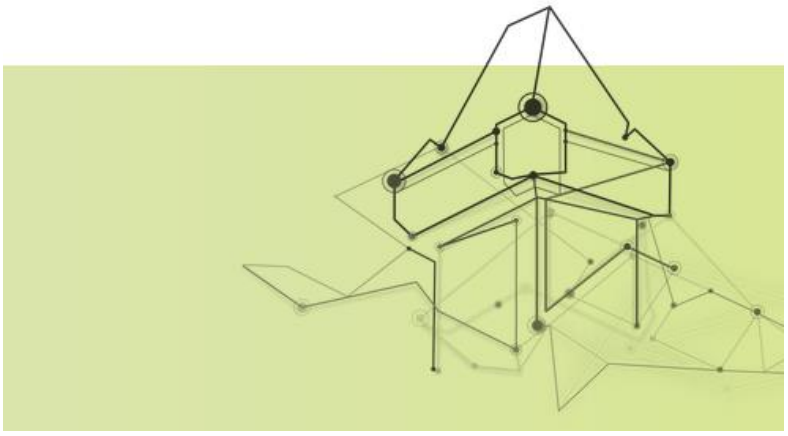
Book of Abstracts

21st STS Conference Graz 2023

Critical Issues in Science, Technology and Society Studies

8 – 10 May 2023



Imprint:

Book of Abstracts, Critical Issues in Science, Technology and Society Studies,
21st STS Conference Graz 2023
8 – 10 May 2023

Edited by: Getzinger, Günter; Jahrbacher, Michaela; Häller, Franziska

ISBN 978-3-85125-955-1
DOI 10.3217/978-3-85125-955-1

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Cancelled Sessions: B.9, D.3, E.3, E.4, F.5, G.2

Keynotes

Collective goods? The making of “population health” in medical tissue and data collections

Erik Aarden
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Against the background of great expectations associated with the application of big data and artificial intelligence in medicine, various voices have claimed that individuals have a moral obligation to make data and tissue materials available for research. This obligation is not only associated with the amounts of materials required in contemporary medical science, but also with presumptions that science produces a public good called medical knowledge. In my presentation, I critically examine this claim by drawing on four case studies of medical data and tissue collections, asking for and about which ‘collectives’ knowledge on health and disease is created. I present each case study as an exemplar for how infrastructures for the collection, storage and use of population data for medical research are constructed and frame particular versions of ‘collective goods’ in contemporary medical research. I first explore how the multi-decade Framingham Study of the causes of heart disease in the United States may be understood as an infrastructure enabling certain directions for research while restricting others. Next, I turn to the Singapore Tissue Network as an example of the complexities involved in finding shared purpose in the collection, storage and use of human tissue und data. I subsequently discuss the Million Death Study of causes of mortality in India as a case of the construction of populations through health data. Finally, I analyze contested meanings of medical research through the example of the European network of sample and data collections BBMRI-ERIC. While each of these cases is situated in different geographic locations and largely distinct areas of medical research, they jointly illustrate how the making and operations of medical research collections produce particular ‘collectives’ and ‘goods’. These imply distributions of rights and responsibilities that cannot fully be captured in terms of medical knowledge as a public good. The question whether and how people should participate in medical research thus requires more substantial consideration of the distributive implications of how infrastructures for the collection, storage and use of population data for medical research get built.

Design futures: Reimagining sociodigital futures in a datafied world

Juliane Jarke
University of Graz, Austria

Advances in computing, in particular the increasing pervasiveness and importance of digital technologies and digital data, introduce new means to measure, represent, and predict social life in numbers. This process has been described as the datafication of social life. It has fuelled utopian visions about a sociodigital future of open and transparent societies that strengthen grassroots movements and democratic processes. At the same time, warnings about increased surveillance and control as well as reinforced inequalities and systematic discrimination have emerged that recognise datafication as 'violent' (McQuillan 2022) and 'harmful' (Noble 2018; Eubanks 2018).

The starting point for my talk is that the future does not simply happen but is made. More specifically, futures of digital innovations and their embedding in aspects of our social, political, cultural, economic and everyday lives are made through expectations, imaginaries, narratives and hypes that shape discourses, and define what is thinkable and desirable. They are largely driven by powerful actors such as technology companies, governments, and research and development who determine how (social) problems are framed, and what kinds of social or digital innovations can and should be sought (Costanza-Chock 2022). What counts as innovation however is aligned with a longstanding narrative about human evolution that centres around practices and tools associated with power, dominance, and conquest rather than practices of caring and nurturing our individual, collective and planetary well-being (Macgilchrist et al. 2023). In my talk, I focus on the ways in which datafied futures are imagined and reimagined, made and unmade by different social actors in three domains: education, demographic ageing and the public sector. I consider the role of design innovation in this process and conclude with a call to action.

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What is scientific racism today?

Aaron Panofsky

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It has been often noted that as the life sciences have adapted certain social justice perspectives on race, a focus on inclusion and difference has led to the “molecularization of race” despite science’s movement away from racism. But scientific racism has never gone away. This keynote will present findings from an ongoing research project into the ways white nationalists have sought to mobilize genetics for their political projects. I will show that while the ideas of scientific racism have barely changed—adapting only slightly to modern technologies—they are becoming institutionalized and distributed in new ways. I’ll show how scientific racism should be understood now as a citizen science movement that has built bridges to professional scientists at the margins of psychology, anthropology, and biology. I will explain some of the practices that sustain them, make them socially dangerous, and make them difficult for scientific institutions to confront.

Postersession

Session Chair: Günter Getzinger, TU Graz, Austria

Organising for potential promethean technologies in a post-growth era

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Despite the urgency created by energy crises, disruptive innovation in energy generation technologies has been limited, and relatively new energy technologies such as solar, wind and other modern renewables only contribute to a relatively small fraction of the global energy mix at present. The slower rate of adoption of new energy technologies, and of innovation in energy generation technologies more generally, can be attributed in significant measure to the dominance of incumbent fossil fuel corporations who benefit from suppression of innovation. Recent advances in the physics of solar-linked energy systems from peer-reviewed literature appear to point towards the possibility of technologies that can produce significantly higher power levels compared to traditional solar. It is currently not clear where these advances stand with respect to creating the 'promethean technology' that they might have the potential to create. At the same time, the incumbent corporations are not transparent about whether they are considering the implications of these advances and what their strategy might be if innovations based on these advances start achieving significant scale. However, it is important that the post-growth research community considers the implications of such technologies in advance, and lays down the pathways for developing organisational structures that ensure that the arrival of these new technologies supports rather than inhibits the post-growth vision. In my poster I will outline some thoughts on possible pathways and organisational structures, and invite the community for further discussion.

FlyingLess – Survey results on behaviour and attitudes towards business and study-related air travel within academia

Caroline Merrem[1], Nicole Aeschbach[2], Susann Görlinger[1]
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Within academia, awareness and concern about climate change are present and often even part of research and higher education. Nevertheless, studies and climate reports of academic institutions show that greenhouse gas emissions from academic air travel make a large contribution to the carbon footprint of scientists.

The project FlyingLess therefore aims to support universities and research organisations in reducing flight emissions, which account for a significant share of their total GHG emissions. FlyingLess is closely cooperating with four partners from university and non-university research. In its transdisciplinary character, the project pursues a participatory process to address the needs and opinions from the partner institutions members.

As part of a master thesis two methods were used for this purpose: First, interviews on the status quo of flight reduction were conducted with different status groups at the partner institutions to comprehensively analyse previous activities, obstacles and instruments of the project partners in the context of flight reduction. Second, an online survey was launched at eight academic institutions (including the four FlyingLess partner institutions) to get a broader picture of different mobility behaviours before COVID-19 such as perspectives and opinions on academic flying at research institutions and universities. On the poster we present the most important findings from the surveys.

The Questionnaire covered questions on the mobility behaviour regarding academic long-distance travel as well as student air travel, reasons for this behaviour and other travel (mode) decision related factors, the evaluation of potential flight reduction measures and internal framework conditions as well as the institution members intention concerning their future academic air travel. In summer 2022 the survey was launched at two highly internationally networked non-university research institutions, five universities and one university of applied sciences. Three status groups were differentiated: professors & group leaders, scientists without professorship/group lead and students.

Based on the sample size of all participating institutions combined, the per capita flight rate of professors & group leaderes is about four times that of scientists without professorship/group lead (regarding the estimated average number of academic plane trips per year before COVID-19). The underlying main travel reasons for business air travel are conferences including a presentation, followed by strategic collaborations. Above all more than 80 % of all scientists surveyed rated conference attendance as well as networking and collaboration for their career development as very or rather important factors when deciding for a long-distance trip. Nevertheless about 70 % stated their willingness to reduce their academic air travel by making greater use of videoconferencing or choosing another mode of transport. More than half would even reduce their air travel in the future by not attending events, which they consider not that relevant. In addition to their individual willingness to reduce air travel, respondents also agreed to varying degrees with different flight reduction measures.

The Nation State of Glitch an Arts Based Provocation

Freyja Van den Boom
Independent, The Netherlands

The State of Glitch

A case study on Arts-based AI research

What role for the imagination to help improve trust and trustworthy AI; and how to regulate AI-related liability?

Not a conference goes by, or someone will refer to science fiction to illustrate one of the many dangers of AI.Just to name a few already well documented examples include the problem of discrimination in automated decision-making and algorithm bias in facial recognition.

Although many countries have regulations in place that empower people with digital rights including the right to give or refuse consent to the processing of their data, to access and share their personal data between platforms and service providers (data portability) in practice these rights have not been sufficient to prevent the (un)intended harm caused for people on a personal and societal level.

We are becoming increasingly aware of the problems and are finding solutions still many (un)known challenges remain that require adequate AI and Data governance.

To contribute to the discussions on how to regulate AI and Human interactions dealing with the legal and ethical challenges the project explores the use of arts-based methods for knowledge exchange. The project presents for discussion insights from and use of Law&Arts-based research practice questioning legal and ethical aspects of digitization and globalization.

Arts-based research practices are a set of methodological tools that can be used across disciplines during any or all phases of research, including data generation, analysis, interpretation, and representation. Benefits from the use of methods such as speculative design and Science Fiction prototyping include improving diversity and stakeholder participation from underrepresented communities relevant for policy discussions and development of trustworthy AI. To understand why disciplines have not widely adopted these methods, this poster introduces the State of Glitch, the world's first nation state with governance that ensures true equality between humans and non-humans.

In response to the need for cutting-edge contributions this poster will also be an opportunity to challenge the dominant academic poster/conference presentation format for knowledge exchange. It will take the form of a conversation piece/poster and an invitation to join this new network of (but not limited to) people interested to discuss the role of arts to help improve (transdisciplinary research on) AI governance by acknowledging the need for additional means to generate and share knowledge, appreciate lived experiences and create spaces for underrepresented communities to engage with AI developers and policymakers, sharing their expertise and proposed solutions.

Ambidextrous Management of Digital Platform in the Industry 4.0 Era – An Exploratory Development of a Framework

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[1]Hong Kong Chu Hai College, Hong Kong S.A.R., China; [2]Gakushuin University; [3]University of Tokyo, Japan

During the industry 4.0 era, across many industries, production lines and the constituent production equipment are upgraded and retrofitted with sensors, communication capabilities, and computational intelligences so that real time operations data could be collected, communicated, and analysed. Analytics- decisions and instructions are then feedback to the equipment for smart real time corrective actions.

An emerging dominant design of the Industry 4.0 era is that of a Cyber Physical System (CPS) in which the physical domain comprises the network of smart production machines

and the cyber domain comprises the distributed analytics works on the collected data as described. Transcending the domains is the organizing entity of an industrial digital platform which is considered as the new innovative “unit of analysis” in the Industry 4.0 era beyond any singular piece of equipment. In fact, many product-centric firms are now making the transition to become a digital industrial platform organizer. Examples include: Siemens’s Mind Sphere, GE’s Predix, FANUC’s FIELD platforms, among others.

This paper proposes an integrative but ambidextrous framework (Shum, Kodama, Shibata 2020) to the managing of the strategic industrial digital platform. In the physical domain side, different equipment (models and makes) are to be interconnected and their output data formats be converted to a common data model to be processed. In addition, makers of such equipment need to engage in technological diversification or, more specifically, technology fusion (Kodama 1986, 1992) to upgrade their functionality to respond to the instructions from the analytics in the cyber domain. Alternatively, in the cyber domain side, the digital platform must avail access of the operations data from the real domain via Applications Programming Interfaces (APIs) to a community of distributed third-party developers for analytics purposes.

To aid the ambidextrous management of the two sides of a digital platform, we propose an OPEN CPS paradigm (Shibata and Shum 2021) which sustains related or unrelated technological diversification (technological fusion) in the physical domain and open APIs and social learning among developers in the cyber domain. Such framework conditions emphasize co-development or co-evolution of the two sides of an industrial digital platform, which is missing in the existing literature. The meaning and extent of openness in both the physical and cyber domains would be critically examined in this paper.

This ambidextrous management framework anticipates and facilitates platform-based digital servitization (Cenamor et al. 2017, Kohtamaki 2019). Digital servitization is a natural forward integration outcome of an industrial digital platform. The scope of digital servitization is beyond the servicing of any singular piece of production equipment, but rather is the entire interconnected network in the physical side, which leads to a potential and viable business model for the organizer of the industrial digital platform.

This all the more necessitates the discussion of network effects and scaling dynamics, governance issues, digital servitization ecosystem, and productivity discussion of digital servitization, mong others. We will use the singular case of FANUC’s FIELD platform to illustrate the open CPS framework, and motivate several research directions related to the rise of industrial digital platforms.

Moral food lab: Transforming the food system with crowd-sourced ethics

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The growing societal interest in converting food production and consumption to a sustainable system means that technological and systemic innovations are on the rise. These system changes - often intending to improve the efficiency of logistical, energetic or spatial processes - affect social, cultural and societal structures. However, the ethical aspects of novel food systems are only sparsely mentioned on the political agenda or in public debate. The increasing use of new technologies by innovative start-ups (such as insect farming, lab-grown meat, 3D food printing, or plant-based protein production) justifies better moral considerations about the way technology is used in agricultural and processing processes. On the one hand, we need a comprehensive reform of food production and consumption so that food security can be guaranteed within the planetary boundaries. New technologies in agriculture and processing as well as new trade structures are indispensable for this. Secondly, we need to isolate and specify the components of these technologies so that they can be tested as a prototype. On the other hand, citizen involvement is necessary to take into account a moral compass accepted by our society in restructuring. After all, the moral choices consumers make in food technology will determine the acceptance of the future food system. In this abstract, we present the outlines of our most recent project which start activities in the middle of 2023. In this research, we build on insights we gained through the Moral Design Lab, a project related to ethical considerations in the development of smart technologies, running in Eindhoven since 2019. We are working on a strategy to permanently involve consumers in techno-moral decision-making to shape the sustainable food system of the future. Our goal is to establish an applied, living and sustainable moral decision-making model for food-technology decisions that citizens can relate to. On this basis, actors in the food network and (EU) politicians can make decisions that are built on crowd-sourced ethics. This leads to greater acceptance and approval of a future food system. We opt for a combination of methods in which linguistic analyses, empirical ethics, and comparative methods from the social sciences are combined through intervention design. This is carried out in an international ecosystem with a particular focus on Germany and the Netherlands. As a result, we expect to learn how different moral viewpoints on food technology are expressed, what the motives are, and how they relate to one another. Finally, these insights will be translated into design principles for the food industry.

Digital platforms in neighborhood assistance – preliminary results of a qualitative study on digitization benefits

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For the provision of care in Germany, neighborhood assistance is considered increasingly important for the care of elderly people. This is all the more true due to the increasing shortage of skilled nursing staff, declining family support and the challenges of demographic

change. However, neighborhood assistance, in particular their digitization processes and the benefits of these processes, have hardly been researched so far. Starting from this research gap the Project NuVe (Benefit of Mediation Platforms for informal helpers in domestic care) aims at examining the benefits of digital platforms for neighborhood assistance organizations and their users.

The qualitative explorative study design encompasses guided interviews with the following actors: Three neighborhood assistance organizations with varying degrees of digitalization, their respective user communities (consisting of help seekers and volunteers), as well as accompanying interviews with experts. This study design allows a multi-perspective view of the benefits of digital platforms for the respective groups and a differentiation based on the degree of digitization.

This talk presents the (preliminary) results of the research project for the group of platform operators. Starting from a comparative perspective, we address the following questions: What type of platform are neighborhood platforms employing? At what points in the matching-process between help seekers and voluntary helpers does the use of digital platforms in neighborhood assistance organizations unfold benefits for the provider? Which actor configurations can be observed in the context of neighborhood assistance? At which points in the matching process of help seekers and volunteers are digital platforms used? How is the tension between the openness and closedness of the platforms for the user group shaped by the provider?

The preliminary conclusion is that the interweaving of the digital and the analog processes represent a solution to a trust problem common to neighborhood assistance. This applies especially to the processes of inclusion and exclusion of persons via the gatekeeping function of the platform provider.

Sociotechnological Standardizations via Design Methods

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Henke&Henke, Germany

A high share of current technologies are developed via rationalized New Product Development (NPD) processes. During these processes, the involved teams apply standardized tools and methods, that aim at integrating the user and other sociocultural factors in the development process. Especially since the User-Centered Turn, and its orientation towards *Emotional Design,* emotions and the human body receive more attention. These factors are operationalized according to the economic interests of the project owner, which creates the necessity to develop a critical interpretation of NPD processes.

The proposed conference intervention shall develop a critical perspective on design methods and their impacts on the standardization of new products and services. Essential questions are: What are underlying patterns of common design methods? How do these methods participate in the standardization of NPD processes?

The theoreticla framework shall be guided by Embodiment and Critical Theory. Embodiment grounds affects and human cognition in the corporality of an individual, and therefore allows

a holistic consideration of the user. Critical Theory helps understanding current technologies in the broader context of modernity.

Technoscientific innovation and sociocultural factors get more and more interwoven via NPD processes. The proposed intervention aims at better understanding the complexity of this phenomenon.

Sustainability of Healthcare Robotics During Covid-19 From The Lens of The Responsible Innovation(RI): A Case Study of Health Sectors in India

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Jawaharlal Nehru University New Dehli, India

In the present world, Artificial Intelligence (AI) is entering every sphere of society, such as health, energy, agriculture, education, transportation, and environment protection. The recent covid-19 pandemic has witnessed the use of AI at a massive level for monitoring lockdown situations, for the collection of patient information, and in other areas. Robotics technology has issues like ethics, privacy, non-empathic, and other societal concern. The objective of this study is To analyse the current state of the robotics in the health sectors in Delhi. Data for research has been collected using primary and secondary survey. Primary data has been collected with the help of questionnaire and focused group discussion and Secondary data has been collected using different methods such as secondary literature review, document analysis, online questionnaire survey, observation of non-participants, and interviews. The finding of this work suggests that if all dimensions of responsible innovation like anticipation, reflexivity, deliberation, participation, and responsiveness are deployed in this technology development, then it can achieve sustainability. The paper concludes that this theoretical framework can appropriately handle proper governance, management, and deployment of healthcare robotics.

The Role of Motivational Appeals to Overcome Biases in Technology Design

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Biases in the development of technology have recently received increased attention. Specifically, biases relating to gender and race are frequently programmed into technology design. Past research has neglected to empirically investigate the role of individual programmers in overcoming or correcting biases, especially the question of how they can be motivated to engage in affirmative action and bias detection – which has recently been identified as an important pathway to decolonization. The authors develop and test a conceptual framework on the effectiveness of motivational appeals directed at programmers, outlining the role of framing, the message speaker's race and gender, and receivers' individual differences in terms of social dominance orientation-egalitarianism (SDO-E) for the effectiveness of such appeals in driving bias detection outcomes (ability to detect potential biases, i.e., a chatbot portrayed as a white male). The framework proposes that a problem framing (i.e., "you are part of the problem") will be more effective than a solution framing (i.e.,

“you are part of the solution”) if the speaker is white and male (instead of black and female) and vice versa. Regarding individual differences, the authors propose that these results will only occur for respondents with low levels of SDO-E and be reversed for respondents with high levels due to the pursuit of egalitarian values, which automatically inhibits stereotype activation. To empirically test the hypotheses, the authors recruited 590 real US programmers via Prolific to participate in a 2 (problem versus solution framing) x 2 (speaker white male versus black female) between-subjects experiment measuring their ability to detect potential biases. Results support the theorized framework. The study generates important conceptual implications for theories on biased technology design, the role of individual programmers for affirmative action and decolonization through technology development, implicit bias and stereotype activation, intersectionality, and bias confrontation, as well as practical implications for the design of motivational appeals as interventions.

Make your own control room!

Ola Michalec[1], Joe Bourne[2]
[1]University of Bristol, United Kingdom; [2]UCL

Looking at media reporting, we might often assume that innovation happens rapidly, that innovation is inevitable, revolutionary, ‘sexy’, and a force for good in itself. This couldn’t be further from truth, especially for critical infrastructures like energy.

Instead, innovations in the context of critical infrastructures engage with the following characteristics:

- **Slow** - as testing and validating for safety and resilience take priority
- **Contested** - there is ongoing competition over the best technology and many people/organisations resist change altogether and prefer to stick to legacy equipment
- **Piecemeal** - technologies are introduced at various rates in various places, which makes it difficult to realise the ‘whole scope’ of the grid modernisation project, (e.g. the imagined industry dream of real-time internet-enabled technologies all talking to each other at once won’t realise for a very long time)
- Followed by years/decades of **maintenance** - it’s not about introducing a new thing, but making sure it’s interoperable with the old ones and durable over a long time.

The poster will interrogate the notions of temporality, contestation and maintenance using illustration as a medium. Taking control room and cybernetics as an inspiration, it will ask: "what is so smart about smart energy innovations?"

Deviant Action in Algorithmic Regimes

Thomas Zenkl
University of Graz, Austria

As algorithmic applications and AI systems continue to evolve, so does their social influence in conveying information, assessing relevance, and reducing complexity. Equipped with what some call “algorithmic power”, these systems continue to shape relationships and how we see the world. However, neither do processes of algorithmic selection, curation and decision-making happen outside institutional boundaries that “empower” them, nor do they go uncontested by (seemingly) passive users. Drawing on a widely located unease against the automation of decision-making processes, the vague imaginaries of "algorithms", and recognizing the social embeddedness of technological innovations as socio-technical systems, I focus specifically on why and in what ways users of algorithmic applications act deviant to the systems intentions, “resist” their influence and oppose algorithmic subjection. Contrary to a techno-determinist perspective, this approach aims to highlight the transformation of human agency (rather than its repression) within algorithmically constituted regimes, to describe the often conflictual and unpredictable integration of technology and thus practical social transformation processes as well as the reciprocal shaping of societies and technologies. This poster aims to present the theoretical implications of my PhD project and to outline considerations of my research methodology.

Stream A: Open Science: Rethinking the Science and Society Relationship

A.1: Organising Post-growth STI

Session Chair: Ben Robra, University of Vigo, Spain

Session Chair: Alejandro Fortuny Sicart, Post-growth innovation lab, University of Vigo, Spain, Spain

Session Chair: Mario Pansera, Universidade de Vigo, Spain

Science Organisation: Current Conversations and Post-Growth Imaginaries

Karishma Jain
University of Cambridge, United Kingdom

Of the limited work that has taken place in examining relationships and possibilities for STI in a post-growth context, the main focus so far has been on on the “T’” and “I” of STI, and not very much on the “S”. While technologies and innovations arising out of science have been instrumental in accelerating economic growth, I argue that science itself is strongly aligned with the post-growth mindset, and approaches for organising science for post-growth will be important precursors for post-growth organising of technology and innovation adjacent to or arising from science.

Despite the increasing popularity of citizen science, much of the scientific work that gets embedded in technology and innovation is done in professional settings, which primarily comprises academic labs at present as industrial labs are now mainly concerned with ‘applied science’, or in other words, developing technologies. Current ways or organising professional science research and the incentive structures that are in place are very much aligned with a growth mindset and are far away from the post-growth aligned experiences of wonder, creativity, beauty and joy of uncovering truths that are often the reasons that may initially interest individuals to engage in science.

The growth-oriented organisation of current science research is causing the emergence of many challenges - the reproducibility crisis, reducing rates of progress and a labour crisis in addition to gender and racial inequities. The community is starting some conversations that begin to address some of these challenges, for example the slow science movement, discussions on research assessment metrics and their unintended influence on hiring and promotions, and recently also those suggesting that organisation cultures recognise the value of aesthetic experiences for scientists as an approach to deal with the mental health crisis in science.

The nature of these conversations within the scientific community is aligned with the post-growth mindset, but they have not yet been framed in this way. In this talk I will provide a post-growth framing to these conversations and draw out approaches from the wider degrowth and post-growth research community to propose alternative ways of organising

mainstream science that will no longer support or propagate the root causes of the challenges science faces, and will create spaces for convivial experiences of wonder, beauty, play and joy, and for doing ‘Science for Its Own Sake’.

I will also outline some initial thoughts on how post-growth aligned approaches to science organisation might percolate through to organisation of science-adjacent or science-based innovation and technology.

Critical geography of Digital Social Innovation. “Reading for difference” the space and spatialities of socio-technological networks in the augmented city

Paolo Giaccaria, Chiara Certomà
University of Turin, Italy

Institutionally promoted as well as grassroots Digitally-enabled Social Innovation (hereafter DSI) initiatives are mushrooming in worldwide cities, both influenced by and influencing in return the urban organisational logics, functional structures and operative processes. Despite over the last few years these attracted an increasing interest in a wide range of disciplines, they remain very marginal and almost unexplored in both human geography and STS studies. Our presentattion engages with the reasons underlying this trend and explain, building upon recent flourishing of critical geography analyses on cognate areas of digital methods, smart city and platform society, how the analysis of spatial implications of DSI can bring novel exploratory insights in TST studies, with special reference to post-growth theories.

To this end we adopt Gibson-Graham's tripartite methodological approach of “reading for difference” social agency, notably DSI initiatives. In so doing, the paper suggests that critical scholars’ limited attention toward DSI roots in a dominant polarised reading of DSI as neoliberal vs revolutionary; and in the massive association of DSI with the first pole due to the dominance of innovation management analyses, leaving underrated considerations on space and spatialities of DSI. Drawing on non- dualistic digital geography contributions, influenced by the material semiotic perspective of ANT, we therefore detect commonalities amongst diverse initiatives and genuinely emancipatory socio-technological agency of heterogenous networks in urban context. In so doing, the paper identifies the multiple issues of interest relevant for STS scholars in the analysis of how DSI is increasingly intervening in the multi-layered spaces of everyday urban life around the thematic nodes of representation, reproduction and power in the growth/post-growth divide.

We can't innovate our way out: reconfiguring what is important through urban techno-politics challenging hegemonic narratives of growth

Leandros Savvides
Cyprus University of Technology, Cyprus

Much of the discussion of innovation has revolved around either giving incentives to private investors or building infrastructure with heavy capital-intensive investments supported and subsidized by the state, to help develop ecosystems for the sake of economic growth. National innovation plans have been attempts by states to become aggregators of innovative behavior and guide investments towards specific routes. The dilemma of private or public investments in innovation is predicated on the very idea that innovation is always a positive development for the economy, society, and even the solution to political problems. Yet, the very concept of innovation could be irrelevant to real-world problems, as the failures of capitalist realism mean that innovation is itself subsumed under the needs of capital. At the same time, unable to find themselves met within the existing structures of innovation infrastructure, are class strata that despite possessing the skills and knowledge, are nonetheless left behind, finding solace in movements such as the makers. An ambivalent social movement with long roots and tradition going back to the counter-culture of the 1970s and the cold war collaboration of scientists in a war economy style has challenged the hegemonic dilemma by placing citizen science into the public sphere and opening the debate on alternative routes of innovation to the industrial model. While it never claimed that would eclipse the production paradigm altogether, it nonetheless utilized practice to ask critical questions: What needs to be innovated and why? Is mass production the future? Do we need such mega-factories and humongous global supply chains producing for the larger portion of the world's population? Who controls those supply chains anyway? Whilst appearing as challenging the status quo in the first part of the 2010s, it seems that recently the movement is more and more recuperated via institutionalization. However, it is worth revisiting some of the arguments put forth, as a critical reflection of what place innovation as a growth concept can have in future talks about solutions to everyday problems.

Rethinking innovation beyond economic growth for sustainability transitions. The case studies of Transition Towns and the Degrowth movement.

Andrea Pérez Porres
University of Sussex, United Kingdom

Confronted with ecological, social, and economic crises, the mainstream response has been to advocate technological innovation within a 'green growth' paradigm. -influenced by Schumpeter's ideas that coupled innovation with economic growth. Technological innovation within a green growth paradigm is seen in the literature as the answer for the current crisis; a position that reflects deeper beliefs in society around the idea that technological progress will fix the current problems and that innovation always leads to economic growth and prosperity. However, evidence shows that current conventional models for innovation in sustainability are inadequate to enable the solving of linked crises of unsustainability.

Post-growth literature has focused on thinking of development pathways without GDP as the indicator and driver of progress. Thus, a new space of opportunity is opening for social movements that are exploring alternative development pathways, in which a different notion of human wellbeing and a radically different approach to economic development are emphasised.

This research aims to contribute to understandings of how innovation is conceived and enacted by social movements concerned with issues around green growth. Most of the literature on sustainability transitions and innovation still focuses on more conventional economic assumptions and understandings of innovation, as well as conventional practices in business, organisations, and governments. There is some research that has started to explore innovation and technology beyond mainstream understandings of innovation such as grassroots movements and convivial technologies. There is less research on how movements might prefigure new models, alternative modes of organising, criteria and settings for innovation that require a rethinking of innovation in a postgrowth society, which is the gap in the literature that this research intends to address.

