ignorant 'empty vessel' that needs simply to be 'filled up' with information about the issue. Likewise, the second statement dismisses the public good of democracy, and thereby reveals the other end of the deficit model – the democratic deficit that results from scientists and technocrats imposing 'rational' and 'objective' decisions on the apparently ignorant masses. Those of us interested in such wild notions as justice or democracy may be reassured by the irritation evident in these statements.

My research on intergenerational justice in the context of the UK's nuclear waste began in late 2022. From the start, this involved expert interviews with pro, neutral and anti-nuclear experts, and a deliberative workshop with young people. It also included extensive documentary analysis and three national case studies on the UK, Canada and Finland. The UK's search for a GDF appears to be a fairly democratic process, certainly in comparison to Finland - the state that is the closest to opening a GDF. In the UK, a test of public support (likely a referendum) is a stipulated part of the process (BEIS 2018), but authorities in Finland have ignored calls for a local referendum on the siting of a GDF (Vilhunen et al 2022). Nevertheless, nuclear waste policy in the UK, like other deliberative processes, continues to exclude a particular group – children and young people. I argue that this is wrong for practical and normative reasons. Practically, the GDF is an intergenerational project expected to take around 175 years to complete. This means today's children (and their children) will be managing (or opposing) this infrastructure in the future. Normatively, today's children and future generations gain little or no benefit from the military and civil nuclear programmes that create the vast majority of nuclear waste. However, these children will be affected by any unexpected impacts or

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1 I am not sure why the nuclear weapons of states are not also considered 'dirty,' as they tend to be more powerful and toxic.

accidents (as happened in the USA's nuclear waste facility in New Mexico), and by the ongoing and inflating costs associated with nuclear waste management in the future. There are therefore strong practical and ethical cases for involving children and young people in deliberation over things that will impact them more than current adults. This involvement could be facilitated by lowering voting ages in whatever test of public support ultimately takes place. However, there is a broader issue that undermines both the UK's search for nuclear waste solutions, and the Government's claims (BEIS 2018) that this search constitutes a properly democratic process.

A Democratic Deficit of the Nuclear?

Any energy source has an upstream end concerned with supply and production, and a downstream end concerned with consumption and waste. In Figure 3, the upstream end of the nuclear is represented by the blue and red boxes, which depict the mining of uranium and the operating of the reactor. The downstream end involves the energy consumed by the reactor and the processes of storage and disposal of waste, depicted in the brown boxes.

Democratic deliberation tends to be concentrated at the downstream end of the

Nuclear fuel cycle
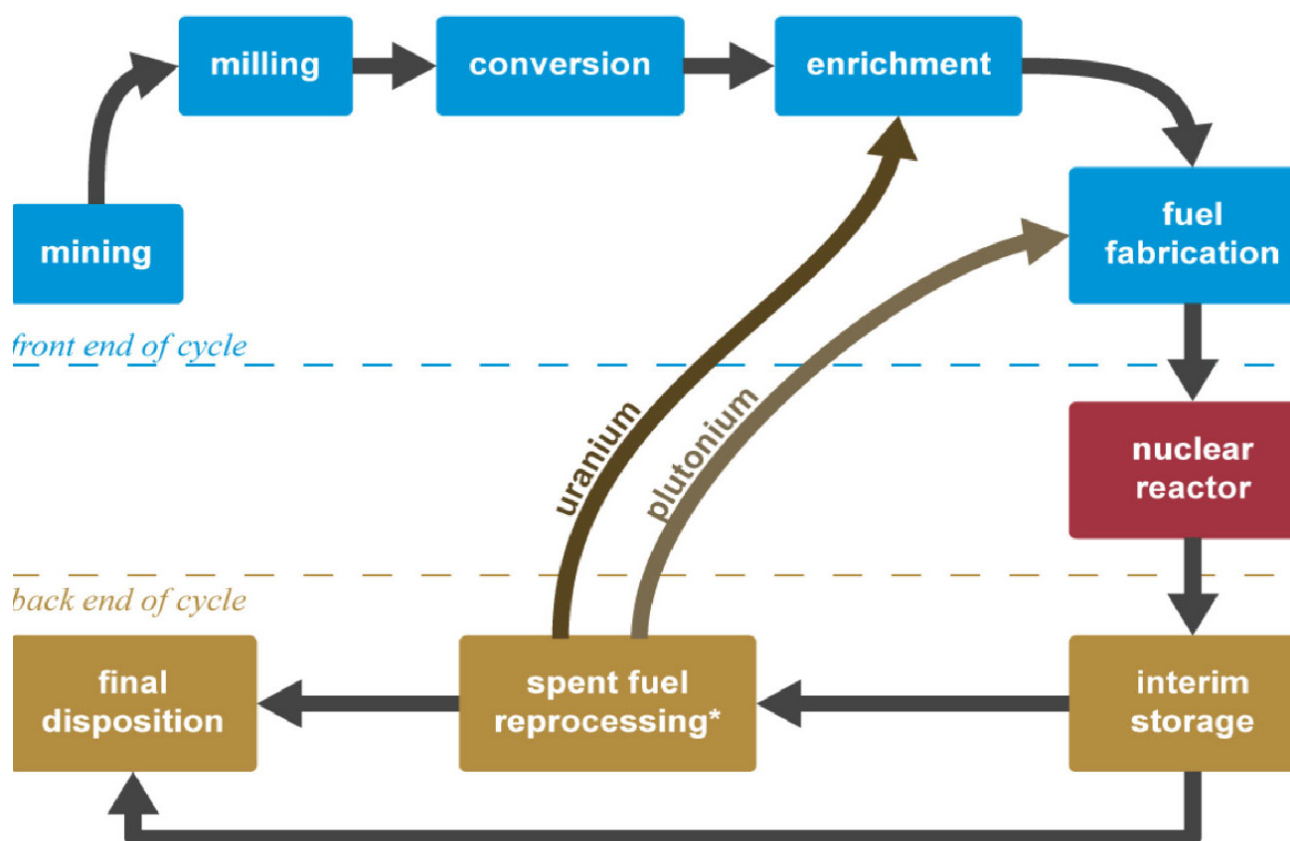
Spent fuel reprocessing is omitted from the cycle in most countries, including the United States.

Figure 3: The Nuclear Fuel Cycle (Energy Information Administration 2023)

nuclear fuel cycle. Democratic inputs thus most often concern issues arising from the processing and disposal of waste, including the siting of GDF's and other such facilities. Wilsdon & Willis (2004) argue for greater democratic input into

upstream processes that include the mining, conversion, and enrichment of the fuels we feed into nuclear reactors. Although the dividing line between upstream and downstream processes is always contestable, and policies must also address concerns about local implementation and unexpected outcomes (Doubleday and Wynne 2011), it remains a key distinction for debates about nuclear democracy. Upstream deliberation became a possibility with the Committee on Radioactive Waste Management (CoRWM), which was established in the UK in 1997 after repeated failures associated with top-down nuclear waste governance. CoRWM conducted an in-depth social and technical study of deliberative democratic inputs into UK nuclear policy. At the end of this process in 2006, they reported that a GDF was the 'best' solution[2] for the UK's nuclear waste, but that this should be sited within a community that volunteers to host the facility and retains the right to withdraw from the process. They also said the GDF should be for 'legacy' or 'unavoidable' nuclear waste already produced, lest it be seen as a 'green light' for new 'avoidable' nuclear waste from new builds (CoRWM 2006, p. 13).

The Labour Government of the time was initially unconvinced that the financial and social costs of nuclear power were viable. A 2003 White Paper stated that nuclear power's economics were 'an unattractive option for new, carbon-free generating capacity.' As the waste issue was unresolved, the white paper recommended that future use of nuclear be subject to 'the fullest public consultation' (DTI 2003, p. 12). However, the Labour Government quickly (and unaccountably) u-turned when the Prime Minister called for a 'nuclear renaissance' in 2006. On becoming Government policy in 2008 (HM Government 2008) the recommendation of a 'fullest public consultation' was dropped. This prompted Greenpeace to sue the Government. Greenpeace won the case, and the court ordered the Government to carry out a public consultation (Cotton 2017). However, Prime Minister Blair vowed to ignore the consultation and continue with nuclear expansion. This u-turn, Geels (2014) argues, was a result of the instrumental power of the nuclear lobby and their direct access to the Prime Minister.

Since then, successive UK governments have quietly ignored CoRWM's condition that the GDF be used for legacy waste alone. Successive Governments have used the mandate provided by CoRWM for the GDF process, while upping the ante with 10, 16 and now 24GW(e) of 'planned' new nuclear now set to provide 'clean, reliable and abundant energy' as part of efforts to mitigate the climate crisis and provide energy security (Gov.UK 2024). This places pressure on the already difficult nuclear waste process by increasing costs (£263 billion upper estimate), adding new risk factors, and extending the timeline of an intergenerational project (175 years and counting) by anywhere up to one hundred years. There have also been suggestions that a second GDF may be required (Thomas 2023).

This all makes the democratic element of the GDF process seem limited and limiting. If nuclear is so 'clean', 'reliable' and 'abundant' (note the absence of 'cheap'), then why not allow it to be subject to democratic deliberation? I make no claims about which energy source will ultimately best mitigate the climate crisis. Risks cannot be removed, only swapped or reduced, and it is always possible that *not* using nuclear will create other risks like those associated with carbon capture and storage. These are monumental socio-political choices that require open and ongoing deliberation, not spurious scientist claims that there is no alternative.

In summary, I call for a new CoRWM-like process to allow the UK to collectively decide its energy future, and to keep on deciding. The alternative is a deficit, not of public understanding of science, but of democracy. This deficit dovetails with a general democratic decline inspired by a neoliberal politic that attempts to place the economy beyond democratic purview. This particular democratic deficit is specific to the nuclear, because of its fraught history, massive costs in relation to renewables, fundamental links to the military industrial complex, and the difficult-to-comprehend temporal longevity of the waste it produces. These factors

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2 'Best' is relative here. Other solutions included shooting the waste into space.

combine to make the nuclear a particularly problematic technology in both spatial and temporal terms, and thus subject to fundamental questions of inter and intragenerational justice and democracy.

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Lee Towers started his postdoc at Teesside University in November 2022 working with Professor Matthew Cotton on a project exploring intergenerational justice and nuclear waste. He is currently writing a short book on these issues as an extended literature review, which will be published by Routledge (in October) as Environmental Justice, Intergenerational Democracy, and the Case of Nuclear Waste. He completed his PhD (titled: Energy, Justice, and low-carbon transitions: a governmentality analysis of the role of community energy in the UK) in October 2022. While focusing on local solutions like community energy, this project explored the history of energy and its role in empire building, and how it manifests presently in fossil capital and big-E energy solutions (large scale offshore wind or large hydro) favoured by states like the UK. Before his PhD, he completed an MSc in environment and development at the University of Leeds and an MA in modern European history at the University of Manchester before this. Lee is mainly a qualitative researcher comfortable using various theories and methodologies, but he's also been teaching himself python and data analysis. His publications include:

Nolden et al (2022). Can liberalised electricity markets deliver on climate change and energy poverty? Evidence from community projects in Great Britain https://www.tandfonline.com/doi/full/10.1080/13549839.2022.2104829

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Friction Takes Center Stage in Science Communication: Theater Dialogues of Dissent

by Willemine Willems, Keje Boersma, Jaron Harambam, Tessa Roedema, Esther de Weger

It is early 2024 when we enter the second phase of our project *Climate Research in Dialogue*. The rationale for the project is straightforward. The climate crisis has become a particularly politicized issue in The Netherlands, as it has in other places; with strong disagreement between citizens and between political parties about the origins and remedies for climate change and varying degrees of confidence in climate scientists and their research. This, of course, does not surprise Science and Technology Studies' scholars as much as others. For decades now, we have been invested in retying "the Gordian knot" of facts and values, science and politics, in one way or the other (Latour, 2012). From that perspective, it would be more surprising if people's appraisal of certain facts had been completely unrelated to their beliefs about life, health and happiness, or how a just society should be structured and governed. By involving citizens in early stages of research, such as agenda setting, we set out to explore the potential of rendering climate science, and thus aim to render climate policies based on such sciences, more socially robust.