This research integrates a thematic analysis and critical discourse analysis from data collected through in-depth semi structured interviews, participant observation and document analysis of social movements active in the UK –Transition Towns, a grassroots innovation movement formed by a network of local initiatives, and the degrowth movement, an academic-activist movement. It is important to look at different kinds of social movements as each might contribute to new theories, discourses, framings, and practices in innovation differently. Discourse theory allow us to identify subtle and implicit meanings, as well as to capture the assumptions that give meaning to material and social realities and the movements' contradictions, commonalities and differences, and contrast their discourses and perspectives with green growth understandings of innovation and technology.

This research will provide timely analysis that is both constructive and critical towards rethinking innovation in society, which will benefit policymakers, businesses, and civil society organisations interested in exploring alternative modes of innovation and convivial technologies compatible with post-growth. Rethinking innovation and decoupling it from the growth paradigm is key to developing alternative pathways, and social movements contribute to discourses in the way innovation is understood and practiced, playing a vital role in sustainability transitions.

Exploring a delivery cooperative platform: Coopcycle case study as an example of post-growth organization and innovation.

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The scholarship of responsible innovation (see e.g. Stilgoe et al., 2013) and critical theory of technology (see e.g. Feenberg, 2002) highlights that technology and innovation, far from being neutral, serve conflictive and different interests and embed, usually dominant, worldviews and ideologies. Hence, innovation could be normatively re-directed from serving

the imperative of growth and the capital accumulation logic of capitalism mode of production to serve societal needs. By drawing on an in-depth case study of a riders' cooperative, CoopCycle, this paper explores the strategies of resistance, appropriation and re-direction of technology that may be compatible with a post-growth economy. The study focuses on a delivery riders' cooperative digital platform which is used, co-owned, and governed by a federation of more than 70 rider cooperatives around the world. Its key characteristics are the mutualisation of the platform services, experiences and costs and the democratic governance of the software development. The platform has been hacked and re-engineered according to the principles of open source and delivered under copy left to any riders' collective who meet two basic requirements: being a cooperative of workers that complies to national or European solidary economy law and workers are salaried employees (Vercher-Chaptal et al., 2021). The software aims to revert the direction of digital platforms in order to serve to the emancipation of the workers and include ecological dimensions (e.g., bike delivery) instead of reproducing the precariousness of labour that is characteristic of dominant delivering digital platforms (Vercher-Chaptal et al., 2021). The case highlights that organizations and innovation could follow different purposes, release people from labour abuses and enable their participation in the organization of their work. As an example of post-growth organization and innovation, the case provides empirical evidence of how technologies and organizations are being re-designed and governed in more democratic, just and participative ways compatible with post-growth literature. It also contributes to developing the emerging literature on post-growth organisations (Vandenventer and Lloveras, 2021) and innovation (Pansera and Fressoli, 2021), which does not yet connect with the co-operative platform movement and could extend the empirical cases which have been influenced by the Peer-to-Peer foundation such as Coopcycle.

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Innovation without the purpose of growth: the emergence and scaling-wide of post-growth organisational values

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Particularly the concepts of post-growth and degrowth have come to the forefront in challenging the dominant and quasi-natural view that growth and capitalism are good and desired (Schmelzer et al., 2022). However, the view that organisations need to operate and innovate for the purpose of economic growth, profit making, and capital accumulation predominantly still persists (Nesterova & Robra, 2022). At the same time organisations have been meagrely researched in the context of post-growth, while innovation has been researched even less in connection to this (Pansera & Fressoli, 2021). The paper follows the view that organisations and consequently the way they innovate as well as reproduce technology have a significant role to play in the emergence of post-growth societies.

In this paper we therefore seek to address parts of the above research gap by focusing on the emergence of organisational values that might operate in line with post-growth assumptions; in particular, values in relation to innovation and technology. The aim is to understand firstly what such post-growth organisational values might look like. Secondly the goal is to understand where influences for such a potential value alignment might stem from but also how the organisational social systems in question might seek to influence other social systems to align their values similarly.

Our empirical investigation is mainly informed by two bodies of literature. On the one hand, the literature on organisational values, particularly views that highlight values as the core to decisions within organisations (Besio & Pronzini, 2014). On the other hand, STS literature which argues that innovation and technology are far from neutral but imbued with the values and purposes of the social system they arise in (Walsh, 2021). Building on this as well as previous research examples we define organisations as autopoietic social systems in which decision premises can be investigated. We therefore collected data on decision premises in the French social cooperative Noesya to understand the organisation's a) purpose and values as well as b) perceived purpose of innovation and technology. The data was collected through in-depth interviews and a participatory workshop exploring the organisation's decision premises.

The preliminary results highlight key findings relevant to research on innovation as well as organisation in connection to post-growth. Firstly, organisations are able to align their values with post-growth. The influences for such an alignment come from a plethora of different social systems. However, what is important to state is that this alignment seems to emerge from an organisational consciousness that views the organisation's purpose as having a role to play in achieving a sustainable society. Secondly, the organisation's perception of innovation and its purpose are closely related to this consciousness. Thirdly, this

consciousness seems to further drive the organisation to seek to influence other organisational systems in adopting heterodox organisational purposes to achieve sustainability.

A.2: Science, Society and Policy – a contested relation in search of a new modus vivendi

Session Chair: Wolfgang Johannes Polt, Joanneum Research, Austria
Session Chair: Thomas König, IHS, Austria
Session Chair: Matthias Weber, AIT Austrian Institute of Technology, Austria

Two Rawlsian Ideas for Technology Assessment

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As emerging technologies have the potential to radically change our societies and will in some instances affect fundamental rights of citizens there is a need of adequate political regulation. Such a regulation must be informed and effective as well as legitimate and publicly justified. TA can play a major role by giving advice for the political bodies and the general public, which are confronted with the corresponding tasks. We will discuss two prominent ideas from the philosopher John Rawls that can enrich the practice of such TA policy advice for our digital futures: 1) the idea of public reason and 2) the idea of full reflective equilibrium.

The idea of public reason is an answer to the challenge of reasonable pluralism that exists within liberal democracies: there is not one comprehensive doctrine or political ideal all citizens endorse but there are many religions, philosophies and worldviews coexisting along with a wide spectrum of political parties and movements. According to the idea of public reason it follows that an adequate justification for a political regulation that touches fundamental rights must be appealing to all citizens. It thus cannot refer to only one comprehensive doctrine or political ideal but must refer to mutually shared convictions within an overlapping political consensus. This fits well with the requirement for TA to be politically neutral – a requirement that we aim to clarify with Rawls's theory.

The idea of reflective equilibrium provides a methodology for justification based on the idea of public reason. It is maybe the most prominent method within moral philosophy. The main idea behind the method of full reflective equilibrium is that a political regulation is justified, if it coheres with the relevant principles of justice citizens mutually accept as well as with shared political judgements and empirical findings, so that one can grasp it as an element of the most plausible system of shared political commitments. The method provides certain rules that have to be followed to arrive at such state – a full reflective equilibrium. If a political regulation is an element of a full reflective equilibrium, it is not only likely to be *accepted* democratically but it is also justifiable to reasonable citizens and thus is *acceptable* in a normative sense.

In this paper we want to show how both of these Rawlsian ideas correspond to the notion of “reflexivity” as one goal of TA and how they could further inform already existing practices and the theory of TA as such.

Social sciences, their societal impact and the agonistic democracy

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Whether in France, Germany or the United Kingdom, social sciences research and knowledge production activities have been recently re-inscribed within institutionalised agonistic political confrontations (Mouffe 1994) which take academic neutrality, freedom, engagement, responsibility, or impact as divisive policy issues (Fecher et al. 2021; Beaud 2021). The multiplication of political formulas and buzzwords by political stakeholders in the public debate to designate all or part of this disciplinary ensemble, such as “islamogauchism”, “wokism”, or “cancel culture”, bears witness to this polarisation of exchanges in the representative bodies of society when it comes to determine the political role assigned to (and taken by) the social scientist (Albæk 1995; Benneworth and Jongbloed 2010). What may have been seen as simple controversies, i.e. as adversarial but argumentative exchanges that just had shifted from the scientific to the social arena (Cefaï 1996) on what social sciences should do and say, are in fact to be analysed differently. Indeed, when the main objective of a debate between MPs becomes to win the confrontation and impose one's representation of the social sciences, then reasoned discourse no longer works, and all tricks become permitted to disqualify the opponent: using purposely polemical categories is one way of doing so (Charandeau 2017). To what extent do parliamentary discussions on the societal impact of social sciences, which are supposed to be the democratic debates par excellence, still play their role, namely deliberate?

In this contribution, I will outline some thoughts on the evolutions of parliamentary discussions on the impact social sciences have on society. Those exchanges are sometimes controversial, sometimes polemical, and their evolutions have both policy and polity implications. To do so, I will draw on the rhetorical analysis of the debate transcripts of the national parliaments of the three study cases (Assemblée Nationale and Sénat for France, Bundestag and Bundesrat for Germany, House of Commons and House of Lords for the UK) over the time period 2012-2022. Following the methodology employed by Wiesner, Palonen and Haapala (ibid. 2017), I will focus on how individuals talk about (and thus represent themselves) the societal impact of research by identifying what argumentative strategies are mobilised and what associations of ideas run through them. All this will allow me to not only understand to which socio-discursive imaginaries these rhetorical tools refer (Charaudeau 2005), but also more broadly how political activity in French, German and UK parliamentary cultures function (Steiner et al. 2005). Indeed, ‘impact’ may be both a rallying and a structuring point for political interests thanks to its interpretative flexibility (Moawad and Schendzielorz 2022); but such definitional negotiations have greater significance as they both form and inform the public opinion on the role and usefulness of social scientists within society. The proposed paper thus suggests a policy implication for encouraging political

stakeholders to return to the deliberative genre (Haapala and Palonen 2017), where the confrontation of several conflicting views, here definitions of the societal impact of research, is key for the survival of a democratic system.

Living Labs as research infrastructures for honest brokering?

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The problems facing societies worldwide, including climate change, new mobility and digitalization to name a few, are complex and wicked (Waddock et al. 2015). Addressing the challenges ahead requires an immense amount of research/development, the (co-)production of knowledge as well as coordination between actors, social spheres and scientific disciplines. Hence, it is important to approach and address these societal problems in a scientifically sound and politically legitimate way. In this regard, Living Labs (LLs) make prominent claims. They are heralded as universal platforms for problem-solving, employing transdisciplinary and transformative methods to sustainably and responsibly solve grand societal problems at the interface of science, policy and civil society (Parodi and Beecroft 2021), pursuing both research and practical goals. In short: LLs are viewed as bearers of a new deal or *modus vivendi* to smooth the waves between science, society and policy.

It is not by accident that a cohesive and definitive definition of LLs is lacking and presumably not to be expected: LLs come in many shapes and sizes, following different strategies and approaches (Backhaus et al. 2022). This is both a strength, for example by allowing for flexibility in the approach, and a weakness by giving way to arbitrariness and buzz wording deprived of meaning. In other words, LLs carry the danger of being instrumentalized to follow a political agenda or an unreflexive and solutionist approach (Morozov 2014). Yet as a research infrastructure, LLs could enable an honest brokering between all relevant actors and thus pave the way for new scientific practices and a new deal between science, policy and society. On the one hand, this would require a collaborative negotiation of system borders, including a reflexive approach to agree on content and context (Grunwald 2019). On the other hand, such a new deal would require appropriately timed and politically legitimated measures of “opening up” and “closing down” (Stirling 2008). These aspects could be features of *good* LL practice, but the vagueness of the concept begs the question if and how current LLs are adequate research infrastructures for honest brokering by relevant actors already, or whether they are “old wine in new bottles”.

To answer this question and to gain a more nuanced picture, we will analyse the structure of and power relations in LLs using a three-step approach. First, a framework containing questions of power and structure of LLs (Schneidewind et al. 2018) will be established based on the existing literature. This allows tracing forms and functions of negotiation as well as types and features of power in different LL settings. In a second step, four LL case studies, each with a different leading institution, will be presented and analyzed based on the framework. Lastly, we reflect on the potentiality and actuality of the self-empowerment by

non-academic actors in and through LLs. Structural limitations, especially the project nature of LLs, currently appears to hinder honest brokering between the actors and the democratic co-production of knowledge. For this reason, we develop suggestions for structural improvement and thus enhanced LL practice.

Some advice to social scientists acting as policy entrepreneurs, reformers and institution builders in the governance of science and technology. The experience with nanotechnology.

Franz Seifert
Independent, Austria

The conveners diagnose deficiencies in the governance of science & technology (S&T) in Austria — particularly with regard to science communication, trust and expert legitimacy, but also ethical self-regulation and science-government interaction. They therefore spot a need for institutionalizing a forum that brings together science, policy and the public. Drawing on my ongoing work on agency among reform-oriented social science networks in the governance of nanotechnology I draw lessons for social scientists who pursue similar projects in S&T governance. In the nanotechnology field, reform-oriented and institution building social science networks have been exceptionally successful. In a number of countries they were able to set up experiments with new types of Technology Assessment (TA) and public engagement aimed at shaping rather than evaluating R&T. The success of these ambitious governance models is owed both to circumstantial factors and policy entrepreneurship: at the turn of the millennium, when the nano policy field took off, S&T policy elites and technology promoters in the OECD zone, alarmed by preceding controversies such as over BSE and GM food, were eager to “draw lessons” from past communication failures and try new ways with regard to the science & society interface. Under these conditions social science networks acted as policy entrepreneurs advocating ambitious governance models that promised to avoid social backlash while shaping S&T from a societal angle. The presentation focuses on the major ingredients of these success stories, from which it seeks to draw lessons: notably the importance of narratives resonating with circumstantial S&T elite concerns (and structural elite interests), S&T elite allies, policy entrepreneurs’ scientific capital (Bourdieu), national political cultures, and persuasion through transnational diffusion dynamics. The presentation also emphasizes the situational and thematic nature of the evolution of the science & society interface and the need of social science networks to at once capture newly arising opportunities and stabilize long term reform projects (and themselves). It finally discusses what could be learned from the German success story of the NanoKommission (which however came into being due to policy entrepreneurship of S&T elite actors rather than social science networks) for the panel’s discussion topic at hand.

Governing regulatory science: institutional divergence and epistemic authorities in the Glyphosate case

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What happens when epistemic authorities are challenged using their own methods? I use the case of the risk assessment of the herbicide glyphosate to gain an enriched understanding of epistemic struggles that exist within scientific communities and the changing nature of controversies in science-based policy. The case highlighted the unique challenge posed by the contrasting conclusions of the International Agency for Research on Cancer (WHO/IARC) compared to the USA/EU national risk assessments. The IARC concluded in 2015 that glyphosate is a probable human carcinogen while other agencies maintain that it is safe. As an international organisation, IARC could not be accused of promoting national interests and its authoritative status could not be easily dismissed. Discussions amongst opposing parties then focussed on issues of scientific relevance, methods and practices and experts' conflict of interests on both sides, and has reached a wide audience, destabilising the decision-making process. Data came from documentary sources, including legal-discovery documents and scientific literature to develop interim hypotheses tested through semi-structured interviews with academic scientists, experts from regulatory institutions and members of civil society organisations. Findings suggest that orthodox techno-scientific approaches within the USA and EU authorities, and differential institutional access, undermined the influence of all types of stakeholders as experts, except for the pesticide industry. The latter have formed an influential epistemic community together with agencies' experts that defended their expertise and practices as "sound": official science, rather than the "*best available science*", powerful lobbying using new media platforms, and financial inequalities were part of the systemic asymmetry in the dispute. Although EU legislation includes a provision for alternative practices and knowledge, an institutional vacuum for alternative approaches left stakeholders without effective access to governance processes, many of whom have temporarily converged around the IARC. Building on social theory of risk, post-normal science and other STS literature, complemented with considerations from institutional theory, I conclude that we need not assume the objectivity of incumbent experts, and instead explore how to create better governance arrangements for complex and uncertain science-based policy, aiming at striking the proper balance between scientific and democratic authority.

Starting from the observation that while the EU regulation supports precaution and includes some mechanisms for broader public participation such the European Citizen Initiative, these instruments are blunted by asymmetry of knowledge access and authority among stakeholders, I propose that current arrangements need to be complemented by a broader institutional access for a diverse range of stakeholders, where entanglement between normative assumption and the construction of the processes and procedures of scientific risk assessment can be discussed in a transparent transdisciplinary setting. The case highlighted how the production of relevant alternative knowledge, is not only warranted but should be actively supported and taken into account in the decision-making process: this will both improve democratic discussion and effectiveness of the available science and practices. These new arrangements could overcome the current dichotomies, safe/unsafe and

costs/benefits that hide nuanced interpretations and judgements, and support foresight in the decision-making process, privileging an equitable and transparent distribution of risks.

A.3: Is there a problem with science skepticism? Invitation to reflect a trendy topic

Session Chair: Erich Griessler, Institut für Höhere Studien, Austria
Session Chair: Johannes Starkbaum, Institut für Höhere Studien - Institute for Advanced Studies (IHS), Austria

"Science cannot be deceived!" How trust in science leads to refused knowledge about vaccination in Italy

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The contribution aims to address how lay people produce refused knowledge, mostly ignored by official science, and refuted by public health institution, to reinforce what they consider science.

Studies on ignorance (Gross, McGoey 2015) often argued that public ignorance of science prevents citizens from making rational decisions about scientifically supported policies as in the case of vaccine hesitancy (Goldenberg 2021). Trusting science, in fact, has important benefits for society and individuals. However, this groups of lays, such as antivaxxers, claim of a specific idea of "authentic" and disinterested scientific community (Harambam & Aupers, 2015) shaping matter of public concern about vaccination policy. Studies show that a broad trust in science involves a confidence that could be displaced from official science onto refused knowledge invoking scientific credentials (O'Brien et al 2021). Free vax communities, often, do not reject science per se, but shows an ultra-positivistic (Yl-Anttila's 2018) and idealized idea of science with specific features. In this line, the objective of our presentation is 1) unboxing the idea of science that antivaxxers address and 2) showing how they contest epistemic authority of what they perceived as antiscientific. One of the strategies consist in doing "their own research" (Attwell 2018) online, but also by implementing research projects. Therefore, we outline the strategies through which these communities want to undermine the authority of official knowledge about vaccination. We will then present two exemplary studies carried out respectively by two major Italian associations for free choice vaccination in Italy: Comilva and Corvelva. The first is a metagenomic study, carried out by Corvelva, to demonstrate the harmfulness of Priorix-Tetra vaccines used in children from 11 months to 12 years, for the prevention of diseases caused by the viruses of measles, mumps, rubella and chickenpox. This study has gained the attention of the public opinion and health institutions in Italy, being mentioned also by international journals such as Nature. A second research project, implemented by Comilva, aims to investigate the effectiveness of vaccine protocols and natural immunization. This project, still in progress, is requesting the participation of citizens who freely undergo antibody tests, giving up the privacy protection of their health data to support the cause of antivax associations.

The pandemic return of the deficit model. Comparing Austria's anti-GM and anti-vaccination movements.

Franz Seifert
Independent, Austria

Three controversies are hallmarks of Austria's evolving science-society relationship: the controversy over the nuclear power plant Zwentendorf in the late 1970s; the movement against genetically modified (GM) food, feed and seeds in the mid-1990s; and the backlash against the nationwide anti-Covid vaccination campaign and legislation for mandatory vaccination in the early 2020s. Contention over the validity of scientific expertise legitimizing state-led projects is a recurrent feature of these controversies in which, as the call for this panel implies, what has been dubbed "science skepticism" plays a causal role. While, in the call, the term's exact meaning remains undefined, here it is tentatively understood as refusal to accept generally agreed upon scientific positions bolstering state-led projects and policies in the course of a social movement. Drawing on such a hypothetical understanding, the presentation draws a comparison between Austria's GM-controversy and the anti-vaccination movement. For one thing it asks: how did "science skepticism" play out in these controversies? For another it inquires how and why "science skepticism" turned into a politically recognized problem—and a problem for whom? The comparison reveals some similarities but also significant structural differences between the two controversies. Indeed, it highlights the anti-vaccination movement's exceptional character that sets it apart from a string of techno-ecological science controversies that have left their traces in Austria's political culture. In the discussion, the presentation also refers to the GM-controversy's wider effects in Western academic and governance debate which, among other things, led to the questioning of any kind of "deficit model" of the science-society interface, including deficit of trust intrinsic to the term "science skepticism." Have the egalitarian and dialogical remedies against science-related controversy, that have since come into fashion, reached their practical and normative limits? What is the appropriate role or ethos of the social sciences who respond to the renewed demand for examining the deficits of trust implied in the term "science skepticism"?

Allies of expertise: the boundary-work of science fans

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For my dissertation project I study Facebook groups that organize around the goal of disseminating and defending scientific expertise in the context of the Corona pandemic. These science fans are frustrated and unsettled by science skepticism and denialism on social media and respond with counterspeech. I first became aware of this phenomenon in January 2021. A post by a group called "Drosten Ultras Against Conspiratards" (translated from German) appeared on my feed. Drawn in by the odd combination of German virologist Christian Drosten, the derogatory term for conspiracy theorists and the association with Ultras fandom, I requested membership and began my (mostly digital) ethnographic research.

So far, I conducted 24 interviews with administrators, moderators and members and collected screenshots and field notes from observing seven public and private groups deemed relevant to the community. I am currently approaching my data through the analytical lens of “boundary-work” (Gieryn, 1983). Science fans support the authority of scientific expertise by demarcating it from what they classify as non-scientific or even anti-scientific positions. They do so by invoking and mimicking notions of scientific conduct, such as rationality or objectivity. However, they also engage in radical practices, such as berating or trolling people for questioning scientific expertise (actions they would deem inappropriate for scientists themselves). Within the community these different styles of boundary-work lead to discussions, functional divisions and dissent.

My goal is to conceptualize science fans as "allies of expertise". In doing so, I understand them less as a homogenous actor than as a lens through which novel practices and performances at the science-society interface become visible. This also invites conversations about science skepticism, as I argue that the practices of allies of expertise are activated in response to ‘post truth’ phenomena. In other words: Whether or not (and to which extent) science skepticism is an empirically evident problem, people in society treat it as such and act accordingly. Since they do so independently but in the service of institutional science, I ascribe them a highly relevant role in shaping science-society relations. At the STS conference in Graz I would be happy to discuss this work in progress along with illustrative data from my field work.

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Is science skepticism really about science?

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Recent years have seen rising public and academic concern about science skepticism. However, science skepticism remains an ill-defined phenomenon as little conceptual work has been undertaken. What clearly emerges from the literature and policy debates, is that this form of popular dissent is generally seen as a negative disposition, in contrast to productive or organized skepticism. While we do not deny that science skepticism can have negative consequences for the attitude holders and society as such, we believe that we should be cautious how we approach a concept that we do not fully understand, especially given the high policy interest in this area.

This paper sets out to further our understanding of science skepticism. We depart in a literature review of conceptualizations and measurement of science skepticism. Building on this, we employ Eurobarometer 2021 data to explore the characteristics of people holding science skeptical attitudes on two central manifestations: climate change and evolution. First we investigate the sociodemographic profiles linked to having science skeptic attitudes,

largely replicating prior findings. We then turn to how science skepticism is related to general science enthusiasm and perceptions of scientists, and investigate the relationship between science skepticism and participation and interest in science.

Our analyses indicate that science skepticism is related to general science attitudes in a non-uniform manner, within and across issues, and that engagement, interest and science-policy preferences are very weakly related to science skepticism. Based on these findings, we argue that science skepticism might not be about science at all, and that we should be careful in understanding science skepticism in a uniform manner as a concept that can be "treated" with a single "cure". Science skepticism seems to be highly issue dependent rather than a general disposition towards the role of science in society.

Science, Media and the Public Sphere: A Complicated Relationship

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The results of the latest Eurobarometer survey on the public image of science and technology have raised some dust in Austria. But they did not come as a surprise. Similar results pointing to the diagnosis of 'science skepticism' had already been identified in Eurobarometer surveys during the last 15 years. However, the discussion about this faded away shortly after each survey. The proposed panel presentation tries to contribute to a differentiated view of this phenomenon and how it could be dealt with.

On the one hand, the survey results indicate that

- a good fifth of the population has no interest at all in science, and
- even most of those interested in science feel comfortable with their given knowledge of science, as only 41% want to know more.
- Based on their knowledge, only 29% of the respondents conclude that science is essential in everyday life.
- Slightly more, but not even half of the respondents believe that science makes life easier, healthier, and more convenient. In all these aspects, Austria ranks second to last or third to last in the EU ranking.
- Also ranking second to last across Europe is the 71% approval rate for the statement "Young people's interest in science is essential for our future prosperity."

On the other hand, it should be noted that interest in politics is even lower, and interest in culture is particularly low, at only two-thirds of the population, which raises the overriding question of a generally low level of interest in public life. Moreover, some results suggest a more nuanced view of the often-claimed science skepticism:

- The percentage of people "very interested" in science has risen from 9.2% in 2013 to 27% in 2021.
- An impressive 89% are interested in environmental issues and climate change, and most believe climate change is man-made.

- This is matched by the fact that the proportion of adherents to conspiracy theories (such as the production of viruses in government laboratories or the deliberate withholding of cancer medicine) is below the EU average.

Based on the Austrian data of the Eurobarometer survey 95.2 (2021), we, therefore, asked which factors support *interest in* and *informedness about science* (as the two relevant cognitive attitudes) and which hinder one and/or the other. In doing so, we assume that in an information society, the media and the public sphere play a crucial role in creating informedness about and interest in matters of public life. Moreover, public sphere theory suggests that, in a democratic society, different expectations of this role (along different media use patterns) are key to how public communication – in this case: science communication – should be done effectively to increase interest and informedness.

The analysis results will be compared with those of a previous study based on the Eurobarometer survey 79.2 (2013) – unfortunately, however, only a partial comparison is possible, as the wording and answer options of some questions have been changed.

Countering science scepticism by means of citizen science – The ultimate solution?

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Research suggests that citizen science, which is involving members of the public actively in academic research can improve the relationship between science and society. Citizens who are usually non-researchers in the field in question are involved in one or several steps in the academic research process, and sometimes also in the decision-making process of an academic research project. The range of activities in which citizens can be involved in academic research is broad, ranging from microtasks, such as classifying images, broader tasks, such as annotating text that require additional subject-specific knowledge to the entire co-creation of a research project from scratch with academics. In addition to the effects found previously, such as increasing public understanding of science as well as the acquisition of subject-specific knowledge and methodological skills among participants in citizen science projects, the question still remains whether citizen science can counter science scepticism. However, it is known that there are several misunderstandings about science among members of the public.

Some authors consider citizen science as a means for achieving the democratisation of science. However, this is also criticised since citizen science can only provide insight into academia to a limited extent. Furthermore, the democratisation of science may actually jeopardise academic freedom.

Therefore, this contribution sheds light on the theoretical background relating to the engagement of members of the public in academic research and the implications for countering science scepticism in European societies. Based on a literature review, the results demonstrate that the (indirect) effect of citizen science projects on the alleviation of science scepticism depends, among others, on the relevant activity itself, the framework conditions and the benefits for the participants from participating in a research project. While

these findings still need to be confirmed by empirical research, they still provide a basis for the discourse on the relationship between science and society and the role of citizen science in combating science scepticism in Europe.

Participants' skepticism towards biobanks: Insights from the Greek biobanking research sector

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National and Kapodistrian University of Athens, Greece

Skepticism *towards* science, differentiated from skepticism *within* science and its essential role in the scientific inquiry, appears to be increased with reference to socially salient scientific areas, like those concerning environmental or health issues. For example, the term "climate skeptic" is frequently used in the so-called global warming controversy, while, similarly, the notion of skepticism has become prevalent in public discourses about the COVID-19 pandemic during the last three years or so. Interestingly, it seems that skepticism towards science can have either a positive or a negative connotation, depending on the context in which it is used and construed. That is, individuals self-described as skeptics typically view skepticism as an asset, whereas mainstream scientists, and those aligned with their assessments, consider public skepticism towards science an important barrier to the implementation of not only science-related policies but also practices integral to the scientific research, such as the recruitment of research participants.

Among (potential) research participants, skepticism appears to be indeed common, especially regarding their involvement in researches conducted within different fields of the health sciences, where skepticism is not that much ideologically driven but rather results from peoples' unfamiliarity with the research or any ensuing concerns. Biobanking research, that is, biomedical research employing biobanks, could provide useful examples of that kind of skepticism and its meaning. Generally described as large collections of biological data derived from the donation of samples of body substances, such as tissues, blood, and/or biofluids, biobanks can be based in different institutions, from hospitals and research centres to pharmaceutical companies, and serve different health-related research purposes (Puerta et al. 2020). As biobanks rely heavily on volunteer participants, increasing our knowledge about social attitudes towards biobanks, including individuals' awareness, beliefs, and trust, is important (Domaradzki and Pawlikowski 2019).

With a view to contributing some new insights into the relevant literature, this working paper is concerned with the notion of skepticism towards biobanks within a national context. By following a multiple-case study approach, which involves semi-structured in-depth interviews, we explore how issues relating to the skepticism of (potential) donors are encountered by scientists and other actors involved in biobanking research in Greece. More precisely, through a comparative analysis of four hospital- and university-based biobanks/biorepositories, which are associated with different types of research (disease specific or more generic), we illustrate how different forms, as well as degrees, of skepticism are perceived, addressed, and dealt with by those scientists/actors. Given the individuality of the case of the Greek biobanking sector, we are confident that our ongoing research can add

some original knowledge about the relationship between science and society, especially when it comes to scientific areas with considerable social and ethical implications.