To get a diverse group of people in our civic assembly rooms rather than the usual suspects (e.g., climate activists), we spent hours striking up conversations on the streets of four cities outside of the Dutch metropolitan area. We connected with random passers-by and tried to convince them to participate in our project—using various playful recruitment techniques from a wheel of fortune game play to getting people to vote on specific climate statements. The conversations on the streets were diverse. Distrust of science and other public institutions, despair about the lack of effective climate policies of the Dutch government as well as anger and irritation about climate activism and sustainable actions were common ingredients of our on-street conversations.

But to get the diversity of our on-street conversations into the assembly room more work is needed. The Zutphen assembly (with 29 citizen participants) is a good example. After a three-hour assembly session in February 2024, most of the participants are positive; they seem content about the work. But this is not the case for everybody; after a few days we receive a disappointed email:

> The objective [of the session], which in my view was countering polarization in the climate debate, has not been achieved. [Emphasis added] The day was dominated by opinions of people on the left and ultra left side of the political spectrum.

This participant's reflection immediately raised a deeply felt concern in our team as our aim had precisely been to create space for a diversity of perspectives and experiences. It also resonates with a recurring problem encountered by scholars and practitioners working towards bridging science and society (Hueske, Willems & Hockerts, 2023). Within the fields of STS, public engagement in science and technology, science communication and Responsible Research and Innovation, the lack of contestation in organized citizen participation and dialogue has been a point of contestation itself (Blok, 2014). What is needed to create room for existing societal conflicts and the politicization of socio-technical issues in organized dialogue and participation? How to make such efforts more inclusive of existing and pervasive contestation and distrust?

SCIENCE IN DIALOGUE

In the Netherlands, as elsewhere, science communication is taking on dialogical forms that demand more from scientists than merely imparting expert knowledge to the public. In recent years, Dutch science policymakers, research funders, and knowledge institutes increasingly emphasize the importance of instigating a two-way flow of information between insiders and outsiders of science. These flows are centered around the notion of "science in dialogue", and are designed to break with the deficit model of science communication which asks of scientific experts that they "fill the knowledge gaps" that non-scientists supposedly lack (Davies & Horst, 2016).

Yet, as any science communicator can attest, two-way communication is hard and longer-term participation in research is even harder. Dialogues tend to be time-consuming and require that all parties actively listen to each other, without too many assumptions and by temporarily postponing judgment. This is especially challenging with controversial topics, such as climate change, where there is widespread skepticism or distrust towards scientific institutions; where consequences hit different communities differently and where not everyone feels heard or engaged. This has led science communication researchers in STS and related fields to emphasize the importance of creating more room for conflict in science dialogue (e.g. Braun & Könninger, 2018; Roedema et al., 2022). But what can be done when creating a room is not enough? When it seems impossible to actually include distrustful and angry voices in the organized dialogue? Are there other ways of initiating constructive dialogue built around conflict that engage these wider publics and allow for the articulation of diverging opinions? How can we learn to value 'the other' for the legitimate value or emotion that they bring to the dialogue table, particularly when we disagree with their politics, their views, their values?

STAGING DIALOGUE AS DRAMA

These considerations and lessons-learned inform the ambitions of the *Theater dialogues of dissent*. This project builds on the first citizen assembly project and seeks to make science communication more participatory in nature and more inclusive of contestation and distrust.

Firstly, to ensure more active engagement of a wide range of voices, we are, for this project, investing upfront in the building of relationships with varying actors with conflicting needs and interests. We will be going beyond merely engaging with citizens once through on-street conversations; we will be building relationships and trust with these actors by actively exploring their own questions and needs, and their own preferred ways of being engaged in the *Theater Dialogues of Dissent*—e.g. through 1-1 meetings and exploratory and reflexive interviews. By first investing in the building of relationships we hope to create an environment of trust, which allows all actors—also those who are mistrustful of climate policies and climate activism—to have their say. Our hypothesis is that by first building personal, one-on-one relationships with actors, participants will feel more welcomed, valued and relatively safe in group activities as well.

Secondly, we also aim to develop a format that foregrounds conflict and we hope to create a method of theatre dialogue in which conflict is used playfully or dramatically to make scientific and socio-technical issues more accessible, relatable and tangible for a wider group of citizens (Kupper, 2017). More than the substantive issue at hand, the surrounding conflict or controversy takes center stage – not climate change itself, but societal polarization regarding climate change, for example.

Contrary to many dialogical processes, the *Theater Dialogues of Dissent* are *not* intended as an interactive process geared toward reaching a common aim based

on the joint weighing of arguments, counterarguments, and evidence. Rather, as a theatrical form, they are about generating drama and tapping into affect and emotion, thereby creating a more visceral, embodied connection with the audience, engaging viewers and encouraging them to respond. This can be achieved by personalizing the issue through storytelling and character portrayal, by depicting the experiences of individuals affected by such issues, and by including the perspectives of individuals who are apathetic or angry about the issue or may be unconcerned. During a theatrical dialogue each of these participants is pushed to reflect on their own views and experiences through the confrontation of competing experiences and perspectives. To enable this exchange, a theatrical dialogue usually consists of several scenes in which the audience, in collaboration with a facilitator and three actors, provides insight into how they deal with the complexity of the issue, what values are at stake for them and what perspectives for action they envision. The performances are followed by structured discussions to provide opportunities for audience members to share their perspectives, ask questions, and explore different – if not, divergent – viewpoints. The aim is thus to provide insight into the divergent perspectives, but also acknowledge the "sore points" that come with polarizing issues. Once enough space for deepening and exploring controversy has been provided through the interaction between improvisational play and dialogue, there may also be room for actors to see the controversy from other perspectives than their own, which may allow for changing how they view these complex issues – although the feasibility of this happening remains to be tested and seen.

Theater Dialogues require raw material: situations, interpretations, and encounters on which to build scenes. We prepare for the dialogues by having conversations with a range of people diversely positioned in relation to a particular scientific and socio-technical issue, wherein we discuss their views on and experiences with the controversy at hand. The starting point in these conversations betrays a different approach to inclusion compared to our earlier civic assembly project: building relationships with participants early on and throughout the project, including those with completely different views from those commonly included in citizen participation.

DISSENSUS AND DIFFERENTIATION

This brings us to dissensus and differentiation. Beyond science communication and creative methods, our work taps into a tradition of political philosophy and pedagogy. In countries such as the Netherlands and in Europe more broadly, science dialogue remains firmly grounded in notions of communicative rationality, often at the expense of more agonistic approaches to deliberation. Yet, as the political philosopher Mouffe (2000) has repeatedly stressed, proper democratic politics involves contestation between adversaries, and demands giving legitimacy to conflict and difference in society. For Mouffe (2000), it is a hallmark of a well-functioning democracy when it is able to turn enemies into political opponents, thus enabling a pluralist democratic politics. This message remains timely. More than twenty years after the publication of Mouffe's (2000) seminal book, *The Democratic Paradox*, we are witnessing increasing public discontent with science and polarization about the role of expertise in society. Whether the *Theater Dialogues of Dissent* will deliver on this injunction to politicize and pluralize science is an open question. Perhaps they can function as a brave space in which adversaries play out and rehearse conflicts as legitimate opponents rather than as enemies. This is the challenge we face in an increasingly polarized science-and-society landscape, and which the *Theater Dialogues of Dissent* take on by invoking drama, dialogue, and dissensus.

PROJECT FACT SHEETS

Climate Research in dialogue

Funded by NWA (Dutch Research Agenda) & ASI (Amsterdam Sustainability Institute) In this project we collaborate with G1000, an organization involved in setting up and facilitating civic assemblies with regional and city-governments. In the course of one and a half years, we have four civic assemblies in four different towns: Roermond, Wormer, Assen and Zutphen. Each assembly consists of two sessions and hosts around thirty citizen-participants. In each of the second assembly meetings, 5-10 climate researchers and policy makers join the work sessions.

Theater Dialogues of Dissent

Funded by NWA (Dutch Research Agenda)

Our co-applicants and social collaboration partner are three science museums (Sonnenborgh Museum & Observatory, Museon Omniversum and Naturalis Biodiversity Center) and Man in the Making (*Mens in de Maak*), a theatre director responsible for the script and the performance of the theatre dialogue. Science museums are currently working on the question of how to make scientific knowledge more accessible and inclusive giving the increasing polarisation around science.

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Figure 1 Citizens and climate
researchers map one of the research
themes together in the second
session in Wormer

Figure 2 Citizens report back on their
concerns and experiences with the
climate issue during the first session
in Roermond

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Liveable Futures: a guiding concept for knowledge infrastructures

by Anne Beaulieu, Efe Cengiz, Raul Cordero Carrasco, Selen Eren, Sarah Feron, Matilde Ficozzi, , Carol Garzon Lopez, Stephanie Hobbis, Ruth Howison, Clarisse Kraamwinkel, Maarten Loonen, Marije Miedema, Dario Rodighiero

Liveable futures[1] bring into question the conditions that make human and more-than-human lives possible and provide these with prospects. Such futures are made of multiple elements, including knowledge infrastructures (KIs). Knowledge infrastructures, by creating and recreating objects, categories and relations, make important contributions to frameworks that make some forms of life intelligible, and other forms of life precarious. It is in this sense that in much of our work, we seek to articulate how KIs can contribute to liveable futures.

Because liveable futures are very much a project that is to be achieved in practice, the phrase is also at the core of engagement activities of the Knowledge Infrastructures Department and of the faculty of Campus Fryslân at the University of Groningen (The Netherlands), where we have launched an annual Liveable Futures Festival and a book series with Amsterdam University Press. The festival and series engage different colleagues and publics and constitute occasions to further reflect on and develop this concept through interaction with a diversity of stakeholders. Liveable futures help articulate what is non-negotiable for survival and what makes life worth living. It opens up a space to share different needs and different matters of care. In our experience so far, it supports interactions about the kinds of 'present' in which lives are lived and how these might continue (or not) in the future-- and it does so in ways that are more generative than discussions framed by catastrophic or utopian narratives.

By collectively writing about liveable futures, we, the authors, have consolidated our understanding of the term and identified aspects where our emphasis varies—both equally important negotiations. We have also shared how the phrase has a different valence, resonating with some of the other languages in which we work (futuro vivible, avenir vivable). And we have debated whether the variability in the term liveable is politically risky, as it potentially builds in too much room for manoeuvre. By sharing the phrase with the EASST Review readership, we hope to stimulate further interaction and engagement with the project to which we are committed: building knowledge infrastructures that can support the knowledge urgently needed for liveable futures. Other terms such as sustainability or Anthropocene are the most common labels to orient action towards improving conditions and conveying a sense of crisis. Before introducing liveable futures, we first take a look at how these two terms work, and consider why a new label really is necessary.

Is sustainability more of the same?

The term sustainability has travelled across different fields over the past 50 years, to become a very prominent term in everyday parlance and a ubiquitous qualifier to a wide range of activities, institutions, goods and services.