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A.4: What is “Openness” in Open Science? The case of publicly funded research and its implicit expectations

Session Chair: Jonathan Edward LoTempio Jr, George Washington University, Austria
Session Chair: Elaheh Mohammadi, Institute for Advanced Studies (IHS), Austria
Session Chair: Chase Alexander Yakaboski, Dartmouth College, United States of America
Session Chair: Eric Vilain, CNRS, United States of America

Means to Openness: Changing Science Funding with Digital Technology

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Weizenbaum Institute Berlin, Germany

In its early days, the Open Science movement was primarily motivated by the challenges arising from the digitization of science. Concerned with the freedom of information, a wide range of practical fields developed with different goals, methods, and interests. Today, this variety makes the call for “openness” a rather ambiguous claim. This conceptual challenge becomes even more pressing regarding science funding. In my presentation I want to consider the conceptual challenge of ''openness'' as a practical challenge of the digitization of science and bring the role of technology and its openness into the conversation. The topic of science funding is particularly well suited for this purpose, since distinctions such as those between “public” and “private” are distinctive in the field of Open Science, although they are being increasingly blurred in the light of the development and organization of digital technology.

In my talk, I draw on material from my current research project, in which I ethnographically examine the innovation community of Decentralized Science, which seeks to transform the way science is practiced, managed, and governed using distributed ledger technology. Some of the projects in this community are still in the concept phase, others are running as prototypes, and some have already merged into operational infrastructures. The scientific institutions growing with these infrastructures are characterized by systematic openness, structural incentivisation and digital ownership. In my talk, I will present a particular project in this community that combines the virtues of digital platforms, cryptographic protocols and data marketplaces to reorganize funding practices in the life sciences. After outlining the idea

of the project, I will describe the funding process, in which research proposals are jointly drafted, commented, and voted upon by scientists, entrepreneurs, investors, and stakeholders like patient groups. Furthermore, I will describe how data and IP resulting from funded projects are made accessible via markets that translate resources into other research projects or further applications.

The case I am describing presents an example of how Open Science funding can be carried out. It provides crucial insights into the largely unappreciated implications of "openness" in Open Science known so far, which become particularly evident when focusing on alternative financial structures of science. With my talk I want to point out the role of technology in the strive towards more openness in science and link to claims of the early days Open Science when the organization of technology was of particular interest. I want to argue that we should extend our expectations about Open Science and take into account the decreasing contrast between "public" and "private" prevalent in the digital condition. With this perspective, in which rendering science more responsive requires rendering technology more responsive, I want to contribute to the discussions about transparency and accessibility in Open Science and raise awareness about the technological means that can enable them.

Dynamics of cumulative advantage in science reform: lessons for Open Research from Diffusion of Innovation theory

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A growing body of evidence shows that, despite its democratic values and aims, the implementation of Open Research (OR) often results in inequitable outcomes (Ross-Hellauer et al., 2022). Therefore, attention to the equitable implementation of OR has become a key priority for science policy leaders and OR communities (UNESCO, 2021; OCSDnet, 2017; Wilkinson et al., 2016; Carroll et al., 2020). Our work within ON-MERRIT, a Horizon 2020-funded project (2019–2022), focused on this issue and found that Open Access (OA) publishing has been stratified by the exclusionary nature of the APC model, wherein authors from better-resourced institutions are able to pay higher APCs on average than those from less-resourced ones (Klebel & Ross-Hellauer, 2022), giving them preferential access to higher-cost, higher-impact (Gray, 2020; Tennant & Lomax, 2019); and that better-resourced researchers are better able to engage with policy-makers at the science-policy interface, giving them the opportunity to influence policy development more so than their lesser-resourced colleagues (Cole, Reichmann & Ross-Hellauer, 2023a). Other research has found that open data may widen the academic digital divide due to the infrastructure-dependent, situated nature of open data practices (Bezuidenhout et al., 2017; Johnson, 2018; Klump, 2017), among many other threats (Ross-Hellauer et al., 2022).

That these inequities are rooted primarily in unequal access to resources aligns with Rogers' (2003b) articulation of unintended consequences within his Diffusion of Innovation theory. In particular, we have documented that it's not just that inequities exist in and are fostered by the implementation of OR, but that cumulative advantage exists (Ross-Hellauer et al., 2022)

– the phenomenon of the rich getting richer, in both economic and academic/scientific terms. This finding is consistent with Rogers' theory, which holds that innovations often widen existing socioeconomic gaps (2003a). This occurs because 1) early adopters tend to have more resources at their disposal to enable them to adopt higher-cost innovations; 2) those driving innovative change focus on doing so within their existing social networks, which are socio-economically homogeneous; and 3) those that adopt early receive 'windfall profits' that widen the gap between them and others (Ibid.). To address these ill effects, Rogers (Ibid.) instructs that 1) attention should be paid to what types of messages are distributed about innovations, to whom they are targeted and how they are communicated; 2) efforts should be made to establish networks of change within less-resourced groups that link them to change agents; and 3) the context-based needs and desires of the less-resourced should be incorporated into the design and diffusion of innovations (Ibid.).

This link, between growing evidence of threats to equity in the implementation of OR, and the rich strand of empirical and theoretical work on Diffusion of Innovation, has to date not been examined. This talk will address this gap, critically engaging with Diffusion of Innovation theory to develop a better, more nuanced understanding of the unintended consequences of OR reform and of strategies to mitigate such negative impacts on equity. In doing so, we will further extend recently published recommendations for equitable implementation of OR (Cole, Reichmann & Ross-Hellauer, 2023b).

Transparency – promise and umbrella term of open science?

Lea Watzinger
Karl Franzens Universität Graz (IDea_Lab), Austria

By adopting a philosophy of science perspective within STS, my presentation will reflect a critical discussion of the key concepts within the Open Science debate. In this context, I will focus on "transparency" as a broad normative boundary object.
As emphasized in the call for papers, transparency represents an important quality of Open Sience and Open Innovation and is a central aspect of their corresponding funding mechanisms. However, transparency is also an important and formative concept for society and various fields of science, such as political science, economy, law, data science, but also architecture or philosophy.
From a philosophy of science perspective, transparency presents itself as a highly enlightening and multidimensional term (Alloa/Thomä 2018): Thus, transparency is a manifoldly dichotomous concept that has a) metaphorical as well as material dimensions and is b) both descriptive and normative (Watzinger 2022). The concept of transparency can therefore function both as an ideal and as a condition – both to Digital Transformation and to political contexts at the same time. This combination makes transparency a highly attractive idea and requirement, it can be considered as a kind of umbrella term for integrity, openness and modernity. Therefore, also for Open Science debates and its funding policies and practices, transparency has become a main requirement that will critically be examined. I will argue that reflecting such broadly adopted concepts is particularly necessary when interdisciplinary projects apply for funding to avoid opaque buzzwords.

Storm Clouds on the Horizon: The impact of sanctions on international academic collaborations and the threat to Open Science

Rebecca Leigh Yarvitz
University of Edinburgh, Scotland

In order to advance the goals of openness and Open Science, international academic collaborations are critical. Not only do these collaborations lead to more efficient, accessible, and innovative science, they can also help foster social and professional ties between scientists of different nationalities, acting as a stabilizing force in the realm of international relations. Unfortunately, such collaborations are under threat in a world of increased geopolitical tensions. An increased reliance on sanctions as a foreign policy tool, as well as general trends away from multilateralism towards a more polarized and fragmented global order, threatens the future of cross-border scientific cooperation and Open Science initiatives.

Economic sanctions have long been a popular foreign policy tool used by governments attempting to alter the behavior of other states or punish behaviors that violate international norms. While there is considerable debate over whether sanctions are effective tools, it is undisputed that they can have significant economic, political, social, and psychological impacts on the target. However, sanctions often have consequences that reach far beyond their intended effect. One of the negative effects of sanctions has been to limit and discourage international academic cooperation. As sanctions are deployed more and more frequently in pursuit of foreign policy goals, there is a risk that cross-border academic collaborations will suffer lasting harm.

The coordinated sanctions imposed by the European Union, the United States, and the United Kingdom, among others, on Russia following the February 2022 invasion of Ukraine have provided an interesting case study of the impact, intended or otherwise, of sanctions on international scientific collaboration. These actions reflect a growing perception that the ideals of Open Science may not be compatible with the harsh realities of a polarized world.

While some sanctions have directly targeted public research funding for projects involving Russian academic institutions, a more common threat to international collaboration has been uncertainty and a trend towards over-compliance with sanction regimes. As universities and academic institutions struggled to understand the rapidly evolving sanctions landscape and the complex legal implications therein, many have “voluntarily” refrained from working with entities in targeted jurisdictions in an attempt to avoid legal or other consequences. In an increasingly polarized world, the threat to international cooperation will likely grow even greater in the coming years.

When the goal of Open Science conflicts with the strategic and national security interests of nations, international collaborations between scientists and other academics may become casualties of geopolitics. This talk will examine the chilling effect on international scientific and academic collaborations of sanctions imposed after Russia’s 2022 invasion of Ukraine. It will further address the risk posed to openness and Open Science by other trends in international geopolitics, including deteriorating relations between the United States and China.

Open-science at a cost: the burden of new NIH policies

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The U.S. biomedical research community has seen tremendous progress in recent years towards an open science landscape. As a result, there are a number of efforts establishing or modernizing standards in areas as varied as open-access publications and preprints, transparent peer review, metadata and phenotype harmonization, secondary use consent policy, data and code management and sharing policy, restricted data access procedures, and of course FAIR principles implementation. These efforts taken together, have demonstrated a strong commitment from organizations such as the NIH to open-science ideals and such institutions have expended considerable resources in this pursuit.

This umbrella of policies, which aim to make scientific data more open and accessible, have had an unintended consequence of increasing administrative burden on biomedical researchers. Researchers are now expected to follow complex regulations regarding data management, sharing and access. This requires significant time and effort for researchers to prepare and curate their data according to the required standards, and to document the data properly for sharing purposes. The recent implementation of the NIH Data Management and Sharing Policy in effect since January 25th 2023, is but one of a number of relevant policies to adhere to, including the genomic data sharing policy and secondary research informed consent procedures. In addition, some NIH institutes employ further guidelines on preferred phenotype and metadata standards and data repositories.

The increased administrative burden caused by data sharing policies is particularly impactful for researchers at small institutions. These researchers often lack the resources and infrastructure of larger institutions, and accordingly have the greatest difficulty complying with applicable regulations. This can put them at a disadvantage compared to their peers at larger institutions, as they have less time and resources to focus on conducting their research. To what extent these policy changes have affected the funding landscape of small institution researchers is not yet apparent. Overall, after many years of increasing inequality of funding among NIH investigators, targeted efforts at the NIH have modestly reduced these trends in recent years. This encouraging progress however has taken place in a time of robust yearly increases in NIH funding. As future funding levels of the NIH are unclear, the potential for small institution researchers to backslide in the face of sagging funding and administrative burden related noncompetitiveness with large institutions is a distinct possibility. This presentation will cover the positive steps NIH has taken to mitigate these possibilities and potential areas of concern as these open-science initiatives take effect.

Leveraging Open Science Ideals to Address the Underutilization of Open Genomics Data in the Clinic

Sara Elizabeth Ratican
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Open biomedical data, particularly genetic data, has the potential to revolutionize the way medical treatment is administered. While the idea of precision medicine based on genomics has received a lot of attention in both the scientific community and mainstream media, it is not yet standard in clinical practice. Despite its potential to benefit all patients, genetic testing is typically only utilized when prescribing drugs that have been designed on the basis of specific genotypes of a condition (most often seen in oncology) or when diagnosing genetic disease. While a variety of factors contribute to this underutilization, the primary culprit is arguably the lack of education of medical practitioners in the use of genomics data to guide their routine clinical decision making.

As a principle example, popular genetic testing companies such as 23andme, have given their clients access to their personal pharmacogenetic data - DNA variants that can alter their body's ability to transport or metabolize specific medications. 23andme has stated that "70 percent of 23andMe customers would receive a potentially actionable result from our pharmacogenetic reports." Yet in the current environment, the vast majority of patients will never see those actions realized. Undergraduate medical training is constantly evolving to incorporate new biomedical research, but frequently lags behind. When a patient presents their pharmacogenetic data to their doctor at a routine 20 minute appointment, physicians are left with a dilemma: Do I prescribe what is considered the gold standard treatment for this condition? Or do I prescribe an alternative based on genetic data I have little familiarity with? An education gap exists, not only in how to interpret and practically apply this data but also with other concerns such as the reliability of the data, insurance coverage, legal liabilities and testing costs. Therefore, the only way to integrate this data into clinical workflows, is to first educate medical providers and improve discourse with the researchers who provide it.

Open science ideas such as increased collaboration and transparency between researchers, healthcare providers, and patients could help advance the use of routine genomic testing for guiding healthcare decisions and ultimately overcome the practical challenges of its implementation. This could involve developing educational materials and training programs for healthcare providers and patients, as well as working to streamline the testing process and make it more affordable. Additionally, open science practices of sharing data, methods, and results, can lead to a better understanding of the complexities of genomic testing as well as its potential to advance our understanding of disease pathologies and pharmacology. By embracing open science, the healthcare community can work together to fully realize the potential of open genomic data for improving patient health outcomes.

On the Effectiveness and Ethics of Translating Open Biomedical Data into AI-derived Knowledge: A Case Study

Chase Yakaboski, Gregory Hyde, Eugene Santos. Jr.
Thayer School of Engineering, Dartmouth College, United States of America

The National Center for Advancing Translational Science (NCATS) at the National Institute of Health (NIH) in the United States established the Biomedical Data Translator program with the vision to enhance human reasoning and speed up scientific discovery "through an informatics platform that allows examination of relationships across all types of data," particularly Open Data. As a team in this consortium known as the Connections Hypothesis Provider (CHP), we will review our individual accomplishments and challenges by analyzing our multi-year effort in mining The Cancer Genome Atlas (TCGA) for novel pathways and biological network motifs and examine the intricacies of curating contextual knowledge from these results. Finally, we will outline two ethical considerations that have derived from our work and must be navigated if Open Data translation is to be fulfilled as promised.

TCGA is considered one of the most impactful Open Data initiatives to date but faces significant administrative and conceptual barriers representative of many Open Data projects. Although advertised as Open, accessing, gaining permission to use, agreeing to data sharing terms, and finally accessing data quality has taken months. Additionally, many cancer datasets have had to be excluded from our analyses due to less stringent standards for timing, use agreement standards, and data quality. For example, only three cancer types could be used in our pathway hypothesis and biological motif mining as other rare cancers in TCGA do not contain enough data to effectively validate genetic relationships after necessary data preparation and cleaning protocols.

The Translator program is structured hierarchically. Knowledge Providers (KPs), like CHP, interrogate Open Data sources and construct knowledge into subject, object, and predicate triples using an agreed-upon ontology. Autonomous relay agent teams then rank, filter, and translate KP results to our end-users. Working with TCGA, our team is still grappling with a significant question that this architecture imposes. Namely, how much empirical evidence is required to posit a biological claim? One solution that our consortium is considering relies on tracking knowledge provenance. In other words, whenever AI-derived knowledge is proposed, a detailed provenance trail is captured to indicate its origin, context, and the data supporting it. However, as downstream users of Open Data, this raises further considerations in both capturing additional context about data collection and post-processing techniques that may have not been recorded as well as how best to represent our algorithms to upstream knowledge consumers.

Since AI-derived hypotheses are only valid in the limited contexts in which they are calculated, two critical ethical questions converge. First, how do you assure that both Open Data and Knowledge Providers detail the necessary context, either informational or algorithmic, required to justify biological claims? And second, how do we ensure the Translator program's clinical and research end-users understand and consider these contexts and limitations? As failure to comprehend confounding context or bias could harm

both our understanding of biology as well as the potential patient treatments. As part of this session, we hope to leverage the expertise of other scientists and philosophers to help address these questions.

A.5: Open Science: Rethinking the Science and Society Relationship

Session Chair: Michael Kriechbaum, University of Technology Graz, Austria

Reflecting Society, Technology, COVID19 and Information Disorder within Hodges' Model

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Individual, United Kingdom, Mersey Care NHS, United Kingdom

This descriptive paper explores technology, society, the COVID pandemic and its informational impact as conveyed through technology mediated communications. The rise of fake-news, mis-information, dis-information, malinformation, has been algorithmically fueled by the emergence of social media platforms, exacerbated by Brexit in the UK, global politics cast as populism, COVID, and the propaganda associated with conflict (Russia's war on Ukraine). "Buyer beware: Caveat emptor" bears historic testimony to centuries old advertising, now accelerated to such an extent by technology that policy and law makers struggle to keep up. What constitutes 'news' is blurred with the provenance of sources less obvious.

The COVID-19 pandemic makes the conceptual framework, known as Hodges' model an ideal tool to expatiate its socio-political and individual mental health impacts and technoscientific reponse. In response the paper also considers the experiential impact of ignorance, and literacies. This contributes to examples that demonstrate the scope, relevance and application of the model. A bibliography, template for the model and further resources are also provided.

Responsible Innovation Practices: Towards effective institutions

Rebecca Lee Coates, Rod McCrea, Elizabeth Hobman
CSIRO, Australia

There are significant opportunities and challenges in enacting responsible innovation (RI) within a science organisation. From managing risk, to guiding public engagement, RI can have a positive and important impact. The effectiveness, however, of RI can depend on several factors, among them governance structures within organisations, policy and policy implementation mechanisms, and the culture and acceptance of RI as an approach to science and policy. This paper presents research conducted by the Commonwealth Scientific Research Organisation (CSIRO) in Australia. CSIRO is Australia's national science agency. It holds a unique role as 'trusted advisor', making it imperative that its science is world-class and directed to areas of significant national importance.

For the purpose of this research, qualitative interviews with 31 staff were conducted, all who were either involved in CSIRO's initiative, the Responsible Innovation Future Science Platform, and/or who were interested in RI research. The sample included research managers, researchers, and postdoctoral research fellows. Participants were interviewed about their understandings of responsible innovation, and their experiences and practices in enacting responsible innovation. The sampling method intentionally sought to gain the perspective of staff at different levels within the organisation. This allowed for the study of the role of positioning within the organisation in relation to how participants perceive and experience responsible innovation.

We found that participants' perception of established principles of RI seems to be more related to practice-based RI management approaches such as managing risk, building public trust in science organisations, and being socially responsible. In discussing the established AIRR dimensions of RI (anticipation, inclusivity, reflexivity and responsiveness) some participants did not distinguish the unique characteristics of the AIRR dimensions as defined in the literature. Instead, participants shared their own personal reflections and experiences of responsible innovation, which was usually based on interactions and involvement with key stakeholders and the general public when researching views about new innovations; and on their own research collaborations, working within the scientific agency. Lastly, we observed organisational role differences in perceptions of RI and practice-based RI. Participants in managerial roles, for example, voluntarily raised the topic of organisational structures, governance mechanisms, and maintaining trust in CSIRO more frequently than did applied researchers and postdoctoral research fellows. Considering the variety of ways staff enact or practice RI, our results suggest that developing effective institutional arrangements, procedures, and processes to support Responsible Innovation may be challenging but important.

Stakeholders working in the research and innovation sector can learn from the information shared by our participants. These shared learnings may help other scientists and research institutions develop and maintain effective responsible innovation practices.

Rethinking the relations by talking about them: Updating boundary-work in an age of public participation

Michael Kitzing
Johannes Gutenberg Universität, Germany

How are the boundaries between science and the public renegotiated in times of increased public participation? To contribute to this question, I will examine the construction of citizen science in science communication. My talk aims to apply and extend Gieryn's boundary-work approach by drawing on considerations from differentiation theory and evaluation studies and applying them to the case of participatory research. Public presentations of citizen ccience, such as self-representations in publications and platforms on the Internet, are analyzed here to examine how citizen science, as well as a non-participatory form of science, is identified, categorized, and evaluated.

The relationship between science and the public has always been contested. Scientists and scientific institutions tend to identify science with a particular mode of knowledge production as well as a set of institutional norms to justify trust in scientific research. Science communication is therefore an important tool for defining and legitimizing the boundary between science and non-science. Thomas Gieryn (1983, 781) describes science communication practiced in this context as "an ideological style found in scientists' attempts to create a public image for science by contrasting it favourably to non-scientific intellectual or technical activities." Hence, boundary-work distinguishes scientific research as a professional activity from other kinds of social practices.

In the case of citizen science, however, the public is invited to participate in scientific research projects, blurring the boundarys between professional science and the general public. Therefore, citizen science is a critical case for boundary-work - both as a theoretical concept and as a social practice. In this talk, I will show how the boundaries between science and the public are (re)established in citizen science communication and contribute to rethinking the relationship between science and society.

The evidence of the EU clean energy competitiveness and its critical assessment in a global effort towards climate neutrality

Anna Kuokkanen, Aliki Georgakaki, Simon Letout, Aikaterini Mountraki
European Commission, Joint Research Centre, The Netherlands

The EU Green Deal gives industry a leading role in delivering the transformational change needed across the society to achieve climate neutrality. With climate-neutrality at the centre, the new growth strategy acknowledges the need of large-scale transformation of not only energy production technologies, but also of energy end-use sectors, such as energy-intensive industries, and aims to accelerate development and adoption of new climate neutral solutions across industrial sectors. Obtaining industry competitiveness in these solutions can help to achieve Green Deal objectives while benefiting Europe’s socio-economic welfare. The paper first outlines an assessment framework along the ten indicators measuring different dimensions of competitiveness: (1) public R&D investments; (2) & (3) venture capital investment; (4) patenting trends; (5) companies; (6) employment; (7) production; (8) turnover; (9) imports & exports and (10) trade balance. This is followed by evidence of the EU industry performance in a number of climate neutral solutions: covering both energy generation (such as wind, solar PV, hydropower), storage (e.g. batteries, hydrogen) and use sectors (such as heat pumps, electric powertrains, steel and cement production). Temporal data of the EU and the biggest economies provide trends over the past 10 years and show how competitiveness in clean energy technologies has become a driving force not only in the EU but also in other regions of the world. The EU performs particularly strongly on innovation related indicators, generating a significant share of high-value patents in most of the solutions and hosting a big share of innovative companies. Increasing deployment of clean energy solutions has generated a growing number of jobs and turnover in the EU. However, while the EU manufacturing in most solutions is increasing, growing demand is met with imports, particularly from Asia. In addition, the EU industry’s global competitiveness,

indicated by a share of global exports, is threatened in an increasing number of solutions. Many of the biggest economies have enacted various supportive and protective industrial policies to improve their positioning in clean energy value chains. Achieving climate neutrality globally will require emission reduction and clean energy technology adoption everywhere, and with that an enormous raw material demand, many of which are located in developing countries. This triggers an inevitable question about competitiveness as a policy driver. Thus, the second part of the paper discusses whether and how competitiveness may need to be redefined and what implications it may have on the existing indicators or if entirely new indicators are needed.

»Harmonia est discordia concors« or a »Caucus Race«? Investigating Living Labs between co-creation and divergence.

Anamaria-Ioana Rasenescu
RWTH Aachen University, Germany

Efforts to vision, trust and cooperation are at the visible frontline of social and technological transformation. However, the multiplicity of knowledge bases, uncertainty and ignorance disorient appropriate developments against the background of current crises.
Two currents are challenging the science system here: On the one hand, there is more than ever a need for scientifically validated knowledge. At the same time, phenomena such as polarization, populism, alternative facts and the mistrust of experts and expertise are putting science under immense pressure.
A multiplicity of data, coupled with diversity of perspectives, influence our perceptions of bodies of knowledge that need to be related to each other for adequate decision making. Iterative data production can only remedy this to a limited extent. What is needed instead are intelligent ways of combining knowledge. New formats of (scientific) knowledge production and communication require a space for dynamics, adaptivity and the intelligent networking of knowledge assets - in tandem.

To address these challenges, a new modus vivendi must be based on a modus operandi of collaborative knowledge creation: As the »Opus Operatum« (Barlösius 2006) on the rise, Living Labs (LLs) have gained popularity for their »experimental, co-creative approach to innovation policy that aims to test, demonstrate, and advance new sociotechnical arrangements and associated modes of governance in a model environment under real-world conditions« (Engels et al. 2019). LLs are characterized by a high degree of plasticity. In this sense, they do not minimize the degree of uncertainty and diversity; rather, they may orchestrate it as a potential for problem-solving and transformation.

In order to tackle the tendency towards polarized democracies, LLs purposefully involve a multitude of heterogenous stakeholders. They generate and co-develop an arena for negotiation, marking them as fields of organized diversity. However, it is still unclear how co-creation allows for harnessing the potential for disagreement in LL settings.
Since LLs enable the enhancement of targeted epistemic diversity, the contribution aims at understanding how conflict in new formats of innovation governance interplays with the co-creation of knowledge production. Divergence here takes a dual character: On the one hand,

it enables a fruitful exchange of heterogeneous perspectives; on the other hand, divergence can act as a disruptive factor in the co-design process.

Against the background of this discrepancy, insights shall be provided by (1) identifying and typifying challenges and conflicts of co-creative knowledge production in LLs, (2) evaluating strategies in dealing with diversity and conflict, and (3) drawing conclusions about the potentials of co-design in LL-settings.
In doing so, this contribution examines nine LLs with co-creative design operating in the fields of landscape and urban planning, transport and mobility. The analysis draws on qualitative data collected through guideline-based interviews with the LL-coordinators.
The data challenges the idea, that securing spaces for more inclusive, transparent and accessible practices of knowledge production offers the intended outcome of active epistemic polyphony. The data indicates that despite of diverging attitudes, epistemic polyphony in co-creative LL-designs is often being challenged by a lack of active controversy.

Stream B: Digitalization of Society, Society and AI

B.1: (Responsible) Standardisation for (the Digital) Society

Session Chair: Kai Jakobs, RWTH Aachen University, Germany

Evolving Digital Standards for Addressing Climate Change: A Preliminary Investigation of Carbon Capture Approaches

Jo Ann Brooks
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The world is facing numerous grand challenges in the twenty-first century, perhaps most notably climate change. And while digital technologies and information standards are expected to be key tools in addressing these challenges, the question of *how* such technologies can help meet the grand challenges – as well as the *processes* through which those challenges can be conceptualized and addressed – remain under-researched.

In this paper we report on a preliminary investigation into how digital technologies and standards for mitigating a significant dimension of climate change – carbon capture – are developing across a broad spectrum. At one end of this spectrum are carbon credit markets, where technologies and standards are tightly constrained and regulated even as methodologies for carbon measurement are continuously under revision. At the other end of the spectrum are small regenerative agriculture projects which also capture carbon but have not converged on ways to monitor and measure effectiveness of their efforts. In between are numerous regulatory agencies and professional communities concerned with outcomes of such efforts. Thus, at both ends of the spectrum as well as in between, decision-making and control must accommodate multiple diverse stakeholders.

These multiple stakeholders include societal, environmental, scientific, legal and ethical professionals and groups representing diverse interests. Processes for negotiating standards are thus a foundational concern. Inter-organizational coordination and decision-making approaches such as open strategy (Hansen, Pop et al 2022; Hautz, Seidl & Whittington 2017; Seidl, Whittington et al 2019) and possibly organizational democracy (Adobor 2019) are likely to be useful, and may require unique sets of digital information standards.

Meanwhile, existing digital technologies and standards for measuring and monitoring carbon capture are continuing to evolve in emergent fashion, as with do most large-scale technologies and standards. Research in engineering management has found that modular approaches are effective for large-scale technological development (Baldwin & Clark 2000; Brooks, Carroll & Beard 2011; Brusoni et al 2023). And in complementary fashion, social science research has found that structurationist (Orlikowski 1992; Fried & Walgenbach 2020; Fuenfschilling & Truffer 2014) and morphogenetic (Mutch 2010; Volkoff, Strong & Elmes 2007; Volkoff & Strong 2013) approaches are appropriate for studying the evolution of such digital technologies and standards.

Thus there is need for both human-oriented and machine-oriented standards (Mann & Brooks 2011; Brooks & Rawls 2012) to support continuing negotiations around the evolution of carbon capture approaches across diverse social and organizational communities and organizations, and in both global and local arenas.

The presented work will detail results of a preliminary investigation into emergent social, interorganizational and technological development processes across the domain of environmental carbon capture for addressing climate change. Work will include both a scoping literature survey (Arksey & O'Malley 2005) and pilot interviews, with the aim of identifying insights relevant for standardisation research, as well as representative sampling for further research (Glaser & Strauss 1967).

Cyber hospital(ity): Establishing security standards in a vulnerable organization

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Cybersecurity is becoming more and more a discussed topic in the public discourse. Like the European Union Agency for Cybersecurity (ENISA) states, "securing cyberspace has become one of the most important challenges of the twenty-first century" (ENISA, 2016). Therefore, to make organizations equally secure, it needs laws and standards to maintain security.
In this paper, we show and discuss how Cybersecurity is a matter of standardization within the everyday labour practices in vulnerable organizations like a hospital.

The ISO 27001 standard is a relatively common regulatory used in the industry to manage information security. Besides, in the hospital, as a critical infrastructure, there also exists a branch-specific standard (BS3), including, e.g. data protection agreements to protect the patients' sensitive data and secure medical devices used in operations. Our research looks at implementing the standard-specific branch in a risky organization and its negotiation processes. That means how the IT staff implements and balances the different interests in a hospital implementing security strategies. What is their implicit knowledge, and how is it established in a hospital-specific context? Hospital interests can vary from securing smart technical systems used in surgery up to keeping the daily work like documentation of patient records to save necessary time in emergency situations. Especially in a hospital, vulnerability on different levels is a maintaining factor (Skotnes, 2021). Therefore, security gaps are prevented under the premise of patients' well-being and disclosure of sensitive data.

According to the definition of Olsen (2019), standards "may include everything from generally accepted norms to legally binding agreements and definitions" (Olsen 2019, p. 5). Lampland and Star add another dimension that dealing with standards can also cause the practice of resisting them (Lampland/Star 2009) and reinterpreting them in the context of the situation in the organization. Kocksch et al. argue that establishing new securing systems based on standards in organizations changes the whole organization, not only on a technical but an organizational level (Kocksch et al. 2019, p. 714). Responsibilities change, and the former working practices and corporate requirements also vary.

Focusing on the organizational structures of a hospital, standards and risk management come together to make uncertainty calculable and preventing a cyber attack that may torpedo existing processes and routines at the expense of human lives.

We take a look at how CISOs, chief information security officers, as the responsible staff, are tasked with establishing security systems and keeping them running under the conditions of everyday hospital life. They are in charge of translating the formal standards into the existing processes. To ensure that, besides the technical knowledge, they need informal knowledge about the practices in the organization to take into consideration when implementing standards. The translation of standards into the organization considering the technical knowledge and the implicit knowledge shows "the extent of slippage between the formal and the informal" (Horlick-Jones, 2005, p. 294) to make new securing systems convenient and hospitable for all concerned.

Cyber Security Visions in Energy Digitalisation: Design, Support Function or Public Trust?

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Increasing internet connectivity in smart energy systems poses serious cyber security concerns. Using a lens of “sociotechnical imaginaries”, we explored how experts envision cyber security governance and standardisation in the context of energy digitalisation.

The three imaginaries identified present cyber security standards as a matter of design, as a support function, and as a public trust. Each vision prioritises a different set of actions, with significance for the role of democracy and expertise in creating smart and sustainable systems.

Energy sector experts have already commenced digital transformation of their systems. The considerations for security are widely expressed as standards proposals, evolving regulations, and user-centered engagement ideas. As we are in the early stage of the journey to sustainable and smart energy, the above initiatives are still “in the making” and require scrutiny with regard to the assumptions about democracy, expertise, and urgency of the proposed futures. By outlining three visions of such desirable futures, we were able to show how these visions might materialise and at what cost. This is an important call to engage STS research with the sociopolitical context of building technologies for the future.

Smart standards : Can they contribute to responsible standardization ?

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Institutional standardisation should naturally be responsible. The aim of institutional standardisation has always been to represent all the stakeholders in a market in order to ensure that the market functions in the interests of all. Rules have been established for this purpose (project information, representation, consensus). However, in the eyes of the public,

standardisation remains largely an unknown and sometimes opaque place, where negotiation and lobbying strategies can be implemented. However, an expectation of greater social responsibility is emerging and developing in all sectors, and public authorities often rely on digitalisation to serve an orientation towards more responsible organisations (Agriculture 4.0 European plan to promote less polluting and more responsible practices as an illustration). Standardisation is no exception to this digitalisation with the progressive inclusion of digital tools to develop smart standardisation. The question we are asking is the following: Can the emergence of smart standards allowing for better man-machine interaction lead to more responsible standardisation?

SMART refers to the formats, processes, and tools necessary for a user (human and technology-based) to interact with standards. On the one hand, the development of such standards raises the fear that standardisation will be limited to functional coordination. On the other hand, it is possible to consider that can better guarantee transparency, openness and the consideration of environmental and social regulations and requirements. Indeed, as defined by ISO, SMART standards will provide benefits in terms of openness and consideration of stakeholder expectations. Standards developers will focus on content creation in a much more effective way by using advanced digital tools automating processes over the whole development lifecycle. End users will benefit from digital standards whose content is tailored to their needs and constantly maintained up to date. Existing formats such as paper and pdf will always remain available. Yet step by step, international standards will evolve to also meeting the growing digital needs of stakeholders and society.

In this paper, we discuss standardisation as a process and then the standards issued in their capacity to serve more transparency, openness, accountability, legitimacy. We follow Vladislas Fomin and consider the term “responsible” as responsibility toward the public. It relies on the fact that standards must not only provide answers to the technical expectations of engineers and experts participating in the standards development process, but they must also meet societal needs and follow the ethical norms of users who are most of the time completely ignorant of the standardization process, even of what a standard is, and also ignorant of the consequences of the use of standards on the products they buy. We propose to analyse the standardisation process leading to the elaboration of smart standards (CEN, ISO, IEC) at European and international levels and to analyse how to integrate the concepts of accountability, transparency, openness and legitimacy.

Towards a comprehensive framework for ethical and responsible standardisation

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In general, to paraphrase Stilgoe et al (2013), people do not try to create irresponsible standards. Standardisation processes are always carried out partly in the language of general beneficence. However, standards can be imperfect, including in their broader social impact. At the same time, organisations increasingly seek to incorporate public assurances of ethical action. In comparison to the industrial scale of production of theoretical and practical research in organisational normative guidance frameworks like Corporate Cocial

Responsibility and Responsible Research and Innovation, there is a dearth of work on the ethical standardisation. A framework is therefore due. Recent work (including Jakobs 2019; Fomin 2022; De Vaujany et al. 2018) sets out the need for such a framework. In this paper we provide further scaffolding.

Standardisation is not one activity. Standards can be *de facto* or *de jure*; they can be initiated from above (as in CEN standards) or from below from industry; they can express strict requirements or conceptual frameworks (as does ISO 26000 on Social Responsibility). Standards touch on every aspect of modern life, from poultry, to water security, to crisis response systems interoperability, to sustainability assessments. Furthermore, each is produced with its own politics and interests (Cargill 2019). Despite this diversity in substance and provenance, there is value in having a general tool on responsible standardisation, for two sets of reasons. First, there are reemergent specific ethical issues that repeatedly arise; second, we can conceive of processes within standardisation efforts that improve their ethical antennae. We put forward the following four-part framework, which rests upon and adapts the AREA framework for RRI.

(1) *Include*. Stakeholders should be proactively identified, involved, and consulted throughout the process. While the RRI framework puts engagement later, the standardisation process *is* a stakeholder matter; the consultation happens from the first. (2) *Anticipate*. As Collingridge (1982) argues, at the time it is easy to adapt a technology, it is difficult to understand its impact, but by the time its impact becomes clear, change is difficult. The point applies to standardisation processes because they can have direct influence on technology development, and also because regulations and legislation can crystalise from standards. By bringing in ethical and social consideration at the earliest possible stage, there is greater chance of identifying issues and making costless or positive adaptations. (3) *Show humility*. Standardisation is a partly a commercial practice, and actors can be expected to use involvement in standardisation to display expertise or to gain a march on regulatory developments. Nonetheless, it is in the long term interests of organisations to be known for promoting regulatory and technological progress, and there will be moments at which commercial inclusivity will be ultimately preferable to short term market advantage. (4) *Lead*. Implementation of standards should be carried out in a way that is aware of context and of possible misapplications. Standardisation at its best involves showing thought leadership in a field, in displaying the ability to pre-empt the next issues with the next technology or problem that is likely to arise.

ETHICS ASSESSMENT OF R&D SUPPORTED BY STANDARDISATION

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Standardisation and standards can be valuable tools for valorisation, commercialisation, and subsequent use of research and development (R&D) results. Furthermore, standards can help researchers in their research in multiple ways (e.g. can prevent them from reinventing the wheel). Most researchers are not familiar with standardisation and rarely use standards in their research projects. How do researchers perceive standards and standardisation? The

study aims to analyse researchers' experience with defining the ethical aspects of their research projects (as well as their project proposals) and the perceived usefulness of the framework provided in CWA 17145-1 and CWA 17145-2. Study participants are experienced researchers in writing project proposals and with no previous experience with standards and related documents. The data collection is based on two-step semi-structured interviews. First, the study explores the researchers' experiences and attitudes on common basic ethical principles, approaches, and practices used by EU-funded R&D projects. Based on the data collected by semi-structured interviews, the study analyses if these principles, approaches, and practices are adequately addressed, considering the organisational, technological, and societal concerns brought by Society 5.0. In the next step, we provide information to the study participants about the framework for the ethics assessment of R&D and provide them with documents: CEN/CENELEC Workshop Agreements (CWAs) – CWA 17145-1 and CWA 17145-2. Using a second semi-structured interview, we collect data on researchers' perceptions. The study results provide insight into researchers' perceptions of the usefulness of the CWAs and the framework, and their attitudes toward standards (and related documents) and standardisation.

Standardization of Ethics: the Problem Case of Autonomous Vehicles

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The ethical issues of autonomous vehicles (AVs) are now taking shape in the realm of regulations and standardization. Since AVs are complex and complicated innovations with a sophisticated structure, their ethical issues are multiple and distributed. To uncover the shortcomings of standards and regulation, I review and analyze documents and policies that deal with regulations of ethical and social issues of AI in general and AV in particular. My sample ща documents consists of a variety of national AI strategies (about 50), supranational frameworks (5 under specific consideration), professional standards (IEEE as an example), and several analytical reports. Special attention is given to professional regulations and standards. Some of them are legitimized at the level of national standards, some are related to scientific and technological advances, and some remain at the level of recommendations and for possibilities of flexible interpretation, especially when technology is still at the stage of innovation, as it happens with AV.

Based on my analysis, the selection of the definitions for the official professional recommendations seem either uninformed or opportunistic, which itself ruins the approach to ethical development and badly needs critical reflection. The problem is that ethical-aligned notions are debatable and controversial, so they provide additional problems while using them. If they are the basics of ethics, then we have issues. The critical view on the content of ethical regulations immediately problematizes the basic concepts, ideas and notions that need to be revised permanently (Ananny, Crawford, 2016; Neyland, 2015). Social scholars of technologies critically reconsider those grounds, deconstruct, reevaluate, and assess their influence on public discussion. Otherwise, the public domain has no proper grounds for the ethical discussions, which is slipping away towards such failed experiments as the Moral

machine. The other extreme is AI developers who pretend to be dealing with the ethical issues or having them in the agenda, which often turns into ethics shopping or ethics washing [Mökander, 2022]. My task here is to restate the ethical standardization issue by elaborating the case of AV.

B.2: Digital twins, cousins and other kins: What can we learn from contemporary models, simulators and test beds?

Session Chair: Ola Michalec, University of Bristol, United Kingdom
Session Chair: Andres Dominguez Hernandez, Bristol University, United Kingdom
Session Chair: Peter Witner, University of Bristol, United Kingdom

The sea and it's digital twin

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In my paper, I would like to address a specific Brazilian context and discuss results from my four months field research at the Center for Artificial Intelligence (C4AI) in São Paulo. Next to my ethnographic observations, I conducted expert interviews with researchers of the C4AI, who are involved in a project called "KEML - Knowledge-Enhanced Machine Learning for Reasoning on Ocean Data". The goals of this strand of the project are to better understand and map the more than 33,000km of Brazilian coastline and the sea surrounding Brazil, and to conduct a digital scan of the so-called “Blue Amazon” from data obtained through a variety of measurement methods.

In this paper, I would like to refer to a sub-project in which small-scale experiments are conducted in a wave simulator operated by the Navy on the University of São Paulo (USP) premises. The data from these experiments are chased through artificial intelligence (AI) systems and extrapolated to models of the ocean in cumbersome processes.

The translation of the pool data to the Atlantic is done in small circles of researchers in recurring patterns of zooming-in (to the abstracted detail of the measured data from the pool) and zooming-out (to the large transmission and superimposition to the so-called Blue Amazon). Through these practices of embedding, translation and digitalisation, the basin becomes a digital twin of the ocean, which is absorbed into the Blue Amazon as a politicised space.

The (un)certain ocean: Digital twins and the endeavor for a knowable ocean

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The ocean remains one of the planet's last great frontiers: only about 5% of the ocean has been explored by scientists to date. Despite the challenges, in recent years EU policymakers have invested nearly 32 million euros in the development of a European Digital Twin of the Ocean with the ambition to create a complete digital representation of the ocean, including real-world processes and real-time data. More than a tool, the development of the twin calls for the transformation of 'data into knowledge' and insists that its uses are 'unlimited' for stakeholders of every variety. Individual countries are also beginning to invest in digital twin infrastructures, often focused on coastal areas of geopolitical interest. These projects all share a modernist ambition for holism and a definitive trust in technology's predictive and therefore anticipatory capabilities in the face of climate change.

This paper explores the mobilization of digital twins of the ocean in light of other kinds of numerical ocean modelling practices. How do digital twins of the ocean incorporate observations and contend with uncertainties in existing modelling practices? What work is made (in)visible in a digital twin of the ocean? What kinds of futures does such a digital twin promise, and for whom? Digital twins of the ocean straddle the borders between the known and unknown, attempting to overcome the limitations of scientific knowledge of the ocean in order to test the effects of potential policy and industry interventions and in doing so secure more certain coastal futures. If they transform data into knowledge, they also have an ambition to make that knowledge visible to a wider public. Building on interviews and ethnographic engagements with ocean modelers, this paper examines the European Digital Twin of the Ocean alongside a second, regional digital twin, showing the different ways digital twin technologies value varied stakeholders and ways of knowing and living with coastlines to come.

Assembling ecosystems indoors — or the modelling of life in closed loops

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In the field of ecology, a new type of experimental platform has been developed at the turn of the 21st century. Ecotrons are replicated climatic chambers whose environmental parameters (CO2, humidity, temperature, etc.) are very finely measured and controlled in order to experiment on the functioning and evolution of ecosystems. In their enclosing of life, Ecotrons thus make it possible to reconstitute artificial ecosystems, through which scientists and engineers aim to unravel the relationship between multiple ecological phenomena otherwise impossible to discriminate 'in the wild', or studied individually in other experimental contexts.

As part of my doctoral project, I have been conducting ethnography since February 2021 centred on the scientific work of the Ecotron laboratory near Paris, with points of comparison in other laboratories with which this Ecotron cooperates in the setting up of experiments.

While Ecotron research aims to account for complex ecological phenomena from a global point of view, the reconstitution of ecosystems implies a significant level of arbitration concerning the choice of species and environmental variables to be taken into account. In this communication, I propose to present the way in which experimenters negotiate the relevant level of reconstitution for Ecotron research: which factors do they consider a priority to simulate in a climatic chamber, and what can they afford to omit? How is the validity of this ecological test bed assessed on a daily basis? And what ecological scenarii do ongoing experiments contribute in shaping?

With Ecotron users coming from a wide variety of ecological disciplines, this questioning manifests itself in the form of controversies concerning the modularity of the experimental platform: I argue that the contours of the complexity that is considered relevant to study under one same and unique dome are being sketched through meetings between external researchers and scientific-technical managers of the platform on the feasibility of experiments, choices of opening or closing technician positions with certain skills, the ordering of specific measurement or analysis equipment for the dedicated use of the Ecotron, or even through the division of labour and the sharing data with other Ecotrons. My goal will therefore be to shed light on the socio-technical modalities in which attempts at holistic apprehension of ecosystems through experimental simulation are embedded.

Digital Twins and their Proxies in Transition

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The paper looks at Digital Twins (DTs) in EU cities within the framework of the intertwined climate-digital transition. The core hypothesis is that the climate transitions introduce a new regime of long-term calculation and knowledge production that interfere with the “smart-oriented approach” focused on real-time service delivery. While DTs contribute to the ongoing process of “dashboardization” of urban government (Mattern 2015) with the purpose to improve urban services in real-time, they are increasingly mingled with the “climate platforms” (e.g., “Climate view”, “Google EIE” and the likes) with the promise to accelerate actions and produce insights for a climate-neutral future is made on specific temporal arrangements. I will take into account the hiatuses and frictions produced by the digital and climate interaction investigating DTs and climate platforms from a temporal perspective. In this sense, the promissory and future-oriented aspects of such forms of digital innovation (see Rip 2018) at the core of the EU Green Deal “mission-oriented” approach (Mazzucato 2018), should be considered as part of a contested “timescape” (Adam 1998; Kitchin 2019) which includes *real-time* service management and the the “vast machine” (Edwards 2011) of long-term modeling and simulations. In combining qualitative fieldwork in cases of urban climate transitions and speculative approaches on climate platform software, I will argue that a new mission-oriented, service-based, and climate-neutral regime of calculation is featuring the transition of DTs and their proxies toward a new mode of experimentation.

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'That Openpilot vibe': Understanding a Very Online test community

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In August 2021, Comma CEO George Hotz launched a new driver-assistance device: the Comma Three. Constituting the renegade start-ups most advanced driver-assistance device, the Comma Three offered purchasers the chance to turn their otherwise regular Hyundai, Toyota, or Kia into a quasi-autonomous vehicle. At least for some of the time. What marks Comma as different is that its Openpilot software is ostensibly open-source, offering users the opportunity to 'hack' their own vehicles, or even 'fork' the stock version itself. The Comma community is more than happy to oblige, sharing tips and suggestions on how to troubleshoot known errors, install Comma devices in new models, or re-mount them for better performance – all in the name of making driving 'chill', as Comma's revealing tagline goes. This paper considers the rise of this open-source test community, building on prior work on the public testing, or 'street trials' (Marres, 2020) of autonomous vehicles. Differing from state-led or automotive manufacturer-led tests, Comma's test community is extremely online, regularly posting both instructive 'how-to' videos similar to those found on sites like iFixit or wikiHow, as well as breezy, stylized videos of Comma users driving – or more appropriately, being driven – to Fleetwood Mac. Through a digital ethnography or 'digitalSTS' (Vertesi and Ribes, 2019) approach, the paper draws on a study of Comma's online community, ordinarily found on a company-moderated Discord channel, often visited by George Hotz himself. The uniqueness of this test community can be considered a synthesis of various pre-existing discourses, from hacking and 'dev' cultures found within engineering communities, to meme cultures across social media. Feeding into the development of in-house modelling and simulation – Comma operates an 'end-to-end' approach to machine

learning using data directly captured by user devices – an online user community has developed into a critical aspect of Comma's broader test culture and, consequently, their developmental workflows, whilst members collectively seek what they call 'that Openpilot vibe'.

Digital Twins on a More-Than-Human Planet: Questions of Participation and Agency

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In the near future, digital twin technologies - technologies that enable "twinning", i.e., closing the loop, between digital models and the physical phenomena they are supposed to "represent" - will be increasingly employed as technologies of governance. Digital twin technologies are being developed to monitor and govern virtually every aspect of more-than-human worlds including cities, forests, agriculture, oceans, nation states and much more. Such technologies will increasingly rely on sensor networks that are able to directly communicate with each other (machine-to-machine networks; M2M) and that provide geo-referenced data. This data, which is being provided in the form of point clouds, will be employed to enhance simplified physics-based models via deep machine learning techniques (such as physics-informed neural networks) in order to provide a real-time digital model that enables twinning. Digital twin governance can be understood as what Fleur Johns has described as governance-by-prototype as opposed to planning - a style of governance that relies on sensing not knowing (Johns 2017, 2019, 2022). Focusing on the on-going design and creation of a digital twin of the German road system (SFB/TRR 339: Digital Twin of the Road System – Physical-Informational Representation of the Future Road System), this paper explores whether and in what ways sensing practices in digital twin technologies promote or restrict participation and human and non-human agency in our more-than-human world. Who and what is considered "eligible to sense and to being sensed" (Johns 2017) and what are the normative assumptions underlying decisions about what is to be sensed and to sense?

Co-creative Twinning: Participatory Modeling and the Reconfiguration of Knowledge in the Connected Urban Twins Project

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In recent years, digital twins have emerged as crucial components of digital cities, promising efficient and effective responses to urban challenges. However, they carry the risk of eliminating the performative complexity of urban spaces (Lefebvre et al. 2016; Dell et al. 2016) through strategic essentialism (Kitchin 2016) and, as data-based models, of representing primarily the material rather than social and economic functions of the urban (Batty 2018). This is because digital twins are outcomes of *boundary work*: negotiation processes that decide which perspectives and knowledge are included and excluded

(Solman et al. 2022). Thus, the active production and design of digital twins, *twinning* (ibid), is a powerful process whose study is significant from the perspective of situated knowledge (Haraway 1988; Felt et al. 2017).

This research considers the modeling process of digital twinning through the perspective of co-creation (Osborne, et al. 2016; Brandsen et al. 2018; Lember 2018) to interrogate its potential for reconfiguring knowledge, actor constellations, and agency. In doing so, it considers the currently largest German smart city project Connected Urban Twins (CUT), in which the cities of Hamburg, Munich, and Leipzig are developing standards for digital twins. The presented research gives account of a series of real world experiments addressing questions of data gaps, value assumptions, knowledge domains, urban complexity and agency in delivering technologies for urban governance. Based on existing methods of participatory modeling (Voinov et al. 2016; Etienne, et al. 2011; Barreteau et al. 2014), a co-creative research method was developed and applied in a real-world experiment with an interdisciplinary stakeholder group. A combined system dynamics and agent-based model was co-creatively developed, implemented in the Twin, and tested.

In presenting the co-creative modeling process, this work describes practices of twinning, analyzes actor networks, knowledge assets and data (gaps), governance structures, positionality, and agency. The research shows that the co-creative modeling method can be a valuable approach in the development of digital twins, incorporating complex perspectives, and reconfiguring knowledge bases and actor constellations through boundary work. However, the research findings also highlight limitations, particularly in terms of power positions, resources, and access, that need to be further addressed in order to realize the potential of such processes. As such, this work makes a valuable contribution to the future planning practices of digital cities and suggests new ways of developing and implementing digital twins that take into account urban complexity and the situatedness of knowledge.

Governing (Through) Digital Urban Twins: Reconfiguring roles of public authorities in data-based governance

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Digital technologies have pervasive on the way cities are governed. One of the latest iteration of urban governance innovation is the development and use of a ‘Digital Twin’ – a dynamic virtual re-creation of a city. Digital urban twins are designed and used for digitally visualizing and interacting with the city, for example to develop future scenarios and test them virtually before implementing them in the ‘real world’. They are therefore considered as key to better predict and act upon cities’ futures. As such, they are the most illustrative recent example of the emergence of virtual modes of experimenting in urban governance. Virtual experiments raise new questions about the collection and use of data, and therefore also about the accurate representation of social order and the design and implementation of particular solutions to urban issues. Data collection involves an act of seeing and recording something that exists somewhere in ‘reality’ in order to make it visualizable and, more importantly, actionable, i.e., to show people both something they can perceive and

something they can reflect and act upon. What counts as relevant data depends on prior normative choices about such matters as what is worth recording, who is best positioned to collect and report data, and what forms of analysis and representation are taken to be compelling. In other words, data and their broader governance context shape each other, and this mutual shaping generates new socio-technical orders in which virtual experiences play a key but understudied role.

This presentation proposes an analysis of virtual experimentation by using digital twins as an empirical entry point to study the mutual shaping of data-based technologies and the broader contexts in which they are developed and used for urban governance purposes. Based on a document and interviews-based analysis of two contrasted projects of Digital urban twins in Rennes Metropole (France) and Liège (Belgium), it more specifically looks at a key point of debates and worries among involved actors: the role of the public sector in digital urban twin projects.

As shown, political actors display different rationales behind their will to develop a digital twin of their city, rationales that are closely tied to specific visions of their evolving role in (virtual) urban governance. These rationales and visions, in turn, have important effects on the practices of creatin, maintaining, and using digital twins, notably the kind of data that are collected, the way they are handled, and the values they are vested with. I therefore show that, depending on the issues they face and the practices they develop, public authorities deploy experimental ways of not only governing the digital twins themselves (e.g. how to collect, manipulate, store and analyse data) but also of governing *through* digital twins, which entails reinventing their role in digital urban governance.

Co-Producing Digital Twins and Urban Governance: Insights from Munich and Boston

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The future of cities is often discussed in terms of managing distinctly urban challenges such as growing population, increased complexity, environmental impact, ensuring essential services to its citizens, and improving the overall quality of life. Actors in urban design, planning, and policymaking have come to embrace the idea of “digital twins” as a solution to address these challenges. Digital twins promise to create a close entanglement between what is framed as the tangible, material reality and its digital representations, in a way that allows for new forms of knowledge and control. The concept originated in the industrial context and has only recently been applied to the urban sphere, with the aim to create digital representations at city-scale – including e.g., buildings, roads, vegetation, and immaterial information, such as traffic rules. In its optimistic reading, cities imagine digital twins as a novel tool of governance, allowing them to facilitate transparent decision-making, improve the sustainability of urban life and economic production, open-up avenues for experimentation, improve crisis-management and resilience, and invite public participation.

In situating digital twins as an emerging concept that is currently pursued by city governments all over the world, our contribution focuses on digital twins as an empirical case

through which we explore the co-production of knowledge, technology, and politics in the context of urban governance and its datafication. In particular, we are interested in how ideas for governing desirable urban futures - including notions of democracy, expertise, participation and public good - are produced through the making of digital twins, and vice versa.

In our talk, we present first findings from an ongoing research project that examines digital twin projects in Munich and Boston. We discuss current initiatives in both cities, and how urban digital twins are translated and locally enacted in different ways.

Testing With Consequences: The Transformative Impact of Software Tests in Digital Urban Twins Development

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The City Science Lab (CSL) is part of the joint project **Connected Urban Twins (CUT)** which implements Digital Urban Twins (DUT) in Hamburg, Leipzig and Munich. We co-create digital tools that are implemented in Hamburg: for example the **Urban Data Narrator** (supports communication with data); **CoSI - Cockpit for Social Infrastructures** (decision support tool for urban planners). Our documentation of formats and methods is a rich empirical source to analyze challenges and transformative potentials of *urban twinning* from an STS view.

DUT encompasses technologies and models that help urban planners to create scenarios and model situations with highly complex dependencies. But a test run in urban planning is never done in a completely isolated situation. Therefore, any form of software being tested in such an environment always has consequences. This is also true for any ‘software-test’ happening in our Lab. To deliberately design these tests is part of the CSLs daily work. Thus, it is important to ask how to design any ‘test’ or simulation, if it is clear that it can have a serious impact on actors and their perception of the urban area.

We want to describe the conceptualisation of DUTs as technologically supported testbeds for urban transformation. Nowadays, tests are considered to be not a mere usability test for an object. Through testing, society itself is put to the test and constitutes itself through the practice of testing (Marres and Stark, 2020, p. 427). Thus, modern societies testbeds are arrangements in collaboration with interdisciplinary groups (Engels et al., 2019, p. 2). Here the test is conducted in the middle of society as a so-called real-world experiments (RE), with the aim to transform (Ziehl, 2021, p. 396). At CSL these arrangements oftentimes use new technologies as their gravitational core. For facilitators and developers, this implies a careful view on the development of the technologies and media that are part of the test's design. In this paper we want to highlight the process of designing such technologies as qualitative studies on two devices (Urban Data Narrator/CoSI) belonging to the complex of the CUT project.

To reflect our own doings and agency we apply the concept of Susan Leigh-Stars “Boundary Objects” on the Twin’s Technologies. “Boundary Objects” are objects for translations between different fields (Star and Griesemer, 1989, p. 387). They support different groups to

collaborate even without consensus (Leigh Star, 2010, p. 602). At CSL we see boundary objects in the form of “convincing software” that enables interdisciplinary agents to participate in testing situations via software. Reflecting two of our use cases, we highlight relevant aspects and characteristics of building twin technology as boundary objects.

To explore our cases we pose the following question: How should *convincing software* for Digital Urban Twins (DUT) be designed to serve as a boundary object for interdisciplinary arrangements in transformative testing?

Who should own urban digital twins?

Fran Meissner
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More and more cities are developing digital twins of their crucial public infrastructures. The data and data models that are needed to build digital twins are forecast to take on more and more relevance in how cities are run and developed. Many twinning projects involve multiple stakeholders in their design but our discussions about how we should govern digital urban twins going forward demand more critical engagement. Starting from the simple question of who should own urban digital twins, this paper will explore and evaluate different options for governing urban digital twins. This paper will draw on intital conversations with practitioners in the field and how they evisage the future of digitial twins. I will explore how practitioners contrast the added value they foresee digitial urban twins will have for urban planning with how they forsee accountability and responsibility of the many actors needed to make digital twins work for cities. The paper will draw initial conclusions about the boarder ethics concerns that require attention in propagating for urban digital twinning.

B.3: Digital Platforms in Society and Industry

Session Chair: Ulrich Dolata, University of Stuttgart, Germany
Session Chair: Jan-Felix Schrape, University of Stuttgart, Germany

Platform architectures on the internet and in industry. A comparative perspective

Ulrich Dolata, Jan-Felix Schrape
University of Stuttgart, Germany

Today’s society is shaped in ever more areas by digital platforms of various kinds. However, to date, social science research on platforms has been primarily oriented toward economics and focused on social media, market and service platforms on the internet. In contrast, comparatively little research has been done on platform-centered organizational patterns in other socio-economic realms.

Against this background, our paper first develops a sociological notion of platform companies and the internet platforms they operate as a new organizational form that consists not only of economic features but also of action-orienting rules, institutional infrastructures and social relations between a great variety of individual, corporate and collective actors that clearly reach beyond economic contexts and far into society. To this end, we specify the often fuzzy talk of “the platforms” by drawing an analytical distinction between the (1) platform-operating companies as organizing cores; (2) the platforms belonging to them as technically mediated social action spaces that provide the basis for genuine social activities on today’s internet; and (3) the institutionalized coordination, control and exploitation mechanisms implemented by the platform operators.