As it is most frequently defined, sustainability is about continuing and lasting prosperity, and reliance on environmental resources to achieve this prosperity. It is a contested concept (Washington, 2015), and is strongly associated with preservation of vested interests rather than transformation of exploitative systems. Part of this negative connotation has to do with the close association of sustainability with 'sustainable development' which is in turn connected to economic

growth. Sustainability, in the context of development, does not convey the urgency of the current problems nor the need to do much more than sustaining current conditions. This stance that reinforces the status quo is visible in the well-known Brundtland (1987) report (WCED, p. 37):

> *Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.*

Implied in this definition is a highly uneven burden, with regards to sustainability. It stresses that further development is what must be achieved sustainably, thereby leaving developed countries and their structural unsustainability out of the picture. Some years later, a very similar elision would be made extremely clear through the intervention of Agarwal and Narain (1991), demanding distinction between essential and luxury emissions as a necessary step toward equity in addressing climate change. In other words, a focus on sustainable development has served to curtail cumulative responsibilities of developed countries—tainting sustainability as a framing concept.

Furthermore, most writing on sustainable development assumes, implicitly or explicitly, that economic growth is the key to development (Washington, 2015). The centrality of economic growth therefore aligns much sustainability discourse to neo-liberal modes of social organisation and extractive relations to the environment-as-resource. Both sustainability and sustainable development originally thrived at the intersection of ecology and political discourse, but have increasingly been taken up by business, where it is "associated with efficiency, profitability and even growth" (Vasseur and Baker, 2021). The term green growth is a related label that attempts to reconcile the impossibility of continued growth based on exploitation of finite planetary resources (Wijkman and Rockström, 2012), the starting point to well-known work on donut economics (Raworth, 2017).

While some remain optimistic about the possibility of decoupling the term sustainability from sustainable development and growth (Washington, 2015), the concept of sustainability is too closely connected to resource thinking, an approach that sees nature and the material world as assets to be exploited (Turnhout, 2024). It relies on the colonisation of nature (Banerjee, 2003), and comes from a tradition that distinguishes, disconnects and often opposes natures and humans, reserving agency exclusively for the latter, as critiqued by Haraway (1991, p. 198):

> *Nature is only the raw material of culture, appropriated, preserved, enslaved, exalted or otherwise made flexible for disposal by culture in the logic of capitalist colonialism.*

The interdependence of culture and nature, of society and the environment needs to be emphasised, as does the move away from the (post-hoc) distinctions and binaries of modernity, in order to understand highly situated, unequal access to 'resources 'and need for radical action (Haraway, 2015).

Sustainability is therefore problematic in a number of ways. First, in the way it orients to action. If sustainability calls for change, then it is only as a breaking force to slow down the scope of exploitation today, to ensure exploitation in the future. Second, it foregrounds an economic logic, for example in the articulation of sustainability as the achievement of a balance between the distinct elements of environment, society and the economy (sometimes expressed with the shorthand 'people, planet, profit'). This is objectionable because they set economics apart, as though it were not part of society (Smythe, 2014), and as though economics is confined to industrial-capitalist practices and values (Gibson-Graham, 1996). Finally, and most fundamentally, it obfuscates that currently (and even arguably in the 80s), the differentiated consumption patterns across the planet amount to overshooting of the earth's resources (see https://data.footprintnetwork.org/#/) −a situation that calls for transforming, not for sustaining.

WHO ACTUALLY LIVES IN THE ANTHROPOCENE?

A second dominant term, the Anthropocene, is the 'scientific proposal that the Earth has entered a new epoch as a result of human activity' (Lorimer, 2017, p. 117). In contrast to sustainability discourse, it does foreground the interaction rather than the distinction of the social and the natural. It signals, by its evocation of an epochal shift, the scope and gravity of current crises. It is also a term that has currency across different constituencies, thereby providing a common banner under which to unite (Hastrup, Münster, Tsing, and Bubandt, 2022). It is furthermore a way to highlight the evidence for disruption at the scale of Earth systems through (human) industrial and colonial activity. However, the term is also criticised along different axes. Its anthropocentrism is blatant (Brannen, 2019), that is to say, the way it centres Anthropos as the deeply problematic category of 'human' and the system of exclusions on which the concept relies (Yusoff, 2018). By insisting on Anthropos as a uniting label, in its lumping of all of humanity into a single actor. Anthropocene evacuates huge differences in the relation, responsibility and vulnerability of those who might be subsumed to this all-encompassing Anthropos (Chakrabarty, 2015; Haraway, 2015; Todd and Davis, 2017), and in so doing fails to acknowledge the ontological and epistemological diversity in human-nature relations (Descola, 2013; Vilaca, 2016). As a diagnostic label, Anthropocene erases crucial distinctions and reveals a 'global' problem at a scale where action and agency are hard to imagine. It can only be embraced via highly complex mechanisms of abstraction, of which the IPCC reports are emblematic. The epochal scale also foregrounds the unprecedented status of the current crisis, highlighting universal human frailty and obscuring how forms of power are maintained, even as solutions are articulated (Whyte, 2020).
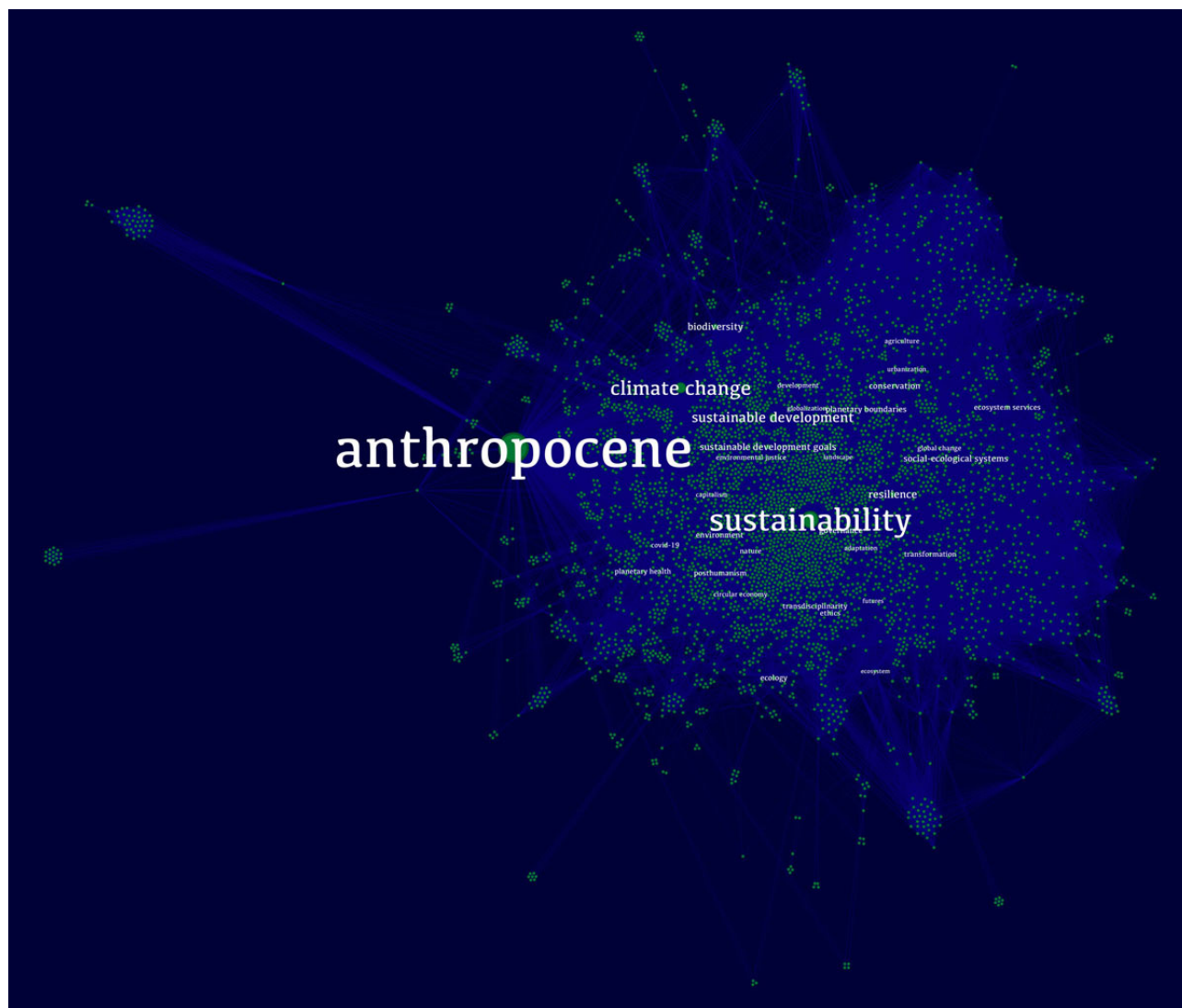
A starting point that lowers the threshold for action is needed, a more accessible, humble future that recognizes the importance and value of everyday mundaneness. Our proposal is therefore to use 'liveable futures'. To provide a better invitation: 'what is a liveable future for you, with others?' instead of 'what to do about the Anthropocene?'

FUTURES...

The proposal for a label of 'liveable futures' as a banner under which to galvanise imagination and care as key forms of action therefore aims to avoid some of the pitfalls in the terminology of sustainability and Anthropocene. The components liveable and future work together to evoke both possibility and need for action.

The term future emphasises that there are prospects, it stresses the indeterminacy of what is to come and the possibility to "probe, interrogate and play with futures that are plural, non-linear, cyclical, implausible and always unravelling" (Salazar, Pink, Irving, and Sjöberg, 2017, p. 2). The term future serves as a necessary reminder of the increasingly frequent implementation of algorithmic shutting down of the future through predictive reliance on past data (Beaulieu and Leonelli, 2021), or through discourses of inevitable futures (Schiølin, 2020). Conversely, much of techno-science is oriented to the future and especially towards an idealized 'future perfect' based on "hopes that… current hardship will have been the necessary precursor to future prosperity" (Hetherington, 2016, p. 42). It is clear that the future plays an important role in constituting the present (Brown and Michael, 2003).

There is also nothing grandiose about 'liveable futures', it is rather something mundane than heroic. We consider these to be advantages, because they do not evoke emergencies and crises. The framing of current situations as emergencies and crises is predominantly intended to spur action—understandably, these are worrying times. But the invocation of emergency (Murphy, 2018; Papadopoulos, Bellacasa and Tacchetti, 2023; Whyte, 2020) can be used to create hierarchies of values, subsuming justice, reciprocity, care and deliberation.

Figure 1 Network of Anthropocene and Sustainability work, based on Scopus search for "sustainab* AND anthropocene". From the retrieved documents, keywords (nodes) are connected through authors (edges), to give a sense of the related research areas or (sub-) fields.

Change over time can be understood through the ability to remember a past and project a future (Conty, 2018). Instead, such epistemologies of crisis also focus on a present that is unlike any past, hence precluding the use of lessons learned from the past (Whyte, 2020).

Against this tendency, liveability, in its humble everydayness, is meant to be a reminder that relations of all kinds exist, may need repairing, and certainly require care. Finally, in our phrase liveable futures, these futures are plural, insisting on plurality, both in terms of outcomes and of experience. When the very possibility of the future is put into question, this triggers a defensive stance that is neither creative nor hopeful and it reinforces the notion that 'nature' or 'the environment' are hostile, as Amin (2013) implies (as cited in Barua, 2021, p. 1481):

> *Resilience infrastructures are part and parcel of emerging forms of neoliberal biopolitics that is 'catastrophist', one where 'the future is increasingly being cast as unpredictable and dangerous' and where 'preparedness' becomes the watchword.*

Furthermore, there may be a great diversity in experiences of the futures to come, a possibility that again, is shut down by crisis thinking that funnels efforts into saving the current state of affairs and may "obscure how everyone one else may experience today's world" (Whyte, 2020, p. 62). The plural form emphasizes multiple experiences and works as a reminder that the task is not to find the best possible future, but rather to open up space for different ways of achieving liveability in different forms, adapted to rich localities.