In a second step, we address the still largely open question of the extent to which the described platform architectures on the commercial web can be transferred to platform-centered organizational patterns in other socio-economic areas, such as industrial research, development and innovation processes or manufacturing. For example, how open or closed are platforms in industry compared to social media or market platforms on the web, given that platform participants in industry have a completely different need for data security? What (economic, regulatory, controlling) power potentials do the respective platform operators have in different socio-economic sectors or societal realms? What roles play established actors, start-ups, or tech companies that migrate into the respective field as new entrants? How are digital platforms in industry integrated into existing corporate structures?

The Architecture of a Platformized Market - A Cross-Platform Study of the Romanian-Based Sneaker Reselling Market

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Living in a platform society (van Dijck et al., 2018) makes for a myriad of consequences at the societal level, as well as core modifications to industries and markets. From platformized industries such as journalism, healthcare, education, transport (van Dijck et al., 2018) to the platformization of cultural production (Poell et al., 2021), digital platforms have been intensely studied in the past few decades. However, the attention is mostly targeted at the GAFAM conglomerate - and for good reason, considering other platforms’ dependency on their infrastructural ecosystem. But as plenty of industries are being redefined through the internet and a lot of markets become platformized, we can witness a wide array of specificities characterizing this process - be it due to local particularities or due to industry communities - which often go under-researched.

One such example is the sneaker resale market, which is currently valued at around 6 billion US dollars. This secondary market offers plenty of insights into how digital platforms create and regulate the infrastructure for consumption purposes. But what makes this market different is how the sneaker resale industry divides a digital platform architecture (Dolata & Schrape, 2022) into where the financial activity happens versus where it is being shaped by internet-based industry communities. Thus, while products are being sold on one platform,

membership-based communities located on a different platform actively negotiate and shape market dynamics.

This paper proposes a deep dive into a particular set of dynamics happening on the platformized sneaker reselling industry in a Romanian-based market. Specifically due to its cross-platform nature, it has salient implications into how the market is shaped by the interplay happening between two key platforms, one consumption oriented - StockX and the other communication oriented - Discord. The former is an e-commerce marketplace widely used for buying and selling sneakers and other apparel, and the latter is an instant-messaging social platform that allows communities to be created on different servers. This paper focuses on how the interaction between the users of one of the most popular Romanian reselling Discord servers generates particular perceived market dynamics on StockX.

In order to do so, this study is organized in a twofold manner: the StockX platform, defined by its organizational core (Dolata & Schrape, 2022), is investigated using the walkthrough method (Light et al., 2016) to lay bare the main platform affordances (Bucher & Helmond, 2016; Davis et al., 2016). As the social action space of StockX takes place on a communication platform, the attention is turned to one of the most popular Romanian Discord servers for sneaker reselling, which is studied using a combination of netnography (Kozinets, 2019) and interview of community members. Taken together, these elements showcase how the dynamics of a platformized market are shaped on a communication platform inhabited by a local community. Therefore, this cross-platform study helps uncover the fluid and heavily-negotiated relationship between platform operators and participants and how the regulatory and economic power potentials are a result of constant cross-platform activity interplay.

Regulatory shock and organizational adaptation: how data architecture modularity and data interoperability affect firm performance in response to GDPR

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Large corporations can be viewed as business eco-systems consisting of loosely connected entities that interact and create value due to complementarities (Adner & Kapoor, 2012; Kapoor & Lee, 2013, 2017; Kapoor, 2018; Agarwal & Kapoor, 2022). The underlying technological architecture of such business eco-systems is crucial to coordinating value creation (Jacobides, Cennamo, & Gawer, 2018; Baldwin, 2020; Agarwal & Kapoor, 2022). While the emphasis of past research has been on how complementary technologies within the business eco-system shape firm performance, the underlying technological architecture is crucial in defining the system-level goals, members' roles, standards, and interfaces of an eco-system (Teece, 2014). The technological architecture determines the patterns in which complementary technologies are incorporated with other components within the system (Jacobides, Cennamo, & Gawer, 2018), whether they connect through interfaces or become fully integrated into the system.

In May 2018, the European Union's General Data Protection Regulation (GDPR) became effective. Environmental pressures may force firms to adapt their relationships with technology complementors. This paper explores how firms' underlying technological architecture may hinder or facilitate such adaptation. We focus on the role of enterprise data architecture, which encompasses the IT and information architecture describing the collection, processing, and usage of data within the organization. It is a type of corporate IT infrastructure (Broadbent, Weill, & St. Clair, 1999) designed to coordinate the sharing of resources across entire systems of interdependent data sources and analytics applications embedded in various business processes.

Our central hypotheses are around how *data architecture modularity* hinders adaptation post-GDPR, and *data interoperability* lessens the negative impact of the regulatory shock. Our arguments are rooted in the following reasons. First, GDPR disproportionately hurts firms engaging in outsourcing from third-party vendors. Hence, modular firms are at greater risk, but vertical integration limits such third-party risks. Second, GDPR disproportionately hurts globally complex firms with data silos, which are more likely to result from a modular architecture and local scaling. Data interoperability reduces such global complexities by breaking down data silos and facilitating internal control by providing firms with a holistic view of their data systems.

We find empirical results consistent with our theoretical hypotheses, using panel data on nearly 100,000 U.S.-based establishments of 23 large finance corporations annually from 2016 to 2019. We combine data from three independent source: (1) establishment-level variables come from annual snapshots of the Aberdeen Computer Intelligence (CI) database; (2) data architecture modularity and data interoperability are measured using a survey at the corporation level, and (3) corporations' exposure to the EU/EAA market and hence GDPR compliance risks are defined using companies' annual 10K reports between 2016 and 2019. We use a difference-in-differences regression design to estimate the effects of GDPR enforcement in mid-2018 on the performance of establishments that belong to corporations with substantial exposure to GDPR compliance risks. The empirical method allows us to separately estimate the impact of GDPR enforcement on firms with different data architecture design features and compare the performance trajectories of firms with a particular feature to those without the feature.

The variety and types of digital platforms used in higher education administration

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The digitalisation of the higher education sector has been accelerated by the COVID-19 pandemic. The increased usage of digital platforms, however, is a rather new phenomenon in higher education systems. While some studies have shown the effects they have on the teaching and learning processes, there is still limited understanding how digitalisation permeates university administrative systems and processes (Coates, 2020; Leišytė, 2022). There is also very scant research on the types of platforms that are used by higher education and research institutions as well as academics. While some authors point to the positive

effects that platform services bring to higher education, others warn that higher education's public stature, principles and values may be eroded by the EdTech industry. It is argued that EdTech companies are 'designed not only to reduce public investments in education but also to provide potentially lucrative domains for capital, including the EdTech industry' (Mirrless & Alvi, 2020, p. x- xi). In this paper we aim to characterise the platforms that specialise in human resource management in higher education drawing on the examples from HolonIQ database. We build on the notion on platform capitalism (Cottom, 2020, Srnicek, 2017) to understand the aims, services as well as the financial models of these platforms partnering with higher education institutions. Literature shows that the range of EdTech actors with digital solutions for performance management is very diverse. They promise increases in efficiency, user friendliness and transparency of performance measurement and management processes. The HolonIQ 2021 Global Learning Landscape provides 41 categories of platforms that offer their services to HE. Six categories focus on deal human resources and performance management, including recruitment, upskilling, mentoring, and improving well-being of academic staff. The majority of these platforms use AI, machine learning, video and audio recognition, bots to assist HEIs with performance management and human resource management, and among other tools, conducting performance appraisals (HolonIQ, 2021). The findings suggest that the EdTech platforms offer a wide range of services to higher education institutions, with the domination of B2B business model of gathering analytical data from the users and capitalising this on the market. Their promise of 'easy' HRM translates into the whole range of services that are not really adjusted to the higher education sector on the one hand, while on the other hand, are based on the tools that have dubious implications for personal data protection and that enhance the 'dark' side of platform capitalism.

Science-Specific Platforms: Formal Organizations for Scientific Infrastructures and Services

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Deutsches Zentrum für Hochschul- und Wissenschaftsforschung, Germany

In the wake of digitalization and platformization (Poell et al., 2019) scholarly communication has been transformed significantly (Neuberger et al., 2021), including the emergence of a new type of organizational actor: science-specific platforms, notably ResearchGate and Academia.edu as academic social networks as well as Altmetric.com and PlumAnalytics as aggregators of novel publication metrics using non-scientific data sources (like social media mentions). Despite their differences, these platforms provide novel scientific digital infrastructures and services which are set up, maintained and developed further by commercial companies.

The platforms regulate, control and curate social action spaces (Dolata & Schrape, 2022) and can be described as *platform organizations* with organizational structures (i.e. decision programs, communication channels and personnel) (Luhmann, 2018). Regarding their relations to the environment, the platforms follow the logics of two functional systems (Luhmann, 2005): they pursue profit interests *through* providing services for the science

system. To analyze these relations, we focus on the platform organizations' *web-presence, i.e.,* on their explicit organizational *self-presentation* and on their implicit self-display through the provided *infrastructures and services*.

Considering research gaps regarding organizational perspectives of platforms (Ametowobla & Kirchner, 2022) and scientific communication (Schäfer & Fähnrich, 2020), we conduct a qualitative content analysis (Mayring, 2019) of the science-specific platform organizations' web-presences. First, we investigate the platforms' display of their organizational structures and how they address the science and the economic system. Second, we construe the platforms' scientific infrastructures and services as enablers of three layers of evaluative observation, hereby drawing on the sociology of valuation (Krüger, 2022). Our findings suggest that the platforms contribute to creating new visibility regimes in science which accelerate the shift from the primary code "true/false" to the secondary code of reputation (Schimank, 2010).

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Platformization and its Limits: Exploring the influence of field conditions on the emergence of platform architectures

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In current social science debates, digital platforms stand for profound changes in the production and consumption of goods, services, and media content. Several authors identify them as central to a new form of capitalism or even proclaim the *platform society*, in which platform organizations influence all areas of social life.

In this paper, I argue that such diagnoses are based on a *success bias* that leads them to overestimate the speed and scope of platformization in society. They are based on empirical research that focuses on a few successful platform companies such as Uber, Airbnb, Facebook, or Amazon, all of which emerged in weakly regulated settings such as the early Internet or the Sharing Economy. In contrast, they neglect the challenges platform organizations face in more strongly institutionalized fields, including those based on industrial manufacturing, crafts, or professional and public services.

I tackle this success bias by shifting the focus from successful platforms to contested processes of *platformization*, understood as the mutual shaping of digital platforms and the social fields in which they unfold. More specifically, I ask how and under what conditions the emerging structures of digital platforms may adapt to the prevalent structures of social fields, or vice versa.

To answer this question, I propose a theoretical framework that combines the *architectural view of platforms* (Ametowobla 2020; Dolata and Schrape 2022) and the *theory of social action fields* (Fligstein and McAdam 2012). I use this framework to draw together findings from a growing but fragmented literature that examines processes of platformization comparatively and longitudinally.

I find that the likelihood, speed, and direction of platformization depend on the conditions of the social action fields in which platform organizations vie for incumbency. Several scenarios are explored for each set of conditions. In *emerging fields*, such as those of the early Internet, the capacity to mediate between different groups is at a premium. Because they provide the technological and organizational means for structured interactions between heterogeneous groups of actors, platform organizations may present themselves as ideal brokers for stable relationships in otherwise uncertain environments. In *stable fields*, such as traditional industries, the level of interaction and mutual awareness among field actors is high, and there is little reason to rely on additional mediators. Moreover, any new conception of the field will be judged against established rules, norms, and worldviews. Where platformization occurs, it may be initiated either by incumbents or by severe crises in the field's environment. Finally, in *transforming fields* where previously established structures are called into question, invading platform organizations may support the formation of social movement-like dynamics. They may establish a new field order by siding with other challengers or by lowering entry barriers for external actors.

Overall, the paper suggests that platform organizations will not thrive equally in all areas of society, nor will they invariably supplant other forms of organization. A field perspective highlights the differential rates and limits of platformization by explaining why some fields are particularly susceptible or resistant to reorganization around platform architectures.

B.4: Understanding the Metaverse: theoretical, empirical and critical challenges for a new(?) internet age

Session Chair: Chris Hesselbein, Politecnico di Milano, Italy
Session Chair: Paolo Bory, Politecnico di Milano, Italy

Critical Questions for the 'Metaverse': Provocations for a cultural, technological, and scholarly phenomenon

Chris Hesselbein, Stefano Canali, Paolo Bory
Politecnico di Milano, Italy

According to mainstream narratives, the era of real-time rendered virtual worlds that can be synchronously and persistently accessed by large numbers of people is drawing close. Such 'metaverses' are for now still the feverish pipedream of tech companies and venture capitalists, and their exact shape, content, and meaning are therefore still undetermined. Moreover, rather than a clear endpoint, the 'metaverse' is a vision or imaginary that is used to mobilize enormous resources towards deepening and extending the current paradigm of digitalization and datafication. It is thus likely that an increasing amount of human activity – both professional as well as leisure-related – will take place in such virtual spaces, and that the paradigm of 'big data' is about to be expanded with massive amounts of new and varied data that capture even more (corporeal, sensorial, spatial, and temporal) information produced by and about people as well as their interactions as these unfold in virtual spaces over time.

Much like the rise of 'big data', the emergence of the 'metaverse' gives rise to important questions, particularly for the social sciences and humanities. First, the significant challenges and benefits of collecting and analysing data on the activities of people in virtual environments as well as of conducting research on the companies, platforms, and infrastructures that enable and control these environments need to be addressed. Second, critical questions need to be asked about how the transition of increasing amounts of human activity to virtual environments may, on the one hand, lead to the creation of better tools, services, or public goods as well as empowered communities and political movements, or on the other hand, exacerbate ongoing harms and inequalities, such as the loss of privacy, state/corporate surveillance, suppression of speech, precariousness of labour, and algorithmic profiling.

As a currently emerging yet uncertain and rapidly developing socio-technical phenomenon, it is of crucial importance to avoid utopian or dystopian rhetoric and to critically interrogate – in advance – the potential challenges, drawbacks, and benefits that might emerge as

metaverses are being developed, who gets access to metaverse data and to what ends this will be put to use, and how these developments might transform or even limit the nature of scholarly research.

From the perspective of media studies, critical data studies, and science and technology studies, this paper discusses first the promises and pitfalls for collecting and analyzing data about and in 'metaverses' as well as the various technologies that are likely to underpin both the development of metaverse environments as well as research on metaverse activities. Second, we discuss how these developments might contribute to the further 'datafication' of human practices and interactions as well as the 'quantification' of research methodologies across the social sciences and humanities. Both these sets of issues are addressed through a series of questions/provocations that each address a distinct tension between metaverse data and the scholarly production of knowledge about 'metaverses' and the assumptions, biases, promises, and consequences that underpin their development and use.

Existing to Exit: The Metaverse as Libertarian Escape Fantasy

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The aim of this paper is to stimulate discussion for how we can develop a critical understanding of the political philosophies, ideologies, and corporate narratives of the Metaverse. This paper will provide one entry point in this important discussion by situating it within theoretical debates that existing network architectures and platforms are not fit for purpose for enacting specific visions of a decentralized internet architecture, particularly one that will be developed through spatial computation and geographically distributed in 'hybrid' space (Saker and Frith, 2019). I contribute to this question by arguing that it is necessary to critically unpack how the Metaverse represents a particular manifestation of 'exit' politics that coalesces around escape fantasies of tech elites, in this case, through decentralized web architectures that ostensibly represent a new kind of territorialization for financial capital (Craib, 2022; Rushkoff, 2022; Simpson and Sheller, 2022; Smith and Burrows, 2021). I examine how right-leaning (neo)reactionary and libertarian ideologies are embedded in Metaverse fantasies of disruption, specifically by manufacturing a new kind of digital enclosure that intensifies user surveillance for commercial exploitation, and surplus extraction through rentiership (Andrejevic, 2022; Sadowski, 2020). The paper will first provide some theoretical ground work concerning the ways that political ideologies of sovereignty are 'baked into' digital infrastructure, often in ways that advocate a 'post-political' philosophy of technocratic computation that align with right-libertarian Silicon Valley culture (Bratton, 2015; Fuller and Goffey, 2012; Golumbia, 2016; Smith and Burrows, 2021). From there, the paper will draw on critical discussions of 'platform realism' and 'Extinction Internet' (Lovink, 2022a, 2022b; Stiegler, 2019) to reflect on how the Metaverse is positioned as an alternative to the platformization of internet infrastructure by and handful of monopoly powers (Helmond, 2015; Helmond et al., 2019). Finally, I argue that Metaverse predictions of centralization and decentralization are contingent on the ways that discourses of 'reclaiming' the internet are situated within specific political and economic contexts. In this case, the Metaverse as

articulated by emerging consortiums of tech and entertainment sectors ‘exists to exit’ from an internet ecosystem characterized by increasing calls for regulation, a stagnation of user growth, and declines in advertising revenue.

Claiming Sovereignty over the Global Future: Metaverse, Globalization and the Role of the State

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The present study will discuss how different conceptions of the metaverse reflect, and rely on, different ideas concerning the relationship between global markets and state power. Indeed, at present the definition of “metaverse” remains rather blurred, more connected to its mythology rather than to technological advancement. And yet, imagining a digital space able to host human interactions beyond the limits imposed by the political and economic partitioning of our planet is not a neutral endeavor: futures come with their own demands.

The metaverse presents itself as the ultimate convergence, a third space where information, money, data and people seamlessly flow on a global scale. Somehow unsurprisingly, it seems just a cyber-utopic version of neoliberal globalization; a future in which the rules of the free market are the primary, if not the only, regulator of the world. And yet, state power still represents the core engine of the globalization project. Indeed, to create the global market, to profit from planetary asymmetries and increase wealth concentration, states had to embrace a new role: to ensure that the law, in terms of property rights and contract regulations, is enforced everywhere in the same way (Pistor, 2019). In other words, and with some meaningful exceptions, states today use their democratic legitimacy to maintain the global market out of the reach of democratic control; to prevent, at the expenses of citizens, a fragmentation of the global level playing field (Slobodian, 2018). The creation of a metaverse relies on a similar principle.

Starting from these premises, the present contribution investigates which kinds of global futures are envisioned in relation to the development of different metaverses and which role states are expected to play in it. In other words, rather than questioning the potential impact of the metaverse on the global society, the present study reverses the question, and asks: which political and economic conditions are perceived as necessary to make a specific version of the metaverse possible? And which visions of the future are mobilized to legitimize the pursuit of such conditions? To answer these questions, the study will review and compare the visions of the future proposed by the main actors currently discussing the development of the metaverse (i.e.: Meta Platform Inc., European Commission and China). By comparing the ways different futures are employed to legitimize the creation of a metaverse, this analysis will shed light on the increasingly strained relation between state sovereignty and digital spaces in a context of accelerating globalization.

The Metaverse vs. Hannah Arendt: A critical reminder of our embodiment.

John Magnus Dahl
University of Bergen, Norway

You don't need to look long on the internet to find characteristics of the metaverse as something that "could fundamentally change how humans live", that the metaverse will be "like real life, only bigger and better", and that "the metaverse will arrive". According to a recent Pew Research poll, 54 % of "624 technology innovators, developers, business and policy leaders" believe that the metaverse by 2040 will be "truly fully-immersive" (Pew Research Centre, 2022). Although the percentage indicates a clear divide in the industry, it is safe to say that a central element in widespread imaginaries on the metaverse concentrate on how it will revolutionize not only internet, but people's daily life, and that this is connected to how the metaverse will be fully-immersive.

But can a virtual word ever be fully-immersive? In this paper, I use Hannah Arendt's distinction between the three fundamental kinds of human activity – labor, work, and action – to critically dissect the imaginary of the metaverse, concentrating on the question of embodiment.

Arendt uses the opening lines of *The Human Condition* to reflect on how modern science, in its manifestations as space engineering and the life sciences, builds on an imaginary where mankind can exchange "…human existence as it has been given […] for something he has made himself" (Arendt, 1958, 2-3). Writing these lines in 1957, spaceships and artificial life bore much more alluring promises than computers. Today, it is a safe bet that Arendt would have seen AI, AR, VR and the Metaverse as clearer examples of how science is imagined as promising us a world where we can "escape the human condition" (Arendt, 1958, 2).

At the same time, Arendt's division of three distinct spheres of life proves useful in criticizing the promises of this imaginary, most visible in popular discourse around the metaverse, through reminding us of our embodiment. Starting with the sphere of labor, I discuss how the metaverse cannot be fully immersive because human beings can never be born, die, or feed in the metaverse. Furthermore, using the categories of work and action, I argue that the allure and attraction of a virtual world – be it the metaverse or contemporary use of all kinds of social media – lies in how it allows us to be *disconnected* from our bodies. We can (in principle) always turn off the computer. Virtual worlds should thus be seen as a parallel (but not less real) world where we can engage with others not through one unique, constant avatar, but through the opportunities to enact many different identities, offered by disembodiment. The metaverse might thus be 'overrated' both regarding its attractiveness and its radicalness.

The paper is mainly based on a theoretical discussion of the relevance of Arendt's thinking when dissecting imaginaries of the metaverse, but the idea stems from empirical, ethnographic research on teenager's social use of smartphones and computers, which will be used to illustrate and illuminate the points of discussion.

A Metaverse of Fluidity, Inclusivity + Plurality

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The term “metaverse” is abuzz as tech companies scramble to claim the emergence, design, and ownership of Web3, but its definition proves broad. A quick online search of the metaverse yields dozens of news reports, essays, and scholarly critiques and analyses about it: reporting, warning, speculating, questioning, and occasionally endorsing the internet’s next big step. However, talking about the metaverse is a tricky task as it invokes an unclear vision for what comes next and leans heavily on advances made by tech companies like Meta and Microsoft. For many artists and small groups who are creating projects in the nascent and evolving “proto” metaverse, it’s already here, and it’s more diverse, user-friendly, flexible, and therefore more desirable than what large tech companies have in mind.

This paper argues that metaverse projects led by individual artists and small groups are modest in scope but powerful as alternatives to mainstream efforts as they promote the idea of the metaverse as a pluriverse, a multiplicity of worlds and possibilities that co-exist. In doing so, they offer virtual worlds and experiences that allow for purposeful interaction, are accessible and inclusive sites for sharing ideas, and function as alternative ways of knowing and being, all of which can be translated by participants into meaningful understandings of and connections to the real world.

Using content analysis and drawing on visual studies and digital culture theory, I critically examine three metaverse projects to explore how creative technologies are used to interrogate the logics of storytelling, identity, and forms of cultural knowledge, and are shaped into the making of a metaverse that engages with multiple realities and experiences towards a digital pluriverse.

American transmedia artist Carla Gannis’s *wwwunderkammer* (2020-present) is a social VR-based reimagining of the archive modeled on the 16th century cabinets of curiosity of western Europe. Set in the open-source platform Mozilla Hubs, the project collectively draws on and rethinks the library, history museum, and art gallery to house a collection of image-objects and recorded interviews inside specially designed chambers that represent and offer commentary on 21st century politics, technologies, and ecological crises.

Chinese-born U.S.-based new media artist Snow Yunxue Fu’s *VR WSPark Metaverse Project* (2021-present) is a virtual site and exhibition space modeled on and visually resembling Washington Square Park in New York City. Initially conceived as a space to exhibit student work (Fu is an Assistant Arts Professor in the Department of Photography and Imaging at New York University’s Tisch School of the Arts), the social VR Sansar-based metaverse space is also a cultural hub for artist lectures, performances, and site-specific events, welcoming participants and audiences from all over the world.

Lastly, AbTeC Island (2016-present), located in the massively multiplayer online 3D virtual world Second Life, was created by the North American-based project and research group Aboriginal Territories in Cyberspace (AbTeC). Co-founded by technologists and artists Jason

Edward Lewis and Skawennati, AbTec Island serves as a virtual headquarters and creative studio for teaching, learning, creating, and offering a safe space for Indigenous communities.

Empowerment, Business and Metaverse

Heidrun Maria Allert
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This work presents findings of an empirical study which took place May 2021 till June 2022. The study analysed articulations on social media accounts which promote the Metaverse and investments in NFT-based assets (such as virtual land in Decentraland). The accounts analysed are hold by families, i.e. parents and single parents, which describe themselves as solopreneurs. Thus, the study looks at the Metaverse and its imagineries not from the perspective of big tech companies and large (platform) corporations, but from solopreneurs and families. As such, the Metaverse is not understood as a technology and a platform allowing for an alternative life and new experiences, but as emerging social practices, processes of subjectification and political agendas. These are not primarily driven by visions of the future and a "new internet era" but are rooted in historical processes of work, economy, and the self, as well as respective ontological underpinnings.

The findings show, that the Metaverse is conceptualised as a business empowering citizens to emancipate themselves from societies. This form of emancipation is routed in a long tradition. The findings are discussed based on Philip Agre's work. He describes the emergence of a business discourse of liberation as the rise of empowerment (Agre, 1995). The study shows that forms of work organisation and learning arising in 1990th as well as the human potential movement are taken up by individuals which are eager to govern themselves. In these processes, individuals for example engage themselves in displacing public law by contract law. The study takes up a socio-material perspective and also takes into account infrastructural aspects of blockchains and smart contracts.

Agre, P.E. From high tech to human tech: Empowerment, measurement, and social studies of computing. Comput Supported Coop Work 3, 167–195 (1994). https://doi.org/10.1007/BF00773446.

Metaverse. Old and new urban issues in virtual cities

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Recent years have seen the emergence of some early attempts to construct virtual cities, affective utopias or dystopias in an embodied internet, which in some respects loom as the ultimate expression of the neoliberal model applied to the urban (albeit virtual). Although there is an extensive disciplinary literature on the relationship between planning and virtual reality related to the gaming industry, it often avoids questions of values. The observation of some of these early experiences – Liberland Metaverse, Decentraland, Seoul Metaverse, SuperWorld, to name a few – raises important questions and issues that are gradually

becoming inescapable for architects, and urban planners, and allows us to make some partial considerations on the risks and potentialities of these early virtual cities.

The first reflection revolves around the private character of these new cities. To whom do virtual cities belong? Unlike the World Wide Web, financed by public bodies, the first experiments in virtual cities are in the hands of Big Tech. The private character of these initiatives challenges norms, rights and values rooted in the physical city, which come into crisis in virtual cities, which struggle between the desire for freedom and the need for regulation. The second issue has to do with the project and its imaginaries, which, on the one hand, re-proposes entrenched and hyper-traditional images – despite the potentially high degree of creative freedom – and on the other, while exasperating the rhetoric of the bottom-up project, is generally configured as an absolutely top-down project, planned down to the last detail by professional experts. A third issue has to do with the accessibility and consequent inequality of these virtual cities. Although during the Covid-19 pandemic initiatives such as Seoul Metaverse have exaggerated its potential as a device for accessibility to welfare services and turist attractions even in situations of physical distance, these initiatives nevertheless avoid addressing issues related to the digital divide, which poses serious problems of socio-economic and generational inequality.

Moreover, in these first experiments of virtual cities paradoxically seem to re-propose urban problems consolidated in physical cities: from spatial and socio-economic inequalities, to touristification, to the total privatisation of space, to land speculation as demonstrated, for example, by the disproportionate real estate market performance of Decentraland. A final question alludes to the unsustainability – understood in ecological terms – of this model, which re-proposes an advanced, polluting and unequal techno-capitalist vision, without asking the main question that the current state of crisis poses to us: that of a radical project for the care of the world.

Dystopia or contemporary utopia, what are these new virtual cities? The construction of a better city and a better world has obsessed architects and urban planners since always. Virtual reality gives us this possibility but it would seem to re-propose well-rooted imaginaries and problems of the contemporary neoliberal-model city. And it opens up a serious reflection on the need for new imaginaries, a radical “politics of the imagination” (Didi-Hubermann, 2010), for virtual territories.

Imaginations from the Other Side. Fashion at the crossroads of a new (internet) age

Michele Varini
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New paradigms of consumption and production made possible by digital technologies have been affecting the fashion industry for several years, accelerating further as a result of, and in response to, the pandemic situation. Within this complex current, one phenomenon has recently begun to manifest itself and grow: various fashion brands have experimented with forays into the world of gaming, a subculture peculiar for its imagery, rules, languages. An interesting case in point is Animal Crossing, a gaming platform developed by Nintendo for Switch, a "hybrid" console. The game is a life simulator (in some respects similar to “Second

Life") where users act in a media context with personalized avatars. A relevant phenomenon, given the ability to customize avatars, is the production by users of customized "outfits," many of which are inspired by iconic collections of major designers. There are profiles where these digital garments are re-shared, re-mediated, processed, giving rise to dedicated profiles, especially on Instagram. Another sign of cross-fertilization between fashion and digital can be traced in the fashion shows hosted in the medial environment: Animal Crossing hosted fashion shows of various maisons. which created, ad hoc, digital clothes and accessories, usable and purchasable directly in the platform, designed to be worn by avatars in the media context of reference.

To address a field such as this, which moves between on and offline making even these distinctions obsolete and hermeneutically insignificant, methodologically a netnographic type of investigation was chosen. A first phase of the research involves an exploratory observation of social networks to Identify Instagram profiles dedicated to re-sharing content related to Animal Crossing. The analysis will be developed in the form of visual ethnography, both to obtain information inherent to stylistic and aesthetic choices and to find recurrences/dissonances with respect to mainstream fashion imagery. The approach is mixed methods, with the intention of being as faithful as possible to the peculiarities of the field of study.

The paradigms of consumption, production and the creativity itself behind fashion objects seem to be moving out of the traditionally followed trajectories. One of the objectives of the present study is to explore this new reality: what are the drivers to fashion consumption in this new context? Are the traditional answers provided by the sociology of fashion valid tools for reading the phenomenon? How are products perceived, their artistic value? What role do skills and creativity play in the reproduction/creation of fashion objects with these digital tools? What are the innovations and threats to the creative and production chain?

The interest of the study is focused on both the role of pro-sumers and the role of producers. The fashion supply chain is engaged in a strong change; the possibilities are many (sustainability, customization, etc.), and many are the threats (artistic value of the product, professionalization of creativities, etc.). The present work could have a dual function: to reconstruct a visual imagery of this fashion co-production and consumption in a media context, a hypothetical "metaverse", laying the foundations for new methodological ideas.

B.5: Studying paratexts in practice – How to research algorithms in datafied societies

Session Chair: Roger von Laufenberg, Vienna Centre for Societal Security | VICESSE, Austria

Session Chair: Vera Gallistl, Karl Landsteiner Privatuniversität für Gesundheitswissenschaften, Austria

RTFM! - Using paratexts to research algorithms embodied as software

Judith Hartstein
German Centre for Higher Education Research and Science Studies (DZHW), Germany

Christin (2020) and others emphasize that studies of algorithms can and must circumvent the opacity of algorithms by fully using the material available. However, the potential of paratexts of software, such as manuals and accompanying documents, is often not used exhaustively. For decades now, scholars have been aware, that software development and production are situated actions (Suchman 1987, 2007) leading to biases in computer systems (Friedman/Nissenbaum 1996) as a consequence of partial perspectives (see Haraway 1988), and that social consequences arise therefrom. Values and intentions of innovators and designers are inscribed into software products and travel with them through space and time, shaping society as they go along. However, in empirical STS research on algorithms, the developers' ideas (what the software is intended to achieve) and the actual algorithmic implementation (what the software is capable of doing) are often only reported anecdotally.

Derived from two different examples from my empirical research, I will show how paratexts of software can be exploited to better understand algorithms in their implemented form. The first example is understanding a closed source software for manuscript processing in scientific journals by using the underlying software patent together with the data output produced by it. The innovators' problem definition from the patent is key to understand, how this software affects the peer review process in journals, which use this software. The second example is understanding open source research software by positioning it through outgoing literature references from its user manual. References in the body of scientific literature in general help understand and compare different works as part of a common discourse and as constructive element of communities – established methods from the field of scientometrics can be transferred to studies of research software. Additionally, looking back at my research experience with software, I would strongly recommend to take autoethnographic field notes, whenever familiarising oneself with software. I will show some of my notes and I would like to discuss this approach with session participants.

Algorithmic Eruptions - A Research Agenda for Tactics in Crises

Thomas Zenkl
University of Graz, Austria

Despite, or especially because of their ubiquity, processes of algorithmic selection and their consequences pose great challenges for research: Woven into the fabric of everyday life and mundane interactions, their subtle guidance and subliminal manipulation are exerted on often unaware users, who, in trying to make sense of them, rely on the industry's carefully crafted "imaginaries" of algorithmic precision and infallibility. Moreover, research shows how "algorithm awareness" is not only unequally stratified within societal groups, but also how algorithmic systems and their social consequences are being perceived differently along algorithmic literacies.

Researching algorithms in practice therefore usually means talking about phenomena that - if known by a target group at all - are difficult to reduce to a common denominator and that – through their opaque operation as infrastructures – hide in plain sight. Thus, I argue for a reconceptualization of the study of algorithms by focusing on the irritations they produce: Algorithms “articulate” themselves within practice, but their presence only manifests when expectations of their subtle functions are being disrupted, when their emergence deviates from the anticipated “flow of things” and the expectations users ascribe to them.

This focus, anchored in the multiple algorithmically produced irritations, can be a novel way of exploring the pervasive yet often subtle effects of algorithmic regimes and the consequences of their epistemological authority in the production of truth, which manifests as socio-technical power. By considering users’ perceptions and tactics, a re-centering of human agency over dystopian notions of algorithmic omnipotence will not only anchor empirical research into users’ experiences, but also help to avoid the reproduction of ideologically driven paratexts of AI and their discursive perpetuation.

In this contribution, I will to explore and discuss how invisible algorithmic infrastructures and their ontological consequences can be assessed when focusing on the manifold irritations they produce, how a sociology of conflict and crisis aided by breaching experiments can provide an empirical starting point to do so, and how resistances to the algorithmic management of everyday experience can emerge as a tactical bottom-up response to the surfacing fissions of algorithmic regimes.

Algorithmic Reflexivity: inquiries in the construction of an algorithmic system from a practice-based perspective

Nikolaus Poechhacker
University of Klagenfurt, Austria

Within Critical Algorithm Studies there has been quite some discussion about how to study algorithms without falling victim to myths of computational omnipotence of these systems (Ziewitz, 2016). As a result, Dourish (2016) argued that social scientists should learn and apply the language and terms of computer science to describe algorithms. This position has then been criticized, arguing that social scientists should stick to their own repertoire and focus on the involved meaning making processes related to algorithms (Beer, 2017; Seaver, 2017). Drawing from ethnographic observations of developing a machine learning based recommender system, I argue that the social scientific study of algorithmic systems needs to take both aspects of algorithmic systems into account. In my talk I describe how different algorithmic techniques require specific data signals that are processed according to their internal algorithmic logic. This can be understood as a specific algorithmic script that guides the interaction of the algorithm with its environment (see also Rieder, 2017). However, the data that is being processed by the algorithms reference data production processes. A central task of the development process that I could observe was the translation of digital data signals in a way that made them processable by the algorithmic system. This required an interpretation of the data signals according to the aims of the development project and the logic of the algorithmic technique.

Based on an ethnomethodological inquiry in algorithms (Ziewitz, 2017) I introduce the notion of *algorithmic reflexivity* to describe the efforts involved in coordinating practice of data production and their interpretation in the process of stabilizing the algorithmic system. Reflexivity as taken from ethnomethodology means to resolve and update the meaning of accounts - here data signals - in relation to an interaction situation. Algorithmic systems, however, are (rather) stable after their development. Thus, I argue that *algorithmic reflexivity* is the process of ex-ante resolving the meaning of data signals during the development process - and thus stabilizing a certain form of socio-technical order. In my talk I will illustrate this methodological argument by discussing the algorithmic technique of collaborative filtering in recommendation systems in two steps. Firstly, I will be reconstructing the algorithmic logic of mediation inscribed into that technique. And secondly, I will provide some observations from my empirical field, how this led to discussions on how to interpret and translate tracking data as input for the recommender system. A combination of media-theoretical sensibilities (Burkhardt, 2019; Rieder, 2017) and a practice-based approach to algorithmic systems (Neyland, 2015; Ziewitz, 2017) allows us to understand algorithms as mediating information infrastructures that coordinate different practices related to data production and data interpretation. Thus, also mediating the emic terms of computer science (Dourish, 2016) with methodological approaches and sensitivities of the social sciences.

Situating Algorithms in Collaborative Research

Richard Groß
TU Dresden, Germany

Proposing "the situation" as a framework for theorizing algorithms, I will draw upon John Dewey’s pragmatist understanding of situations to present machine learning (ML) as a material practice that takes shape – and often fails – through challenging episodes. To elaborate on this problem-centric conception of situations, I will introduce an ethnographic case study of ML-based collaborative research on honeybees at the intersection of sociobiology and data science.

My analysis will draw attention to problems concerning the practical requirements of successful cooperation in ML-based research. Through this analytical perspective, I will explore issues in pattern recognition as related to the comprehensibility of algorithmic contributions to the observed episodes. Specifically, I will argue that ML as a practice that relies on algorithms features latency problems in the coordination of heterogenous human as well as non-human “machine learners” such as algorithms (Mackenzie 2017). The specific problems I identify speak to underlying issues of contingency (Esposito 2022), alienness (Parisi 2019), and (in-)visibility (Amoore 2020) that characterize algorithm-based practice more broadly. As the core of my contribution, I will show that ML-based research practices feature reflexive strategies of problem calibration that allow human machine learners to respond to these issues.

Understanding algorithms in terms of the situated practice they appear in, my ethnography-based contribution focuses on epistemic challenges and addressability issues in scientific

applications of ML. Paying attention to these problems requires reflexive cognitive adaptation on part of the involved researchers through challenging episodes of their practice.

Views from the developer

Martin Kampel
Technische Universität Wien, Computer Vision Lab, Austria

Development and design of algorithms and data structures is a fundamental task for computer scientists. Algorithmic thinking is taught in any introductory course for developers and is the first step to translate real world problems into programs. The output is machine interpretable code, which should fulfill the specified criteria. Functionality, run time and optimization are key features in a traditional programming course. Looking at programming courses and projects at our university but also at programming in industry Fairness, Bias and Transparency of algorithms are not the main concerns.

View from the developer could by summarized in the following way: fairness of algorithms is a nice to have, but functionality and run time are the main criteria. Aspects of fairness are in mind of the developers, but not actively followed. Fairness is clearly distinguished from an unbalanced data problem. Developers see themselves on the safe side of the outcome of unfair algorithms, since they are usually “European”, male and high income.

Developers are very much aware of data and algorithmic bias, but do not have standardized processes to avoid it. Having the problem of small datasets to learn from like it is common in e.g. medical applications bias is unavoidable and extra efforts are necessary to overcome it.

Transparency is not a primary target for developers, it is well accepted that non experts do not understand most of the algorithms. Developers and programmers do a lot to understand the way technology works, motivation to allow everyone to understand it is low. Furthermore transparency does not protect IPRs, slows down the implemented solution and makes it less accurate.

In this presentation, we want to critically discuss fairness, bias and transparency from the practitioner’s point of view. Observations and findings are based on programming lectures and seminars, supervision and consulting of algorithmic development projects and unstructured interviews with developers and computer science students.

What is Bias, Anyway? - The Multiple Experts on Bias of Algorithms in Long-Term Care

Katrin Lehner[1], Vera Gallistl[1], Roger von Laufenberg[2], Victoria Kontrus[2]
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Background. With ongoing demographic change and related expansion and digitalization of the care sector, long-term care facilities increasingly count on algorithmic technologies, from ambient assisted living systems to fall-detection sensors and robotics (Queirós et al. 2017) to decrease caregivers’ burden and increase care recipients’ safety. While the use of technologies featuring AI-based risk assessments has become progressively pervasive in

care settings and their development and implementation have been studied intensively, the biases these technologies entail are complex and yet under-researched.

Aims. This paper makes a novel contribution by engaging critically with methods that can be used to study bias of algorithmic systems in care settings. Drawing on the methodological framework of analyzing bias as algorithmic failure (Rettberg 2022) and expanding it with a multiple-perspective methodology (Vogl et al. 2017), this paper asks what can be gained from exploring the multiplicity of algorithms and its related biases in long-term care and which methodological challenges and potentials arise from such an endeavor.

Methods. To explore this multiplicity of algorithmic bias in long-term care, we conducted multiple-perspective qualitative interviews (ibid.). Fieldwork took place at an Austrian long-term care facility where an algorithmic fall-detection and monitoring system was implemented. 3D-sensors were used in rooms of selected older residents to monitor their behavior and alert caregivers in case of a fall. We interviewed six technology developers, five care home residents, seven care workers as well as two representatives of a special interest group. The research team also conducted about 60 hours of participant observations at the facility. Data analysis based on Situational Analysis according to Clarke (2019) allowed to identify structures, materialities, discourses and practices for each group of actors and further enabled a critical consideration of the co-constitution of human and non-human players in the field of applied AI.

Results. Preliminary findings on the multiplicity of algorithms expose the diverging and partly inadequate understanding of the AI's functionality, depending on the group of actors, which results in a problematic inequality of knowledge. In narrations of engineers the economic logic of the AI becomes apparent, which is supported by gatekeeping its functioning and leaving other actors uninformed. Therefore, for caregivers the technology mostly represents an 'algorithmic black box' (Pasquale 2015), thus reasons behind algorithmic decision-making ultimately remain opaque to them. Simultaneously, a re-arrangement of care practices is realized to make them 'fit' with algorithmic decision-making and to reduce false alarms. Hence, biases that occur through the algorithmic systems are mainly framed as either data-problems or user-errors, stemming from 'wrong' interaction with the system by care staff or older care home residents.

Discussion. Consequently, we argue that bias of AI in care settings takes different forms for these different actors and re-arranges their (care-)practices differently. This multiplicity of bias, however, also calls for novel concepts to describe this performativity of algorithmic bias from different perspectives. We outline questions for such a multi-perspective conceptualization of bias of AI and discuss associated methodological challenges and their implications for present and future research on AI in long-term care.

How to teach the study of algorithms: Experiences from the field

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Due to the ongoing digital transformation, algorithms and data are increasingly permeating our societies. From public administration over surveillance to entertainment: Algorithms increasingly play significant roles in a wide range of activities. Given their omnipresence, it has become increasingly important to make their role in society a topic in computer science/informatics curricula.

In this work, we present the concept and contents of the course “Critical Algorithm Studies” and our experiences from teaching that course for six years at TU Wien - with about 5000 computer science students one of the largest universities in the German speaking world. As the course title implies, it is dedicated to the critical and social study of algorithms. This field of enquiry is decidedly interdisciplinary, which is reflected in the range of literature it draws upon, with contributions from Computer Science, Media Studies, Legal Studies, Philosophy, Political Science, and Science and Technology Studies (STS). Exposing computer science students to this body of knowledge challenges their assumed authority to be the primary experts when it comes to algorithms and sensitises them to appreciate their limits of knowledge.

While issues and concerns related to algorithms are increasingly commonplace today - academically, in policy processes as well as in the public debate - this was not yet the case when this course started. Being held the first time in 2016, this course’s topics have moved from niche to mainstream significance. Being a niche topic at the time of its origin, it was the work of students to initiate, design and largely run the course. In the following years the course has been successfully institutionalized, its relevance acknowledged and the structure and content stabilised. Given the involved lecturers’ engagement with STS, concepts, theories and sensibilities from STS have increasingly become the foundation of the course. The development of the course parallels the institutionalisation of topics such as fairness, accountability and transparency as well as AI ethics in academia, industry and regulatory debates, as evidenced by the increasing number of conferences and publications on these topics.

Despite this success story, the course’s continuation has always been a challenge. Despite an increasingly stable structure, the question what topics should be taught under the umbrella “Critical Algorithm Studies” continually challenges the design and content of the course. Two additional issues arise from the interdisciplinary character of the course. On the one hand, there’s constant pressure to argue how it is relevant to the education of computer scientists, on the other hand the precarity of academic careers is an issue: Over the six years of its existence most of the course’s lecturers joined and left the institution. At the same time, the number of people knowledgeable in the course’s content at TU Wien, who research at the intersection of computer science, STS and other disciplines, is limited, making the search for suitable successors difficult.

B.6: Round table: Knowing in Algorithmic Regimes: Methods, Interactions, Politics

Session Chair: Bianca Prietl, Universität Basel, Switzerland

- **Discussants:**
    - Stefanie Büchner (Hannover, Germany): The Organization in the Loop: Exploring Organizations as Complex Elements of Algorithmic Assemblages
    - Simon Egbert (Bielefeld, Germany): Algorithmic Futures: Governmentality and Prediction Regimes
    - Juliane Jarke (Graz, Austria): Reassembling the Black Box of Machine Learning: Of Monsters and the Reversibility of Foldings
    - Katharina Kinder-Kurlanda (Klagenfurt, Austria): Making Algorithms Fair. Ethnographic Insights from Machine Learning Interventions
    - Nikolaus Pöchhacker (Klagenfurt, Austria): Recommender Systems Beyond the Filter Bubble: Algorithmic Media and the Fabrication of Publics

Abstract

Algorithms have risen to become one, if not *the* central technology for producing, circulating, and evaluating knowledge in multiple societal arenas. In this session, we want to discuss the implications that this development has, and will continue to have, for the epistemological, methodological, and political foundations of knowledge production, sensemaking, and decision-making in contemporary societies. In order to so, we propose the concept of *algorithmic regimes*. It draws our attention to the transformations in the socio-material "apparatuses" (Barad 2007), cultures, and practices that configure and regulate how (valid) knowledge is produced and by which means truth claims can be made. Thus, the concept of algorithmic regimes does not so much refer to technology-induced changes of science and scientific knowledge production, but to a wider and more fundamental shift in society's "regime[s] of truth" (Foucault 1976; Deleuze 1992), characterized by an "epistemic colonization" (see Gillespie 2014; also Kitchin 2014; Beer 2018) of computationally driven techniques and modes of knowledge production.

This transformation in knowledge production and decision-making has fuelled – and been fuelled by – utopian visions of open and transparent societies and science that lend strength to democratic processes and grassroots movements. At the same time, knowledge production and truth claims within algorithmic regimes have also proven to be "violent" (McQuillan 2022) or "harmful" (Noble 2018; Eubanks 2018), with scholars and activists pointing to criticizing algorithmic discrimination or threats of surveillance and control.

To grasp the complexity and momentousness of this shift, it is necessary to look beyond the technical nature of algorithms to acknowledge the wider social, political, cultural, economic, and material entanglements of algorithmic systems as they apply to the generation, accumulation, storage, and connection of (big) data (e.g. Seaver 2017, 2019). We argue that at least three interconnected aspects are crucial to understanding algorithmic regimes: (1) the *methods* of researching and designing algorithmic systems; (2) (social) *interactions* and

how algorithmic systems reconfigure them; and (3) the *politics* engrained in algorithmic regimes.

By exploring these three aspects of algorithmic regimes, we aim to address the following pressing questions:

- How do different social actors come to know about and make sense of the world through the deployment of algorithms and algorithmic systems of knowledge production?
- Which kinds of knowledge do we value and which knowledge regimes do we look to in the face of multiple collective uncertainties and challenges?
- What kind of society do we want to live in? Which sociotechnical futures do we desire? And, how can we imagine futures of social justice, social cohesion, and caring communities in (opposition to) algorithmic regimes?

In order to discuss these – and further – questions on knowing in algorithmic regimes, we propose to organize a **round table**. The round table will feature contributions from our forthcoming edited volume “Algorithmic Regimes” (to be published open access with Amsterdam University Press in 2023), shedding light on the complex as well as profound role of algorithmic regimes in contemporary society.

B.7: Data journalism in a datafied society

Session Chair: Sonja Radkohl, FH JOANNEUM, Austria

Session Chair*:* Robert Gutounig, FH JOANNEUM - University of Applied Sciences / Content-Strategy, Austria

Dynamic Topic Modeling of Video and Audio Contributions - Case Study "Der Wegscheider”

Andreas Stöckl
University of Applied Sciences Upper Austria, Austria

In this article, we show how topics and their development over time can be automatically analyzed and visualized in a series of audio and video contributions. These can be series, from podcasts or recurring television programs. If the volume of the contributions is so large and spread over longer periods of time that it would only be possible to consume or even analyze them with a lot of effort, then the presented automated solution can help to get results.

Several current Deep Learning systems are used, which take over the tasks of transcribing the audio data, summarizing the texts, and topic modeling. The transcription is performed with the state-of-the-art model "OpenAI Whisper" (https://github.com/openai/whisper), and the main content per broadcast is extracted from the resulting texts with the language model "GPT3" (https://openai.com/api/). This content is used with the broadcast date data for

dynamic topic modeling with the system "BERTopic" (https://maartengr.github.io/BERTopic/index.html).

As a result, the system forms clusters of content ("topics") that are described and visualized. The information visualizations show the topics and their position in relation to each other. Scatter plots and word clouds are used here to help describe the content. In addition, line charts are used to show the development of individual topics over time.

Besides the above-mentioned problem of a large amount of data, some typical problems of topic modeling must be solved. For example, finding and especially describing the clusters/topics requires preprocessing of the texts, for which language-dependent stop word lists and rule-based filtering are normally used to extract the essential content. Here we use the language model "GPT3", a current and powerful tool that is accurate and precise.

For the implementation of the described method, a software prototype was created, which combines the above-mentioned submodels into a software solution, and enables automated analysis.

We demonstrate the method and the software prototype using the example of an analysis of over four years of Servus TV's weekly commentary "Der Wegscheider" shown. This covers 161 broadcasts from the end of 2018 to the end of 2022.

It can be seen here that a very narrow range of topics comes up again and again on Saturday night. The analysis shows that three topics are so dominant that hardly any other topics are noticeable. These are content on migration, the so-called "mainstream media," and the Covid-19 pandemic. The weekly commentary revolves practically only around these three sets of topics.

The analysis of the temporal development reveals how the topic of the Covid-19 pandemic begins to push the other topics into the background from the middle of 2019 and, in some cases, to cover them completely.

This example demonstrates how current artificial intelligence methods can be used for journalistic work to produce analyses and visualizations that would otherwise be unmanageable due to the large amounts of data involved.

Pragmatic data craft: Conceptions of skillful data journalism between idealistic claims, scientific approaches, and economic boundaries.

Gabriel Malli
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Embedded into broader societal trends of datafication, data journalism is an emergent journalistic sector that has drawn significant scholarly attention in media and communication studies in the last decade (Ausserhofer et al., 2020). While present research often focused on workflows, practices, and routines in the field of data journalism (Gutounig et al., 2022), this paper takes an actor-centered approach and investigates how data journalists conceptualize their profession. Drawing on material from ten semi-structured interviews conducted with data journalists in the German-speaking area, we identified knowledge forms,

ideals and skills that our interview partners consider crucial for becoming and being a data journalist. Applying a coding approach informed by concepts of Grounded Theory Methodology (Corbin/Strauss 2015) we found that data journalism is frequently linked to an ideal of a more objective and scientific way of doing journalism, bearing an investigative and emancipatory potential. At the same time, statements of our interviewees indicate that data journalistic work is structurally limited by economic pressures in the media industries.

Navigating such tensions and succeeding in the field of data journalism requires certain proficiencies: Besides general journalistic capabilities of inquiry and writing, interviewees first stress the importance of skills regarding the generation, selection, revision, and evaluation of numerical (raw) data. Second, they frequently mention the significance of analytical prowess and statistical knowledge for reducing complexities and transforming data material into processed and sorted information. Finally, digital competences in presentation, visualization, and design are deemed essential for the transformation of technical information into journalistic products that are both interesting and comprehensible for general audiences with restraints in their data and visualization literacy. In our sample, individual specializations and prioritizations of certain skills become apparent, reflecting the fluid and collaborative character of the field of data journalism (Stalph, 2020). Despite differences, however, we can find a common emphasis on applied technical knowledge: According to the interview partners, pragmatic problem-solving competences and practical know-how regarding the computer-assisted manipulation, analysis, and presentation of data lies at the very heart of skillful data journalism. Allowing for “efficient” journalistic work in a competitive environment, such capabilities are acquired mostly autodidactically through learning-by-doing processes in an ongoing sequence of interactions with computers and digital tools.

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Challenges in Data Journalism Training Regarding Data and Visualizations

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Within the last years, an increasing use of data in journalism can be observed which is linked to the general datafication of society but also to the digital transformation of journalism in general. Especially during the COVID-19 pandemic, the competencies among journalists to successfully process, interpret and evaluate complex data and data visualizations have gained significance. This societal need to address a large-scale pandemic journalistically has led to an increased use of data stories. Despite a growing need for data journalistic skills the field lacks standardized education or a defined skill set. Consequently, data journalists oftentimes acquire skills and knowledge autodidactically (Heravi & Lorenz, 2020, Kennedy et al., 2021; Quandt & Wahl-Jorgensen, 2021). Nonetheless, training programs are emerging, and this paper focuses specifically on the challenges that arise when such new offerings are created.

We conducted 10 interviews with data journalism trainers in Austria, Germany, and Switzerland (fall 2020 till spring 2021) and confirmed our findings via a survey aimed at data journalists in the same area (fall 2021 till spring 2022).

Results indicate that among trainers working with (raw) data is seen as more challenging than designing and interpreting visualizations. As trainings oftentimes follow journalistic workflows, most challenges emerge at the very beginning before participants start with the analysis and processing of data. For instance, it is demanding for participants to understand a data set, to clean and process data as well as to analyze data to find a journalistic story. Oftentimes, soon-to-be data journalists have a background as a journalist and lack statistical or mathematical understanding. In addition, visualizations bring about their own challenges: They are often underestimated, as journalists expect quick solutions whereas the reality is much more complex and comprehending.

Overall, we see a great variety of needs and goals within data journalism trainings, ranging from simple challenges to complex tasks. Those are highly dependent on the usage of certain data analytics or visual analytics methods and visualization types. Therefore, in trainings as well as in tools that might be developed to support trainings, context-sensitivity is mandatory to be a relevant contribution to the field.

This paper is part of the research project “SEVA – Self-Explanatory Visual Analytics for Data-Driven Insight Discovery” (FFG, 2020–2023).

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Design Guidelines for Visualization Onboarding Concepts in Data Journalism

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Data journalists face two challenges when producing data-centric stories. First, they are required to possess a certain level of visualization and data literacy (Boy et al., 2014; Lee et al., 2017, Pedersen & Caviglia, 2019) to analyze and interpret data during their research. Second, readers of these data stories need to understand statistical information and data visualizations to gain insights from them (Börner et al., 2016; Engel et al., 2019).
Visualization literacy is extracting information from data visualizations and gaining insights effectively, efficiently, and safely (Lee et al., 2017). However, many users lack visualization literacy and thus have difficulties interpreting and working with novel visual representations they are unfamiliar with (Grammel et al., 2010; Perkhofer et al., 2019). This bears the risk of drawing incorrect conclusions and leads to frustration or the rejection of otherwise powerful data visualizations (Börner et al., 2016). Using self-explanatory and simple visualizations is one way for journalists to avoid overwhelming readers (Feigenbaum et al., 2016; Riche et al., 2018).
Right now, the complexity and social relevance of the COVID-19 pandemic have put data visualization at the center of worldwide attention (Shneiderman, 2020). In this context, data visualization researchers, journalists, and experts have been providing various data visualizations for public education. The general public got in touch with diverse data visualizations presenting medical data such as reproduction numbers, COVID-19 cases, hospitalizations, etc. Therefore, more advanced visual representations are necessary to capture more complex data structures and larger amounts of data. Visualization onboarding methods might address this challenge by supporting users in reading, interpreting, and extracting information from visual representations of data (Stoiber et al., 2022a; Stoiber et al., 2022b, Stoiber et al., 2021).
Based on previous studies (Stoiber et al., 2022a; Stoiber et al., 2022b, Stoiber et al., 2021), lessons learned, and a case study with an interactive, automated data analytics onboarding tool for journalists, we derive design actions (guidelines) (Bruijn & Spence, 2008). The design actions comprise structured guidelines on integrating and designing visualization & data-analytic onboarding concepts for data-journalistic use cases along the framework by Spence (Bruijn & Spence, 2008), including a *(1) description* clarifying the title, the *(2) effect* of the design action towards onboarding, advantages and trade-offs (*(3) Upside* and *(4) Downside*), *(5) issues* describing the application of the design action, and *(6) theory* a reference to the cognitive theory is provided. Additionally, we also illustrate the usage of the design action with examples. The presented design actions may help journalists integrate onboarding design in their data visualizations and support the readers in insight generation.
Link to the references of the abstract: https://docs.google.com/document/d/1KBAM8R62MT-nDRIwpKAfdyb1cryvdvAmF218uywhUc4/edit?usp=sharing

B.8: Exploring Digital Interactions with Erving Goffman

Session Chair: René Werner, Johannes Kepler University Linz, Austria
Session Chair: Christian Dayé, Graz University of Technology, Austria
Session Chair: Franziska Gürtl, University of Vienna, Austria
Session Chair: Stefan Laube, Johannes Kepler Universität Linz, Austria

Let's Playing Together: Observing Play Together and its Permanence among Gamers

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The Social Construction of Technology (SCOT), as Wiebe E. Bijker suggests, the users have crucial roles in co-production process of the technology contributing to the sustenance of the technology in the long run. "Permanence" as concept inspired by SCOT perspective enable enables new methods of text creation, use, and distribution, not only within the digital environment but also beyond it. In this case, the present paper interrogates an example of single-player video games to highlight the connections and investigate the concept of digital permanence in the context of online multiplayer games. The use of text to create digital permanence is viewed as an essential component of the video game medium. This recognition has opened new avenues for the study of video games as a "cyber-script" for the purpose of emotional expression, which is not possible in the physical settings. As the video game is an example of an interactive medium, this means that the participant actively contributes to the whole experience, making it a relatively recent addition to the cultural canon. The present study intends to the interactive components of a gamer's experience which contributes to the durability of playing duration in collective memory by employing player's the emotional attachment have to those games as a proxy. By employing a qualitative research design, using a lens that focus on understanding the narratives and stories of the young players, involving digital ethnographic observation, unstructured interviews, the finding based on a biographical study on a game called *Play Together* discovers that the players linked with each other and formed relationships, socializing, and adapting their personalities with their in-game persona which may not reflect their personality outside of the games. This game enables players to interact in the virtual setting and gain shared experience with other players and in the process feel a sense of fulfilment from playing. Eventually, this digital reality resulted in the players fully immersing themselves into the game, so much so that it is capable to fully adapt into their daily routines. Hence, significantly modifying their way of living. By investigating this game, it may portray the significant influence of gaming in the lives of avid sociality of young people.

Online moderation. A ritual approach to interactional involvement

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Online, the question of involvement in discourse often entails moderation. Social media posts and profiles can be subject to different forms of moderation (for example when they get flagged, banned or deleted); participants of video conferences can be granted access or be 'muted' by meeting hosts. Thus, the other way around, online moderation directly addresses 'the right amount of involvement': who, when and how are moderators to intervene in the speech or actions of others? This paper reflects and discusses the use and gains of Erving Goffman's concept of interaction rituals in the analysis of practices of online moderation.