...THAT ARE LIVEABLE

If the future is open, it is accompanied by 'liveable', as a normative qualifier. Liveable futures are scenarios in which the possibility of liveability is envisioned. Liveable futures are neither objects nor certainties, but sets of conditions that can refer to situations good enough to live properly, to describe a desirable and enjoyable future, or to describe the minimum needed for survival. This may be different across forms of life; as Mette Nordhal Svendsen notes in her analysis of the dynamics of imagined futures, a key question is what is assumed to be the "common good" (Groth-Jensen, Svendsen, and Snell, 2023). Liveable can therefore have a range of connotations, spanning endurable, survivable, suitable for living in, inhabitable, agreeable, among other common meanings. Such a sliding scale seems appropriate for these uncertain times. The term liveable futures indicates that the possibility of survival—and therefore also the possibility of NOT living on—has to be taken into careful account. While liveability has been turned into an indicator[2], liveable futures is neither a measurable object (like growth), nor a certainty, nor an assessment (like sustainability), but a situation to live in. Such a sliding scale might be risky: it provides room to manoeuvre for different agendas, and might seem to lack the strength of a clear goal. However, clear goals can only be reached in the context of strong relations of accountability, of commitment. Liveable futures stress the conditions in which these relations thrive, so that negotiations and commitments to liveability can emerge.

Liveable, especially in the British spelling, has a conspicuous suffix. The particle -able has the meaning of 'capable of'. Liveable therefore invokes the capability for living. Capability for life is not a feature of the organism, but of the organism in interaction with its context. For Butler (2010), liveable is important to "move away from a focus on individualism and the protection of life in and of itself and directs attention to the conditions which maintain life, which either enhance or reduce its precariousness in a particular location at a particular time" (McNeilly, 2016). For Butler (2010), liveability is undergirded by the conditions that ensure physical persistence and conditions of 'social intelligibility', the possibility of living a life that counts, that is meaningful.[3] Conversely, frameworks (racism, sexism) that increase precarity of certain lives by making them unintelligible (McNeilly, 2016), such as those of migrant or transgender persons, decrease the liveability of certain lives3, rendering them 'wasted' because of their perceived 'uselessness' for economic (industrial-capitalist) progress (Bauman, 2003).

While Butler has elaborated the term liveable as an important criterion for human life (Butler, 2010), we propose to extend it to all forms of life to avoid falling in the anthropo-centric trap that also surrounds the Anthropocene. Instead we embrace the challenge of formulating what a liveable life for an insect or microbe or mushroom might be as important and generative of better living-with non-humans in a multispecies planetary environment. While precarity—that which threatens liveability— is defined by Butler (2010) as "politically induced condition in which certain populations suffer from failing social and economic networks of support and become differentially exposed to injury, violence, and death" (p. 25), precarity can also be environmentally induced and experienced, affecting non-humans.

Whether the plurality of 'liveable' is potentially also a weakness is the object of debate--also among the authors. On the one hand, 'liveable' can be co-opted into dominant, often neoliberal discourses. Perceptions of how to classify 'liveable' can be diverse, and may even contradict each other. Debates about 'invasive species' are indicative of such a potential tension, valuing the movement and presence of some species, while others are threatened, often following global hierarchies and colonial flows (Cottyn, Devliege, and Cahn, 2023; Kirbis, 2020). Disagreements about the creation of 'liveable' environments are also central to broader conservation discourses, which often side-line, actively exclude, and at times forcibly relocate and actively devalue some (human) lives over those of others, as exemplified in global critiques of indigenous hunting practices (Hobbis, Soete, and

Hobbis, 2024) or the Half Earth vision for conservation (Büscher, Fletcher, and Brockington, 2017). On the other hand, this plurality and conceptual openness of 'liveable' opens up a space for interaction about 'liveable futures,' one that has the capacity to account for human and planetary diversity, including the inequalities and systems of exploitation that have, so far, shaped too much of the past, present and visions for the future. The phrase 'liveable futures' signals an ethically and politically normative aspiration. It serves to express the need of dealing with serious problems to ensure futures and stresses that much is at stake—a humble aspiration towards the possibility of life that has to be developed in caring interaction, with awareness of trade-offs.

ENDNOTES

(1) As a phrase, we have come across 'liveable futures' in some urban planning contexts, which stresses its relevance to everyday life.

(2) The Economist Intelligence Unit has a liveability index of cities:

The concept of liveability is simple: it assesses which locations around the world provide the best or the worst living conditions. Assessing liveability has a broad range of uses, from benchmarking perceptions of development levels to assigning a hardship allowance as part of expatriate relocation packages. Our liveability rating quantifies the challenges that might be presented to an individual's lifestyle in any given location and allows for direct comparison between locations" (Global Liveability Index, 2022).

(3) See discussion of phrase 'all lives matter' and of Butler's position in Victor (2016).

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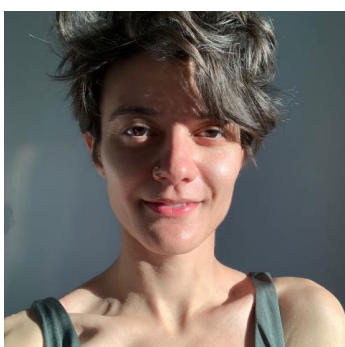
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STS Multiple

DOING MARINE WORLDS:
MARINE STSING THROUGH GERMANY AND BEYOND

by Tanja Bogusz, Ramona Haegele, & Laura Otto

THE SEA – A MATTER OF CONCERN FOR SCIENCE AND TECHNOLOGY STUDIES

When we think of the sea and marine worlds, we often conjure up a variety of images, emotions, and associations. The sea has long captured the imagination of poets and writers, given its vastness and majesty and how it teems with diverse forms of marine life. More prosaically, it has played an important role in global work, trade, and colonization. This is reflected in some earlier STS work that has been foundational for the field. The seminal scallops-study of Michel Callon (1999) not only established an early account of marine-human relations, and the tensions between science and the fishery sector, but, notably, a methodology for actor-network-theory based on the translation practices between different human and non-human entities. John Law (1987) developed an early account through his study of the material forces as a core precondition for the Portuguese expansion on the African continent in the 17th century. Reading this expansion through the contemporary achievements and limits of maritime technology and engineering exemplified STS' radical critique of classical sociological human-centered and power-driven approaches.