Firstly, I conceptualize moderation as an interactional co-production, with a focus on its ritual dimension. According to a commonsense understanding – as well as a vast body of advice literature –, moderation is achieved by individual moderators who aim at upholding and (re-)instating rules of conduct in order to facilitate discourse and participation in debates. With his concept of interaction rituals, Goffman looks at rules of conduct in practice, conceiving *etiquette* in everyday interaction such as "little salutations, compliments and apologies" (1956, 478) as expressions of demeanor and deference which refer to "some of the senses in which the person in our urban secular world is allotted a kind of *sacredness* that is displayed and confirmed by symbolic acts." (ibid., 473) Thus, Goffman points out the everyday production of 'persons' in interaction, which binds them as members of society. This perspective allows an analysis of how this is achieved and moderated by whom in practice – and also how and when it might be distorted or even fail.

Secondly, moderation occurs as sociotechnical interaction. This holds true for most forms of moderation, but especially for online moderation, which relies on website, app or software design as well as specialized tools such as bots to moderate. Thus, in practice, questions of involvement are not answered by (paid or volunteering) humans alone, but as part of heterogenous sociotechnical cooperation. This reliance on technology has been discussed widely in the context of 'content moderation', highlighting its hidden, or even manipulative effects on interaction. It also relates to forms of online moderation which make themselves accountable to users *as* moderation. Technologies take part in performing (and breaching) etiquette online: looking at these sociotechnical practices of moderation from an interaction ritual perspective, it becomes an empirical question how rules of engagement and distance are moderated – and how they can be moderated.

The Addiction of a Viral High: How Platforms Propel Commitment to the Creator Economy

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Social media is often described as addictive for users, and by design, as platform designers fine-tune technology to direct and exploit our attention to keep us on platforms. In this paper, we consider the flipside of social media platforms with a focus on the experience of addiction

among content creators. We investigate how social media platforms propel creators' commitment to make content, and we find addiction to be a key mechanism driving the production of content and thus the creator economy at large. Through an ethnographically-grounded analysis of the affordances of platform metrics, and their manifestations in creators' sensory experiences and narratives of work, we develop a phenomenology of addiction in the creator economy.

This paper marshals rare in-depth ethnographic data among a company of high-performing content creators who are skilled in making videos go viral. They work for an online publishing company that is popularly referred to as a "content farm," because they produce a high volume of formulaic and disposable content produced mainly for, SnapChat, and YouTube. Based on 18 months of immersive participant observation and interviews with 60 creators, we examine, in real time, creators' experiences "going viral."

Focusing on the affordances of platform technology, we propose a phenomenology of viral addiction along four dimensions. First, creators learn to become highly attuned and sensitive to their performance metrics by tracking their performances on the Creator Studio. Platforms structure creators' attention through these technologies, such that even this case of high-performing content creators come to feel dependent upon platform's "metric power."1

Second, creators tell remarkably consistent accounts of what it feels like to make a "banger" video (with over 50 million views), in terms of both the physical and emotional pleasures of high reach and high earnings, as they are rendered on Creator Studio. The psychic thrills of virality produce distinct and shared embodied sensations, like spiked endorphins, sleeplessness, and feelings of euphoria.

Third, creators frame these experiences as addiction in problematic terms, using the language of "getting high" and being "out of control." Collectively, they recognize and resist the power of platforms even as it profoundly shapes their daily habits.

Fourth, creators chase the thrill of going viral again immediately after each success. We find parallels in the production of compulsive play that are well understood in the gambling and gaming industries.2

Thus, we argue that the platform affords and structures affective relations to work in the creator economy. Bridging sociology of work, STS and communication perspectives on affordances, and sociological perspectives on labor, we outline the phenomenology of addiction as experienced by high performing content creators. We contribute to both empirical and theoretical understandings of how platforms incentivize the labor of visibility, which is a precondition for the business model of social media and a core part of how platforms harness value in human attention.

B.10: Political Participation, Youth and Social Media

Session Chair*:* Susanne Sackl-Sharif, University of Music and Performing Arts Graz, Austria

Wokeism in the public debate – Discouraging or triggering political participation among youth?

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Today, political participation among young people largely takes place in digital realms and on social media platforms. The research project *Understanding Youth Participation and Media literacy in Digital Dialogue Spaces* (U-YouPa) aims to gain a deeper understanding of what constitutes such political participation. The digital literacies that enable their participation include technical, cognitive, social, civic, and creative capacities that allow them to access and have a critical understanding of, and interact with, media.

Besides being the study objects of the U-YouPa project, young people in Norway, Germany, and France are invited as co-researchers by participating in three Living labs (Dell'Era & Paolo, 2014). A generative toolkit including Say-Do-Make tools (Sanders & Stappers, 2012) is applied to engage the participants in collaborative creative acts. The first lab aims to trigger the participants' reflections on participatory media formats, ethics, and intercultural dialogue. They develop short stories in the form of a storyboard that summarise and communicate issues addressed in their discussions. In the second lab, these storyboards serve as input to the development of more elaborated manuscripts. In the last lab, a media festival is organised where all participants meet in hybrid settings to share their stories and to jointly reflect upon the issues addressed.

Two labs have been conducted with a group of upper secondary school students in Norway. When analysing the conversations between the students, a theme that clearly emerged addressed the concept of wokeism. "Woke" was initially used to describe people that are well-informed and up-to-date with what is going on in the community, but has gradually become more about being alert to racial or social discrimination and injustice. To be woke, awaken, also includes questioning the dominant paradigm in the strive for achieving something better.

The phenomena of wokeism can indeed become a catalyst for change towards a more inclusive and just society, but it can also have the opposite effect and become an oppressing force. In connection to the woke movement, cancel culture has for many become a derogatory term for a cultural phenomenon and practice of shaming and ceasing to provide public support to people, companies or institutions perceived as problematic or unacceptable. The participants in our study mentioned with distress examples of public actors that have expressed unwelcome opinions not perceived as woke, and thus have been cancelled and excluded from the public debate.

In the second lab in Norway, the students demonstrated a great sensitivity towards who is woke, and who is not. They also exhibited an understanding of wokeism on a metalevel, and

the danger of cancel culture as a negative reflection of woke that may polarise the public debate. Both manuscripts independently developed by the students, addressed this topic by developing a more nuanced image of their main characters who both had been cancelled. Through their stories they presented a more complex view and put an emphasis on the importance of understanding the “other” to not radicalise public debates and discourage political participation due to the risk of being cancelled.

Infoslide education and “trojan journalism”: Encouraging young people's political participation on social media.

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Political participation, understood as involvement in democratic decision-making and negotiation processes (also beyond institutionalized channels such as elections) has become a central demand on citizenship in liberal democracies (Junge, 2015). Initiated both by governmental and non-governmental institutions, programs to promote political participation are booming (Theocharis/van Deth, 2018). However, young people frequently feel excluded from established offers and consider them not very attractive (Kitanova, 2020). The same applies to legacy media, which also have difficulties reaching young target groups (Galan et al., 2019). However, journalistic offerings form an important basis for political participation and the shaping of public opinion. At the same time, social media have emerged as the preferred space in which political opinion-making and debate among young people take place (Briggs, 2017). On the one hand, these platforms, apart from all the potential risks, have democratic potential as they offer low-threshold opportunities for civic activism and participation (bottom-up). On the other hand, they are also used strategically by professional political and journalistic actors to promote certain forms of participation (top-down).

In this paper, we investigate the potential for enabling political youth participation of the TikTok channel *wien.stabil* and the Instagram page *die_chefredaktion*. Orchestrated by professional Austrian media-makers, these popular social media accounts uphold a journalistic claim and seek to raise political awareness among young people in Austria. Through a comparative analysis of the two accounts, we identified recurring topics, formats, and mediation styles that attempt to attract youthful target groups outside the legacy media and target at fostering practices of political participation. Our analysis shows that the formats represent two common mediation models influenced by the broader conventions of the respective platform: Embedding short journalistic videos into a broader entertainment program, *wien.stabil* implements a “Trojan Journalism” (quotation of its founder) that subliminally tries to encourage the audience to participate politically. By contrast, the Instagram account *die_chefredaktion* provokes political engagement in a more direct and prompting way by posting “info slides” and videos with an explanatory or educational character.

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Supporting the Political Participation of Young People Using Content Strategy Methods – a Fridays For Future Case Study

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Fridays For Future (FFF) is one of the most successful social movements when it comes to motivating young people worldwide to participate in demonstrations and other protest actions. In this regard, they successfully reach their target groups through digital platforms (mostly social media) where they spread knowledge about climate change and connect with allies (i.e. Wahlström et al. 2019; Wallis & Loy, 2021).

Behind the scenes, however, the organizational teams are small and the active members often have to take on many tasks at the same time. To better distribute this workload, FFF faces the necessity to motivate further young people not only to demonstrate but also to engage in organizational tasks.

Against this background, I explore different possibilities to support the organizational teams of FFF based on a case study of FFF in Graz, Austria, in this paper. I started my fieldwork with ethnographic observations and informal conversations at demonstrations and networking meetings (Gobo und Molle 2017, Kozinets 2020). In this early phase, I got in close contact with the social media and communication teams of FFF in Graz which has been the focus of my interest ever since.

Inspired by a participatory research approach, we (the communication teams and I) developed the next steps of our joint research in two workshops. With the method of card sorting, we discussed what topics or challenges are most relevant to them. In the first workshop, participants wrote down topics on cards and ranked them according to priority and

feasibility. In the second workshop, topics were further concretized. It has become apparent that, above all, reaching new target groups is an important issue.

Currently, we are developing new strategies using content strategy methods to engage further target groups and I summarize the most important recommendations for action in this paper. Content Strategy has assembled a wide-ranging set of methodologies and tools for the target-group-centric development of content. Therefore, also my recommendations are widespread and include, for example, (online) surveys to get to know target groups or usability testings with social media content to ensure which content proves to be most engaging.

This paper is part of the international research project “Understanding Youth Participation and Media Literacy in Digital Dialogue Spaces” (The Research Council of Norway).

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On the Importance of the Plaza. Political Participation of Young Skateboarders in a Digital Society

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Since the beginning of the Covid-19 pandemic, inner-city public spaces in Graz, Austria, have been increasingly used by young skateboarders, as other opportunities for sporting activities were often not available. Although skateboarders have been part of public life in Graz for many years, the pandemic made them more visible and audible, as many people were in home offices and homeschooling. In some central places, especially at the Kaiser-Josef-Platz, this led to complaints from residents about noise pollution. As a reaction, the city of Graz introduced a ban on skaters doing tricks in public spaces based on a new interpretation of the road traffic regulations in April 2021. Since then, skateboarding has been allowed, but not leaving the grounds with jumps or tricks to maintain public safety.

This ‘skate trick ban’ led to the formation of an urban social movement that encompassed a multitude of different actors (e.g., artists, scientists, skaters, oppositional parties, journalists) and provoked many protest actions. In addition to demonstrations and art actions in public spaces, much of the mobilization of allies took place on social media platforms. Especially the platforms of the local skateboarding club 'GRÄB – Grazer Rollbrett Ästheten Bund' played a central role in this regard, acting as a hub for the exchange and dissemination of information.

Against this background, this paper explores the protests of the skateboarding community and its allies in Graz in more detail and deals with the question of what political participation can look like in a digital society (Lindgren, 2017). We use the term ‘digital society’ to describe the digital transformations of recent decades, which have led to social media increasingly becoming an integral part of social structures. Digital transformations are not merely seen as technical, “but deeply politically charged processes embedded in broader social constellations” (Kannengießer and Kubitschko, 2017, 1). Therefore, the intertwined character of online and offline protest actions is particularly relevant in this paper.

The paper is based on empirical surveys and analyses conducted as part of the international research project “Understanding Youth Participation and Media Literacy in Digital Dialogue Spaces” (The Research Council of Norway, 2020-2025). These include analyses of social media and newspaper articles, participant observations at skateboarding venues, and interviews with young skateboarders.

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B.11: Imagining care-ful datafied futures

Session Chair: Irina Zakharova, University of Bremen, Germany
Session Chair: Juliane Jarke, University of Graz, Austria

Destabilizing Auditing: Auditing as ‘care-ful socio-digital relation’

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Growing usage, deployment and adoption of artificial intelligence (AI) approaches in recent years has led to the proliferation of literature on AI ethics in recent years. The turn towards ethical AI has also been accompanied by ‘auditing’ practices which aim to implement checks and balances on developers during the development of AI tools on the one hand and to introduce an external AI auditor. These processes of ethics and auditing are premised on moral totalitarianism wherein “commandments, moral imperatives, ethical principles, codes of conduct, practical laws . . . these all endeavour to provide a clear set of instructions or

patterns of operation that are designed to program and direct human social behaviour and interaction" (Gunkel, 2022). This has led to a proliferation of toolkits or booklets that foreground one or the other aspect of 'ethical AI'. Such 'ethical' approaches are symptomatic of a managerial response to the ethical concern of AI wherein ethics is conceived as a site and conduit of governance.

A relational approach to AI, on the other hand, interrogates the very assemblage of AI as a socio-technical system involved wherein the ethical concern turns its eye back to the political. Building on the relational turn in the field of AI ethics and building from our work on developing an AI auditing tool for non-expert auditors, we foreground the need to think of auditing as a 'careful sociodigital relation' that understands "ethics as a socio-technical achievement" (Henry & Oliver, 2022) rather than as abstract values or design decisions. Auditing in such a situation emerges as a site of the political and not governance, as a site of contestation around which actors gather and not as a site to resolve differences and disagreements via a checklist of ethics.

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Watching over you? - Practices and patterns of smartwatch use

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According to Eurostat data, in 2022, a quarter (25%) of the population in Europe used wearables, which are technologies attached to the body, that have sensors enabling them to capture biometric data like the heart rate, the number of steps a person takes, or even the quality of sleep, making it one of the most commonly used Internet of Things (IoT) devices. With wearables, *bodies* become *augmented* (Viseu, Suchman 2010) and capable of producing intimate data about his/her host, the data then becomes an integral part of how the user views. Thus, the very notion of time is altered by the daily datafication of the body and the routine itself, establishing what Veronica Barassi (2020) referred to as the three hegemonic temporalities: *immediacy; archival; and predictive time*.

How these devices are implicated or not in our daily lives, and how do they alter our behavior? Surveying the individual uses of these watches, we seek to look into the motives behind this desire for monitoring. The questions to be dealt with will be: Who are the people who wear smartwatches? Why is biometric data like heart rates, steps taken in a day, or the quality of sleeping patterns matter to the users? How do social, cultural and consumer habits change? What are the perceived benefits and risks?

This presentation seeks to understand how the interactions between the user and the wearable device could have a significant impact on the way people control, organize and live their daily lives. It will discuss how the interaction between the smartwatch and the user (and vice-versa) influences the user's perception of time but also of their own body. In addition, the aim is to explore how these devices implicate the way identity narratives about the body are produced and how it influences the notion of the time elapsing.

To understand the social dimension that is implicated in the features of smartwatches like self-tracking and other smartphone extensions our approach will be focused on the micro and qualitative dimension. Using an ethnographic perspective, the experiences of using a smartwatch in daily life, as well as a macro dimension based on a media analysis about the sociotechnical discourses on a smartwatch are explored. In sum, this research wants to understand the impact these kinds of devices have in daily life, how they convoke actions that could change old habits. Moreover, the results will help to approach how the introduction of automation in everyday life can create a mechanism of co-dependency with one's own smartwatch and implied consequences in matter of social and cultural dimensions.

Matters of care? Capturing therapy chatbots' transactional data exchanges through critical feminist screenshotting

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Instead of 'ubiquitous googling' (Ridgway 2021) and receiving 10 blue hyperlinks on the first page of results, conversational agents, or chatbots, attempt to answer queries with one single response, without a choice for the user to click on links that best suits her search. This shift marks the transition to the 'conversational web', with chatbots employing artificial intelligence (AI) enabled software and integrated into the invisible data infrastructures of IoT. Their antecedents include Weizenbaum's psychotherapy programme ELIZA (1964-66) and they are often modelled on the figure of a domestic servant (Schiller and McMahon 2019). With increased usage during the Covid pandemic, these AI chatbots do the work of providing (mental) health and care. How do these 'surrogate' technologies (Atanasoski & Vora 2019) return responses to queries as care and what kinds of datafication processes are taking place?

Situated at the interstices of critical feminist STS studies, media theory and artistic research, this presentation makes public entangled query/response 'intra-actions' (Barad 2007) of chatbot apps through a new materialist lens of care. Embodying 'situated knowledges' to enter 'power-sensitive conversations' with 'witty agents' (Haraway 1988), a performative auto-ethnography elucidates agentic and transactional capabilities by comparing two therapy chatbots. Wysa is an 'AI coach', sharing data with Bangalore-based 'mental health professionals trained to listen'. Woebot is 'your mental health ally', combining cognitive behavioural therapy and 'sophisticated AI to help users monitor their mental health.' A method of 'critical feminist screenshotting' offers an alternative 'way of seeing' (Berger 1972; Cox 2017), whilst exposing not only the 'gaze of the algorithm' (Noble 2018) but some of the chatbots socio-political workings and 'care-less' data repercussions.

What is shown is a response called up from a database somewhere, an amalgamation of presets and rules formed into written text, or videos and links from other databases. Yet the code, interconnectivity to the servers, the transmission of data and its flows and what is shared with other third-party actors is not revealed. Therefore, these AI bots operate transactionally and are shaped by (and trained on) users' answers, intimate data with technologies that they wouldn't necessarily divulge to humans (Stephens-Davidowitz 2017). Capturing behaviour and activities of the 'body as a platform' (Clough 2008) through dialogical exchanges and screenshots, these entangled 'intra-actions' with conversational agents (AI) are reconfigured sociotechnical assemblages— 'matters of care' (Puig de la Bellacasa 2017). Screenshotting makes visible their 'artificial intimacies' and empathetic limitations (Turkle 2015), within posthuman technics of mediation (Hayles 1999, Stiegler 1998).

Care in Digital Welfare Infrastructures and its Dark Sides

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Increasingly digitalised and datafied public infrastructures are transforming both the welfare institutions and social relations all over the world. These digital transformations are often introduced as acts of caring for the citizens and affected communities. Similar to technology corporations, however, public actors' imaginaries of caring digital technologies can be rooted in behaviourist and often unjust, unequal understandings of social lives. For example, information systems used in public service provision are known to discriminate against marginalised social groups (e.g. Allhutter 2020), while technologies used in public schools can normalise surveillance (Lupton & Williamson 2017). Such research is widely concerned with data politics and governing practices of profiling, risk prediction, exclusion, surveillance, and controlling public resources allocation. Building on this literature, we focus on the promise of care and how it is enacted in digital welfare services on the ground.

We are particularly interested in the dark sides (Martin et al. 2015) of these promises of care.

Drawing on the concepts and ethics of care (Puig de la Bellacasa 2017, Tronto 2016) we view care as distributed socio-technical arrangements of public data infrastructures and asymmetric: involved actors make political decisions about limited care resources and how these should be directed to solving certain problems and not others. In arrangements care reveals what Martin and colleagues (2015) call its darker side and a "selective mode of attention" (p. 627). The dark side of care refers both to norms inscribed in design of socio-technical systems and to practices enacted within such systems (Linden & Lydahl 2021). Building on the notion of the dark sides of care, we question specific arrangements of human and non-human actors involved in digital welfare, asking who cares for whom and what conflicting perspectives on care co-exist within each arrangement.

Drawing on various broader research projects from Germany and Sweden, we discuss how dark sides of care play out in digital welfare with particular focus on surveillance and discipline, autonomy and agency, inclusion and exclusion. Empirically, we explore such

ambivalent arrangements of care distribution in public data infrastructures through three empirical vignettes concerning different domains of datafied welfare - education, aging, and smart cities. By attending to public data infrastructures through their promises of care, we explore how digital welfare invokes care-ful or care-less relations between the state and its citizens. An analytical focus on care provides social researchers interested in technological transformations with means to juxtapose technological solutions with problems they aim to solve and to consider alternatives to such solutions.

B.12: AI-based decision support systems for medicine and healthcare: Negotiations in development and practice

Session Chair: Renate Baumgartner, Eberhard Karls Universität Tübingen, Germany
Session Chair: Kevin Wiggert, Technische Universität Berlin, Germany

The pretended and expected shift in the physician-patient relationship in medicine empowered by AI

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AI-based decision support systems could improve future medicine and healthcare as a tool that can help physicians to establish more accurate diagnoses and, in general, improve patient outcomes. Today, we witness the broad application of digital technologies; many are already implemented in health care, and many are still in the development stage, often followed by overhype and overpromise.

Many expectations have been outlined in the literature and public about AI transforming the physician-patient relationship. These expectations have motivated us to conduct a multistakeholder study using qualitative and quantitative approaches followed by two scenarios based on Anticipatory ethics (York et al., 2019). In both studies, one scenario focused on an AI-based decision support system presented as a virtual assistant named Cronko. The first qualitative study we conducted from June to December 2021 using semi-structured face-to-face interviews with 75 key stakeholders: patients, physicians, IT engineers, lawyers, hospital managers, and public policymakers. The preliminary results were the starting point for a quantitative study focusing on future prospective physicians in Schools of Medicine in Croatia and Slovakia (n=1715) conducted from October to December 2022. The results of both studies provide us with an opportunity to compare and analyse the perspectives of experienced physicians and prospective physicians on the transformative impact that medical AI might bring.

Experienced physicians and medical students see the main benefit of AI tools in performing administrative and straightforward tasks that otherwise take too much of their time. Furthermore, this saved time would be invested in improving the physician-patient relationship, particularly by increasing communication and consultation. However, the

prospective physicians (60%) have raised a concern that AI might negatively impact the physician-patient relationship, making patients trust them less. As far regards the clinical context, according to experienced physicians, where AI would be the most useful was triage/screening, as during triage, physicians do not have much time to dedicate to patients leading towards a lack of empathy recognised as one of the significant shortcomings existing in the current context that might translate to other AI-empowered clinical contexts.

Another puzzling issue that emerged is the case when the physicians and AI diagnosis differs. Interestingly, the experienced physicians and medical students stated they would consider it a second opinion and reconsider their conclusions. Only 3% of medical students were ready to reject their conclusions and adapt exclusively to AI-based diagnostic conclusions. Although, a small percentage demonstrates the overreliance tendency of prospective physicians to trust only AI-based decision-making systems rather than their judgements.

In the end, the experienced physicians and prospective physicians have emphasised that AI-based decision-making systems having a transformative power to change the existing social relationship between a physician and a patient puts us at a crossroads between, on the one hand, improved quality of care provision and on the other healthcare stipulated from the existing element of humanness. Therefore, the real challenge in front of us would be to find a perfect balance and to use AI as a tool that will help get closer to patients, as emphasised by our respondents.

Between Development and Stabilisation - The Doctors' Understanding of their Role in AI

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The newspaper headlines read: "When the computer replaces the doctor: May the "death algorithm" decide about lives?" (Pfeffer, Matthias 2021). These and similar headlines circulate in the media. This concern is also transferred to the patients. What the physicians themselves say about their understanding of their role was determined on the basis of four interviews with leading physicians in the field of AI and ML and then examined with regard to their understanding of their role using White's and Abbott's theory.

After all, developments in line with the concerns spread by the media would bring about serious changes for them. The profession of medicine is crucial for the self-confidence of the actors. Together with the style of the profession, the institution and the various netdoms (networks with the associated cultural forms), suitable markers can be set that can sense disruptive changes.

The institution of medicine is a complex web of styles, provisionally stabilised control struggles and different netdoms in which identities move. Although the styles are changeable constructs that have an effect on the institution, they are also first produced and channelled by it. According to Abbot, the institution's claim to competence emerges from the profession,

which is historically shaped and consolidated. Thus, the institution of medicine is in a constant state of tension between self-preservation and further development.

Doctors strive to optimise the state of health and to cure diseases. All doctors emphasise that innovation is part of medicine and that the way they work has to change constantly. On the one hand, control struggles among doctors (what is the best treatment method) are desired, but on the other hand, the established methods only stabilise until a new method emerges. The result is a hybrid of doctors and computer scientists who learn from each other in order to generate the optimal methodology for the patient.

The explanation for the public concern about the demise of the doctor through AI lies in the netdoms and switching processes.

There are different netdoms in the institution; the netdom of the doctors and the netdom of the patients. Switching occurs when an identity switches from one netdom to another. These switching processes, or communication processes, between the doctor and the patient, however, only contain stories about the further treatment procedure and not information about which AI methods were behind the anamnesis, the diagnosis and the treatment (e.g. operation). Mostly, the AI methods are controlled with established procedures (blood sampling and analysis), but this is not passed on to the patients. Because of this lack of transparency and accessibility, the fears, allegations and concerns are brought to us by another institution: the institution of the media. In addition, the output of the media is accessible to all and fake news is only now increasingly being checked and deleted. The way of working is changing, but not the role of the doctor. However, it must be made more transparent for patients in order to reduce scepticism and strengthen trust in the new methods of AI.

Norwegian specialist doctors’ views of AI for prostate cancer imaging

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Even though MRI (magnetic resonance imaging) is considered the most sensitive non-invasive method for prostate cancer detection, it is considered challenging for radiologists to differentiate between certain benign and cancerous tissue because the two often being similar visually. With a global shortage of radiologists and new guidelines that suggest that all patients suspected of having prostate cancer undergo MRI examinations before taking biopsies, the few working radiologists are left with an excessive number of images to analyze manually.

The use of artificial intelligence (AI) as decision support in prostate cancer imaging is seen as a possible solution to this issue, with the possibility of lessening radiologists' workload and improving the speed and accuracy of separating clinically significant and insignificant lesions. Due to the technology's promises of potentially solving these issues, it is of interest to explore how specialist doctors that work with prostate cancer diagnostics see the use of AI in prostate cancer diagnostics, and if or how they see it as a part of the practice and methods for diagnosing prostate cancer.

Drawing on a qualitative interview study with 15+ specialist doctors that work with prostate cancer (urologists, radiologists, oncologists, pathologists, and nuclear medicine doctors) that work at public hospitals in various cities in Norway, we aim to explore “how specialist doctors envision AI for prostate cancer diagnostics and its impact on diagnostic processes”. We asked them questions ranging from what implications of AI in prostate cancer diagnostics could be, questions about how AI could impact how specialists collaborate in diagnostic processes, to ethical issues and challenges, and questions about communication and information about AI.

Data collection is still ongoing, but preliminary results suggest that doctors are positive about using AI in prostate cancer imaging, as it could alleviate radiologists so they can do the tasks that they themselves find most important and exciting to do, and the tasks where humans are considered irreplaceable. Another preliminary result suggests that doctors are hesitant about sharing information about AI’s involvement in diagnostic processes, as they see that informing patients about AI’s involvement could impact patients’ feelings of certainty and safety in the situation of receiving a diagnosis.

Support systems as communicative and cooperative counterparts – Towards new perspec-tives on trust in, trustworthiness of, and trust adjustment towards AI applications

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We investigate and reflect on connections between communication and cooperation with an (AI-based) support application and the triad of trust, trustworthiness and trust adjustment. One of the starting points of our considerations is the question of how the design of communicative interaction processes can contribute to addressing possible asymmetries of ability, power and knowledge between support systems and their users within the direct interaction. In addition, we also want to discuss the extent to which this approach can strengthen the cooperative dimension of human-technology-interaction through a proactive approach to normative requirements (e.g. transparency, explainability), and, in particular, the components of trust in, trustworthiness of, and trust adjustment towards such systems.

We want to base our conceptual considerations on a concrete application example: the use of an AI-based application to support the diagnosis of deep vein thromboses via point-of-care ultrasound imaging. A specific characteristic of this application is that it not only augments ultrasound-based imaging by real-time segmentation and registration, but takes on an accompanying, even guiding function that leads through the entire examination process itself. The system’s developing company intends the examination procedure and the accompanying diagnostics to be performed not only by specialists experienced in this specific examination, but also by medical personnel that is inexperienced or still in training. Even under these circumstances, the system may be utilized, e.g., in acute situations that demand swift diagnostic clarity. The approach thus goes beyond the mere augmentation of the ultrasound image and implies an active management of processes through the system. Hence, the application can be regarded as an increasingly proactive interaction and

communication partner, i.e., a cooperative counterpart (e.g. Guzman & Lewis 2020; Hepp 2020) within new kinds of network-like and distributed interaction structures (cf. Latour 2005; Rammert 2007).

Based on this example and with implications towards a theoretical-conceptual perspective, we discuss the extent to which the specific consideration of the communicative and cooperative interaction dimension within such development and design projects can contribute to supporting trust or to establishing its basis. Thereby, we want to focus on the trustworthiness of the application itself and its perception on the part of the users. In addition, we are further interested in trust adjustments in practice, i.e., how designs can avoid unwarranted and ensure warranted levels of trust in concrete system outputs. Among other things, our argument aims to show that, e.g., the direct communication of system capabilities or uncertainties within the immediate interaction processes can contribute not only to establishing an actual as well as perceived trustworthiness of the application, but also to support justified (warranted) levels of trust and avoiding unjustified (unwarranted) degrees of trust in applications. This in turn not only reduces knowledge and thus power asymmetries between users and applications, but also addresses the specific needs of different user groups, as well as the position of medical professionals as the ultimate decision-makers, despite possible tendencies towards loss of habit and distance.

Voice Diagnostics and Stress Monitoring Methods – Private Sector Infrastructuring and Automation of Health Data

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The development and adoption of AI powered ‘stress monitoring methods is a growing field in digital health care. Through reading stress parameters from the voice and determining anxiety and stress levels of a person, researchers not only claim to predict burnouts, but also to detect pathologies, disabilities, and mental health issues. These techniques are aimed at prediction and often align with strategies to outsource workloads from the public services and health care, keep hospital stays at a minimum and care for elderly population increasingly at home. But how is the voice rendered into a source of data useful for healthcare and how are voice signals measured, analyzed and categorized in order to be productive?