Today, anthropogenic pressure on coastal areas, rising sea levels, overfishing, and loss of marine biodiversity impact the marine sciences (Helmreich 2023), as well as global society (Hastrup & Hastrup 2015) on a formerly unknown planetary scale. Despite efforts to establish protected marine areas since the latter half of the 20th century, given growing awareness of marine pollution and overfishing, "the world's oceans are in danger" (Plumer 2019) - an alarming realization. Consequently, current STS-research on the marine realm has shifted perspective from observation towards collaboration, thus seeking "contributory expertise" (Collins & Evans 2002) regarding the existential threats to the ocean and its inhabitants (Asdal & Huse 2023). We see a similar shift in marine science, which has traditionally been dominated by the natural and the engineering sciences. On the one hand, researchers seek to include "society" and societal expertise within their research, as exemplified in the current Ocean Decade's call for inter-and transdisciplinary research (UNESCO-IOC 2021). On the other, Marine Social Sciences (MSS) has emerged as an international research field in its own right (Bavinck & Verrips 2020; McKinley et al. 2022), developing socio-cultural research topics on and within marine science. In Germany, MSS has stimulated, in 2017, the establishment of a strategy group "Marine Social and Cultural Sciences" within the Consortium German Marine Research, the largest marine research group within KDM. However, marine STS and ANT, either within MSS, or STS or marine research more generally, remains only weakly organized. Building on the momentum of the recently established ststing e.V., founded in 2019 (Helm et al. 2021), and intensive discussions within German MSS, the formation of a working group on "marine STSing" was deemed crucial.

OUR 'DOINGS'

Our group brings together specialists from the marine humanities with STS scholars to discuss STS methodologies within our respective research fields. Within stsing e.V. we create inspiring entanglements between marine research communities, which are mostly separated by disciplines and research topics. We started

in the early summer of 2022 with an online reading group and regularly held online meetings every two months and discussed "classical", as well as contemporary papers at the intersection of marine social and cultural sciences and STS. We have invited senior STS-scholars such as Stefan Helmreich, Caspar Bruun Jensen, and Kimberley Peters to discuss their current works on marine realms with us. In June 2023, some Marine-STSing-members met at the biennial MARE-conference in Amsterdam to discuss our research with international colleagues. We have strengthened the group's coherence by fostering less hierarchical relationships between senior and younger scholars, in-depth-reading and discussion of current works and papers, and continuous announcement and networking through *Mattermost*, as well as within the German sociological, anthropological, geographical communities.

Having established an online platform and safe space for exchange among marine STS scholars from various disciplines and fields, members of the group have also organized events. In December 2021, twelve members of the group met at Goethe University Frankfurt to discuss "Who cares for marine environments, climate change and responsibility in the Anthropocene and how?". In March 2023, some group members organized and chaired the double-panel on "Ocean Forms/Events – Exploring Maritime Flows and Productions of Knowledge" at the STS-Hub Conference on the topic of "circulations" at RWTH Aachen University and in March 2024 group members organized and hosted the panel ""(Un)leaking marine and coastal ecosystems" at the inaugural conference of stsing titled "Leakage" at TU-Dresden. Some of us will be present at the upcoming EASST/4S-conference in Amsterdam as well. A webpage on our research, publications and activities is currently in preparation.

We also hold regular sessions to share and discuss papers written by group members on a monthly basis, who have disciplinary backgrounds in anthropology, human geography, sociology, political sciences, philosophy and disaster risks studies. Exploring marine STS through multiple "classic" and contemporary approaches, concepts, and methods, we tackle it as 'a doing in itself', as we co-produce the ocean and knowledge about marine environments and lifeworlds (Siriwardane-de Zoysa & Hornidge, 2016) by studying them. The papers reflect the diversity of the research field; we have discussed, among other things, the role of seagrass and turtles in the conservation of marine habitats, learned more about the practices and routines on research vessels and the idea of field research shared between biology and ethnography, and discussed how modeling oceans can be understood through a STS lens, to list but a few examples. Our upcoming activities confirm one of the main goals of the group, namely, to be an open space where different epistemic cultures and disciplines meet, with presentations to be given by mathematicians as well as by experts from within the field of fisheries.

In the long run, we aim to include more natural scientists, technicians, and engineers working on marine realms with the purpose of developing practical nature-society-based solutions that recognize the trade-offs between economic and ecological interests, combining STS-marine social sciences with critical sociologies of knowledge. We also wish to strengthen marine social science on diverse academic and institutional levels in Germany and beyond. This is why we are seeking to grow the marine STSing group, to create new waves of knowledge for the future, expanding out from academia to civil society and policy making. Our research topics and sites span as far as the Arctic to the Indian Ocean, from the Baltic to the Caribbean Sea, from the Pacific to the Atlantic. We are looking forward to seeing who will join the rising tide of interest!

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Laura Otto holds the junior professorship for the Anthropology of the Rural at Wuerzburg University, Germany. Her research focuses on coastal transformations, particularly in the Caribbean, where the arrival of massive algae blooms has generated vast-reaching socio-ecological transformations since 2011. Laura is a founding member of the marine STSing group, and her expertise includes ethnographic methods, STS theory, as well as marine cultural studies.

Cover illustration

Riot police on the campus of the University of Amsterdam after breaking up a student protest on 21 June. Credits: Folia / Toon Meijerink