Health data are often based on administrative infrastructures and biomedical records, at the population level. In the Nordic countries, they are sourced from long-established population registries, ranging from population registries, disease registries as well as treatment registries (Bauer 2014). In contrast, voice databases are created in conjunction with cooperations or entirely by the private sector. This raises different questions of privacy and ethical issues. In order to follow these issues, we examine the underlying data repositories that are created, used and maintained for automated voice analytics and biometrics of the body or the population. We focus on specific cases to examine the emerging infrastructuring through IT aspirations: Cases include a public, open-source benchmark database of stress recognition in voice signals used and generated for health research on stress and the ‘EU-Emotion Stimulus Set’, developed to help regulate emotions of autistic patients through a

computer game developed for kids aged 5-10 years and a voice analyser. The latter is based on the understandings that this condition can *'alter both the production and recognition of intonation of the voice*' (Amandine Lassallee et.al. 2018). How can we understand the terms in which stress/emotions and its automated recognition or prediction is worked on, from these cases? This contribution focuses on how knowledges are created and calibrated in these settings: What kinds of measurements and technologies are involved in the formation of these knowledges? How do they participate in the formation of the issues raised as to automation?

While there is ongoing development of databases and software, the envisioned health prediction applications are at a very early stage. Developing such modules performs and caters to visions of AI-supported decision-making, yet so far tentative and based on small scales. At the same time, the technologies are expected to be pervasive, with development and experimental implementation taking place simultaneously.

In examining the datafication of the voice, we draw from information systems, human computer interaction and software studies. This paper will contribute to current discussions in digital STS as well as in sociology of health on how the digital (re)configures health practices. We wish to further contribute to debates over how to conduct studies on digital artifacts and which methodologies are appropriate to locate politics in technical and scientific decision making.

B.13: Bringing STS and the sociologies of work and organization together: A joint perspective for understanding digitalization?

Session Chair: Anna Pillinger, JKU Linz, Austria
Session Chair: Stefanie Raible, Johannes Kepler Universität Linz, Austria

Un_gleichzeitigkeit: A joint approach on socio-technical systems?

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The fact that digitization is changing work in several dimensions seems to be undisputed by now. However, how the organizing of work will change has not yet been decided. Digital technologies can give workers new degrees of freedom and at the same time pave the way for radical Taylorism. There is also the risk of a division of labour markets into ‘good’ digital knowledge work and exploitation-prone (simpler) services. Work organisations are changing through digital technology alongside with these developments. Work and place of work no longer coincide, organisational steering (and control) functions can only legitimise themselves to a limited extent via traditional hierarchical attributions. Decision-making programmes become more dependent on the social reconstruction interface that ascribes meaning to technical output.

The sociology of work focusses in this context on the actions of actors; organizational sociology is more concerned with the appearance of new forms of organizing and, on the

part of STS, on how technology constructs the (working) world. The range of STS approaches and their sociological foundation was shown very instructively by Judy Wajcman as early as the beginning of the 2000s.

It is obvious that a systematic interweaving of research perspectives can be very fruitful, since (paid) work is a fixed point of social debate, which is organised in a highly differentiated way and its productivity depends on technology as Floridi puts it. As a common comparative perspective, I want to discuss in my contribution the change in the temporal structuration of work and in the same breath discuss the concept of the 'socio-technical systems'. While this is often used to indicate the interconnectedness of technology and social entities, it rarely reflects what distinguishes the 'sociotechnical' from other systems. Based on empirical research results, I present a concept of “Un_gleichzeitigkeit”, fanned out into three relevant dimensions. Digital transformation processes of work occur simultaneously in functionally differentiated organisations and yet are structured temporally in different ways. Objectively, transformation processes are dependent on the operational context and its economic constraints, which entail a specific prioritisation and focus organisational attention. In social terms, digital transformation processes entail a redistribution of prestige gains in the organisation and generate new forms of internal inequality through (digital) accessibility. Only digitally addressable organisational members can engage in internal organisational discourses and accumulate power potentials through this.

In conclusion, the question is posed as to what extent the “Un_gleichzeitigkeit” perspective can represent a theoretically connectable and empirically operationalizable joint research perspective of STS, sociology of work and organisational sociology.

Pragmatic analytical tinkering: The intermingle of STS and more-than-one sociology in empirical research

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The increasing digitalization of work pushes us to think across disciplinary boundaries in order to grasp the challenges and risks connected with it. Thus, understanding the ongoing transformation of work requires to reflect also on our analytical practices as part of our research. An increasing interweaving of STS with concepts from the sociologies of work and organization has been taking place for some time already (cf. Orlikowski 2007; Wajcman 2006). However, these research projects do not follow established disciplinary boundaries, but set their respective research agendas which are very much based on their empirical work (cf. Laube 2013).

The question of how STS and concepts from the sociologies of work and organization can be brought closer together is thus not one that must be understood exclusively as a linking of different styles of thinking. Instead, with reference to our own research, we argue that connecting STS, the sociologies of work and of organization must be understood as analytical practices in-between: between disciplinary border regimes and pragmatic analytical tinkering. Importantly, we think that these approaches should be fed back into the

different disciplines and research communities so that our specific access to the phenomena we investigate becomes visible.

For instance, Katja Schönian (2022) investigated the implementation of a new intranet in the context of a merger in the telecommunications industry. Her analysis stresses the material dimension of such an undertaking. In fact, the material layer moves more into focus when using STS and concepts that relate to the so-called “material turn” in the social sciences. Doing so, Katja was able to show how internal branding strategies associate with the materiality of the intranet so that both configure the technology. Likewise, Dennis Eckhardt (2023) did ethnographic research in a price comparison platform. He explored the everyday work practices that people perform in order to maintain the platform. His analysis brings together the sociology of work and STS and hence offers to change the ways in which sociology and anthropology think about labour.

Both research projects show that the socio-technical interweaving of digitalization can be best accessed through this array of different concepts and approaches. In fact, by working beyond disciplines, we learn to address analytical problems and therefore reflect on our research. In addition, bringing together STS and more-than-one sociology is not a pure epistemic debate. Instead, when doing empirical research, we highlight the value of moving beyond disciplines as a specific analytical practice in order to interpret and make sense of our data.

Boundary management as a common perspective on the ‘digitizing’ consequences of Corona measures in the world of work

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Corona measures had deep impacts on the world of work. Measures, especially those of physical distancing are boundary management. By defining “safe distances” of e.g. 1.5, 5, or 10 m the boundary between acceptable and unacceptable work is set. Further categories such as “systemic relevant” redefine the importance of certain industries in Corona times and resulted in work to be done on-site and other work that had to be digitalized or suspended. A common effect of this boundary management is a digitalization of various fields of work, such as home office, digital client administration or even an increase in digital art projects.

In this paper, we identify four different types of boundary management, which lead to a boost for digitalization: blurring of boundaries, setting of new boundaries, shifting existing boundaries, and boundary conflicts. The study is based on empirical semi-structured interviews in four different fields of work with qualitative-interpretive evaluation: (1) development and support in the software industry, (2) production-related services in manufacturing industries, (3) person-related services in hospitals, (4) cultural and artistic work especially in theater.

This paper shows how boundaries are (re)drawn and what effect it has on digitalization, which sustains even after Corona. Further, we saw that harsh boundaries were easily

overcome in fields of work which were already digitalized, while other fields (culture, personal services) were struggling much more with equipment and digital work culture. In addition, simply physical-material limits of digitalization become apparent. In the fields that are considered easy to digitize, work in virtual space is at the same time accompanied by a shift in the boundaries of work action.

The diagnosed boundary work and boundary management provide, on the one hand, indications of the potentials and problems of increasing digitization, such as a partially detectable reduction in the quality of work, especially in interaction work. On the other hand, they are a contribution to the reconfiguration of the relationships between nature, technology and society as an open-ended negotiation process. Both, sociology of work and STS have an established understanding of boundary management, which blend into a comprehensive perspective. This helps to integrate a socio-technical perspective on the digitalization boost of work.

Conversations Around Education, Work and Technology: Mapping Learning Management Systems (LMS) in a higher education institute in India

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The paper traces a range of conversations with students, teachers and administrators in a higher education institute to map out the network of relationships that a learning management system establishes. The paper argues that research in the field of education benefits from a sustained engagement with questions surrounding work/labour and technology construed as assemblage/apparatus. The higher education system in India is undergoing an entangled process of transformations—increased bureaucratisation of the education system, demands for increased productivity beyond teaching (and research), adoption of new information technologies, a new national education policy and adoption of new teaching-learning-management methodologies. The paper argues that interfacing the field of education, science and technology studies (STS) and sociology of work provides education and STS an explicitly political edge which is so often missing in the field of education and STS. The concern of ‘education’ and ‘science and technology’ is usually framed in postcolonial, Third World countries such as India as a ‘developmental’ problem which limits possible discussion of the sites with a ‘political’ bent, as a site of production. In this light, the paper makes a methodological and theoretical call for the higher education system in India to be studied in a two-pronged manner, unpacking debates surrounding work/labour and education as a socio-technical system.

Data at Work: An empirical study of management practices in white-collar workplaces in London

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This research undertakes a qualitative empirical study of the lived experiences of workers in the negotiation of conflicting interests with management with regard to the setting of the rate and intensity of work in professional services and technology sector workplaces in London, UK. It focuses particularly on the ways in which data-driven technological systems introduced by management shape the experiences of this process. Qualitative data is gathered through conducting ten semi-structured interviews with workers and managers, as well as a non-participatory observation of a relevant trade union workers' enquiry. Data is analysed thematically inspired by a constructivist grounded theory. A growing body of literature focusses on issues of algorithmic management in digital labour platforms and the logistics sector. Little empirical research has tended to comparable issues of data-driven management in white-collar settings. As such, this research seeks to address this research gap by foregrounding matters of data and management and the ways in which they are implicated in workplace issues. This presentation combines the insights of surveillance and management studies' understanding of the internalisation of management logics to form a productive subject. A Marxian analysis reveals how workers are compelled to adapt their behaviours to conform to a rate and intensity of work dictated by a fictitious norm of Socially Necessary Labour Time. While a science and technology studies perspective on the social embeddedness of technological systems reveals the ways in which data-driven systems are implicated and shape the relationship between workers and management. Conclusions highlight the importance of both workers' and managers' role in conforming to the logics and dynamics of data-driven systems. As such, management functions are not outsourced to technical systems; instead they augment human managers' capacity to manage and displace some management function to individual workers themselves.

Hustle Culture and the Spirit of Platform Capitalism

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Sociologists note the rise of a new economic regime, giving rise to the gig economy and making all work conditions more precarious: "platform capitalism." In this article, I contend that the rise of platform capitalism creates a new cultural set of beliefs, symbols, and rituals, catalyzed in predominately white middle-class online communities, which I term "hustle culture." This paper explores hustle culture and proceeds with four core arguments. First, I argue that hustle culture emerges from platform capitalism as a means to make sense of the precarity of work brought on by thus this new economic order. Second, I demonstrate that distinct from other cultural forms like the American Dream and the Protestant Ethic, hustle culture and its adherents believe that entrepreneurialism and the platforms themselves will lead to financial freedom from the typical constraints of the workplace. Still, hustle culture co-opts a historical notion of "the hustler" articulated by Black Ameircan communities. Yet, hustle culture still perpetuates colorblind racism and sexism by waxing over the consequences of structural inequality. In response to economic and technological change, I

show that self-described “hustlers” believe that social mobility results from an “entrepreneurial mindset” and the savvy use of platforms. In this paper, I define and articulate hustle culture's central beliefs, locate its origins born from platform capitalism and the gig economy, and expose hustle culture’s connection to (and dismissal of) racial inequality using a digital ethnography of hustle culture from the popular social media platform, “TalkBox.” This work offers the literature a deeper articulation of hustle culture to better account for how individuals make sense of, legitimate, and perpetuate rising inequalities and transformations to the nature of work in the era of platform capitalism and the gig economy.

Worker-led Innovation & the scope of social constructedness of technologies at the workplace: the case of digital platform cooperatives

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Science & Technology Studies emphasize the constructedness of technological artifacts by social actors. In particular, the classical foundations of STS examine the influence of strategic actions (Bijker/Pinch 1987) as well as problem definitions organized by social actors in order to shape technology and its underlying knowledge base in their sense (Callon 2006).

Similarly, a conflict-oriented sociology of work assumes that the use of technology in corporations is shaped by actions of interest politics. In a traditional sense, the conflict between management and workers is seen as determining for technological innovation (Braverman 1985; Burawoy 1991).

Both perspectives challenge assumptions according to which the development and embedding of technologies at the workplace follows a non-negotiable *one best way*. What is questionable, however, is how far their social design-flexibility extend. If conflict-oriented sociology of work assumes that workplace technologies are shaped by corporate conflicts, then the scope of social constructedness can be discussed in particular with regard to alternative innovation regimes and comprehensively transformed corporate power constellations.

One such comprehensive transformation is represented by the democratic management of worker-led firms (Azzellini/Ness 2012). Especially in the course of digitization, cooperatives have been rediscovered as models of collective corporate governance in the context of platform economy (Scholz 2016). They represent an alternative to the private-sector platform economy, which is characterized by hierarchical production concepts and digital control regimes (Woodcock/Graham 2020).

The contribution therefore aims to reconstruct the innovation regime and democratic negotiation processes over digital technologies in platform cooperatives in order to discuss the scope of social constructedness of digital platform technologies. For this, the empirical case of the CoopCycle federation is reconstructed based on six expert interviews with members of the cooperative conducted between 07-09 2022 in the project “Visions and best practices for the digital transformation”. The alliance is an association of worker-owned cooperatives operating worldwide in the bicycle delivery logistics sector. They all use a

platform software provided by an internal development team, which is adapted to the specific needs of worker-led corporations.

Because lines of conflicts between owners and workers are structured differently in cooperatives due to their collective form of ownership, alternative innovation regimes of digital platforms can be observed. Thus, the process of social negotiation over technology can be reconstructed on three levels: At the federation level, the distribution of technical resources is negotiated. At the level of individual cooperatives, decisions are made about business models that influence the design of technology. At the level of immediate labor processes (informal) negotiations about the embedding of digital technology take place.

At all three levels, design decisions are made to reduce technological power relations preserving work autonomy for the cooperatives' couriers. In doing so, the cooperatives are highlighting the social flexibility of digital platform technologies, that can be oriented towards social needs. But since they operate as entrepreneurial organizations within restrictions of market-based economies, their strategies to ensure a worker-oriented technological design have also to adapt to external market requirements, which limit the scope of social deliberation over corporate technologies.

From waste pickers to resource managers? How digital technologies are shaping the value of work in a German municipal waste management enterprise

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Circular economy approaches are often associated with a re-valuation of waste as a resource to be achieved through the implementation of certain technological solutions in general and recycling in particular. In recent years, however, the idea of a "technological fix" to socio-environmental challenges such as waste management has been criticized for ignoring the structural and social dimensions of policy implementation.

Using the example of a German municipal enterprise that is in the process of digitizing its waste collection segment, our contribution examines the extent to which this re-valuation of (plastic) materials is accompanied by a re-valuation or de-valuation of work. More specifically, we ask about the processes of de-/re-valuing waste collection practices, the actors involved, and the causes of these processes (e.g., societal narratives, digital technologies). We will discuss initial findings that suggest the relevance of different levels of organizational decision-making and meaning-making have in de-/re-valuing processes. These range from societal narratives of circular economy, to computerized processes of route planning for garbage trucks (digital or AI-based technologies), to a reassessment of the role of individual waste collectors as resource managers. At the intersection of waste studies (STS) and the sociology of work and organization, our contribution maps different scenarios on which levels digitization (especially AI-based technologies) can shape the future of plastic waste collection in (municipal) enterprises.

Building responsible technology? Tech workers’ identities and worldviews in the global tech workplace

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The exponential growth of digital technologies and artificial intelligence systems across a broad range of organisational settings – including physical and digital workplaces – has raised many concerns, expressed both in a wide range of digital policies promoted by the European Union and in an increasing interest towards 'responsible technology' by the tech industry. But what is the role of the developers and deployers of such technologies in the global digitalisation process? And how could they contribute to making 'social responsibility' a key element in everyday industry practices and technological decisions?

In order to address these questions, this research focuses on the way tech workers – from software developers to project managers, designers or data analysts – are making sense of their work and the world they are creating, examining how the reflexive perspectives of a globalised industry's workforce are shaped by personal and professional trajectories across a widely diverse and unequal world system.

To do so, the Marie Skłodowska-Curie Global (MSCA GF) research behind this paper deploys an international qualitative fieldwork across the Latin American, European, Asian and US branches of a major global technology and consultancy company spearheading innovative responsible tech initiatives, analysing concrete workplace organisational set-ups and the ways in which they can enable the application of tech worker perspectives of social and ethical issues, making them actionable to the everyday reality of the global tech industry.

This paper will thus discuss the way STS-oriented research focusing on the design of sociotechnical systems could be undertaken through detailed studies of the ways human beings are actively shaping and building such systems – investigating both their workplaces and worldviews by bringing together perspectives from the sociology of work and organisation, on the one hand, and from the sociology of religion and symbolic systems on the other.

Ultimately, this paper argues that an essential element to ensure that the key principles of responsible technology become anything more than good intentions is that the spirit of such approach reaches the shop floor of the tech industry, shaping concrete software developments and broader digitalisation of work and society by echoing with the professional frameworks, workplace actions and technical decisions of tech workers themselves.

The (organizational) Doing of AI. Combining STS and Organizational Sociology to understand the implementation of AI into workplaces.

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In this presentation I will demonstrate one instance for which the use of theoretical-methodological perspectives like that of practice theory(-ies) (Nicolini 2012), which are common in STS, can benefit from being informed by dedicated concepts from Organizational Sociology when researching the implementation of Artificial Intelligence into workplaces.

I will use one case of my PhD-project as an example to demonstrate this claim. Artificial Intelligence is arguably one of multiple prominent buzz words of societal debates and narratives of digitalization in the last couple of years (Sudman/Engemann 2018). One public service organization in Austria has decided to employ AI twofold: To use image recognition to scan relevant information of reimbursement claims and to automate the reimbursement process so that clerks are to only check those cases that the AI system categorizes as problematic or inconsistent. But while the management's idea may seem straightforward the practical implementation is not.

Based on qualitative interviews and short ethnographic participations with clerks of this organization, I will present different practices that employees have developed to engage with these two AI systems. This includes, among other practices, the attempted minimizing of anticipated overhead workloads as well as using their (perceived) knowledge of the inner workings of the AI model to trick the automation process in order to give them back control over the reimbursement process. Furthermore, the project management and regional offices as well as local team leaders and employees have to deal with regional differences in practices and responsibilities that stem from the specific organizational context that this project is embedded within.

Using these examples, I want to present how the process of understanding these practices benefits from an explicit focus on organizational dynamics through the perspective of sensemaking and -giving in organizations (Weick 1996, Meyer 2019). Through these combined lenses I argue that one can gain a better understanding of the (organizational) 'Doing of AI', meaning the practices of constructing and enacting AI systems by employees in their everyday work life and organizational context. However, this claim does not dispute that STS perspectives have arguably informed Organizational Studies in the last decades. My contribution is to be understood as one zoomed in instance of how these two disciplines can benefit from each other.

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Conceptualizing the developments and implementations of research integrity screening tools and their potential organizing effects.

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For over a decade we have been witness to a constant increase in the development and adoption of tools powered by algorithms to assist decision-making processes within organizations. This automation of internal processes can even be appreciated in highly complex decision-making settings such as journal peer review evaluations. With the growing public distrust of science and the multiple scandals regarding the dubious integrity and irreproducibility of scientific work, algorithmic tools are slowly being implemented as standard elements in the evaluation process of scientific submissions to academic journals, and are regarded as potential tools and innovations to address concerns about scientific integrity and transparency.

Critical voices, such as Introna (2016), may urge us to study the algorithmic governance effects that can result from the homogenous enforcement of predetermined norms when these types of tools are widely implemented. However, even though algorithmic tools can influence and reshape institutional norms within social fields, organizations play a key role in managing these governance effects (see also Büchner & Dosdall 2021). Organizations can either enforce, manage, or buffer the norms enacted by algorithms. To fully comprehend the effects of these technologies, it is thus crucial to factor in the role that organizations play when deciding how to adopt these tools.

While STS theoretical frameworks help illuminate the socio-material entanglements which stabilize the use and design of these technologies, these theories do not allow us a great degree of clarity when analyzing the potential disruptions, reorientations, or homogenizations of norms and practices. To answer the question of how the design of software tools is capable of reframing or reinforcing certain practices, normative frameworks, or standards within a particular organizational setting or across an entire field, we suggest introducing into the STS framework the analytical distinctions made by Ahrne and Brunsson (2019), which distinguishes between network, institutional, and organizational effects and allows us to see organization outside and among organizations.

We propose to think of algorithmic tools as artifacts for creating partial organizations, capable of generating organizational effects within social fields. This means that these tools can support the adherence to rules within organizations and among organizations, reshaping or increasing the rigidity of working practices. Furthermore, software can work as means of contesting a given order by creating new standards or metrics and making particular problems or criteria more visible among organizations in a given field.

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Policing 4.0: Software-Development and Implementation in the German Police

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While organizational sociology is beginning to carve out the dynamics of digitalization and organizations (Büchner, 2018; Kette & Tacke, 2022; Kirchner, 2019), the digitalization of public organizations has rarely been discussed. Moreover, a general connection to the STS Studies is mostly missing. We would like to contribute to the academic exchange between organizational sociology and STS studies by presenting a research design aiming to investigate the software-development and its implementation within the German police.

The research case is an in-house software-development process within the German police. In interdisciplinary teams, using agile project management, IT-experts as well as policemen and women work together to develop software solutions which are to be hosted on an also internally developed cloud-network. Understanding technologies not as mere artefacts, which are disconnected from their production- and application context (Gillespie, 2014; Kitchin, 2014; Rammert & Schulz-Schaeffer, 2002), we ask how this context of action is being inscribed into the developed products and the other way around. Thereto the developing process must be understood in the context of the organization as the embedding system. Our work diametrically connects to other studies on the German police, which (critically) center on the transforming effect of technology introduction (Büchner & Dosdall, 2021; Egbert et al., 2021).

Police organizations as embedding systems are characterized by a unique constellation: They are part of the public administration and have a traditional bureaucratic-hierarchical formal structure (Apelt & Männle, 2023; Wilz, 2012), meaning relatively strict hierarchies and rigid procedures. Moreover, they are confronted by sometimes contradicting demands of their environments, namely their audience (e.g. citizens), other organizations of the public administration, and the political system (Luhmann, 2021). Additionally, police organizations are being specified as professional organizations. Therefore, the executed tasks are characterized by specific forms of action (Wilz, 2012) which may contradict the logic of the given formal rigid procedures. The strains of both logics, the logic of a bureaucratic organization and the logic of a professional organization are applied in the organizational action (Wilz, 2012).

The new task of in-house software development adds a further layer to the already complex, multidimensional structures the policemen and women are facing. Not only does the organization invite experts from different professions into the organization, but those experts

also demand new ways of organizing their work. Agile project management as a form of post-bureaucratic organizing (Alvesson & Thompson, 2006) is being introduced, challenging the traditional modes of collaboration.

Our goal is to offer a perspective on software development from organizational sociology, integrating the above-described production context, but at the same time invite the audience to discuss the fruitfulness of STS perspectives for the presented research design.

Analysing the distributed agency of human-robot collaborations in care and industrial production

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In our talk we would like to present empirical results from our sociological project SoCoRob, which is part of the priority programme "Digitalisation of Working Worlds" funded by the German Research Foundation (DFG).

In this project, situated in between sociology of work and sociology of technology/innovation, we investigate processes of developing and implementing collaborative robots in the fields of care work and industrial production. Collaborative robots are lightweight robots that are designed to perform work tasks in the vicinity and in direct collaboration with human workers without posing a threat to them by hurting them. Robots, especially collaborative robots, are considered “a front end of digitalization” (Decker 2022: 199, our translation). We see it therefore necessary to study the effects development and implementation of these robots have on the distribution of work tasks among human workers and robots – compared to states prior to the deployment of a robotic co-worker. Our main question is how the distribution of agency between human and robot co-workers is socially constructed through prototypically realised work settings.

The concepts of prototype scenarios and distributed agency are central to our research. Prototype scenarios are prototypically realised situational scenarios of new applications of new technologies. They arise when innovators translate their ideas about future situations, how a certain new technology should be designed and used for particular purposes in certain contexts, into prototypes of the new technology and into partial physical realisations of the intended context of use (Schulz-Schaeffer & Meister 2015: 167; 2017: 204; 2019: 40, 44p.). For analysing how parts of actions are newly distributed among human and robot co-workers, we developed a method combining notions from the concept of the script (Akrich 1992) with the concept of distributed agency (Rammert & Schulz-Schaeffer 2002), especially recent updates made by Schulz-Schaeffer (2019), who distinguishes between three dimensions of action: effective, regulative and intentional.

In the panel we would like to present findings, based on the application of our methodological approach for analysing the distribution of actions. It contains two case studies from our empirical research. The first case study is about a collaborative robot in a care facility that is supposed to serve drinks. The results of this case study show how additional prescribed tasks and additional repair tasks for caregivers explain how and why this care robot,

introduced as a means to relieve caregivers of care-related service tasks, increases the caregivers' workload, although it got integrated in order to relieve them from and support them with certain tasks.

The second case is a real-world implementation of a collaborative industrial robot in a car factory for calibrating fog lights. Of particular interest here is the distribution of work tasks between the human operator and the collaborative robot during the planning process and different solution approaches that were compared in a feasibility study.

As part of the talk, we will also present our methodological approach for analysing the distribution of actions in more detail.

Interfaces and Expertise: A Transdisciplinary Approach To Researching Digital Media Technologies in Industrial SMEs

Benjamin Doubali, Sascha Dickel
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Work in assembly and production lines of industrial SMEs is often characterised by very heterogeneous tasks and a juxtaposition of automated and manual, more craft-based processes. In this environment, workers and operators develop expert knowledge for their specific domain with deep understandings of work processes, strategies of troubleshooting or underlying embodied and situated practices like a “professional vision“ (Andreasson et al. 2017). This goes alongside the trend that machine operation, production control as well as forms of knowledge transfer and learning in the workplace are more and more based on digital media technologies with audiovisual interfaces.

Results from the sociology of work show that theoretical concepts based on human agency (like “routine“) have their shortcomings in crasping the complexities, (in-)stabilities and the embeddedness of work practices in socio-technical processes of manufacturing (Pfeiffer/Suphan 2020). We argue that we have to turn to STS perspectives to re-conceptualise research of industrial work in SMEs by emphasizing the positions of practical knowledge of and communication with mediated actors, thus clarifying current developments and conflicts in the digitalisation of (industrial) work.

In particular, we propose to join (1) questions about tacitness and explicability of expert knowledge (Collins 2013) in industrial work practices (2) with a shift towards a relational notion of the interface as a set of practices to make human-machine-interaction work, proposing a performative and ecological analysis of *interfacing* processes (Lipp/Dickel 2022). How are expertly practices in SMEs and digital production technologies rendered available for each other? Under what conditions do such efforts succeed - or fail? Which abilities are expected from interfaces, which are attributed to and inscribed in them?

Drawing on these considerations we follow a transdisciplinary approach in cooperation with partner organisations from (industrial and HMI) design, industrial IT and SMEs in manufacturing. Our project (*IN-KNOW*) seeks to explore the intersection between the sociologies of media, organisation and work with STS, researching the collaborative development of a digital knowledge management application for machine operators in SMEs.

The study is grounded in a methodological mix of multi-sited ethnographic fieldwork (partly as a "transdisciplinary research tandem" with designers), semi-structured (expert) interviews as well as participatory measures (workshops, interface testing sessions, ...) as part of the collaborative technology development process.

The analysis of the data focuses on the various forms of knowledge and expertise that are mobilized in the process of collaborative technology development. This includes local knowledge and experiences of workers, technical expertise of designers and developers, as well as the wider organisational context of an industrial sector shaped by the socio-technical imaginations of digital transformation and an ageing society. In this paper, we aim to discuss current activities and obstacles of these explorations.

B.14: Cultures of Prediction

Session Chair*:* Christian Dayé, Graz University of Technology, Austria

The Forging of Futures: Notes on the Dynamics between Polls, Prediction and Power

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The scandal around manipulated opinion polls involving former Austrian chancellor Sebastian Kurz is a recent and infamous instalment of a wider phenomenon that I term the ‘power to forge stable statistical chains’. The notion of ‘forging’ thereby denotes three different meanings, involving the forging of strong bonds or ties, the forging of materials to change its shape and the malicious practice of forgery. This concept posits that public opinion, as gauged by the polls, is not only the result of measurement, but that public opinion itself is an effect of social practices that bring into being what they purport to describe. The focus here shifts from solely studying the mechanics of polling, to also include the hinterlands in which the production of polls takes place.

Opinion polls for elections are a way to come to produce an image of the future, a practice that, at least since the end of 1940s, is embedded in a culture of prediction. Recent socio-technical changes have fundamentally altered the landscape of polling, challenging the authority of those who speak in the name of the future and the ways in which those futures are communicated to the public. These shifts involve a multiplication of possible futures and an ontological politics of bringing those futures to fruition. To exemplify those shifts, I will explore two case studies from Austria and the US in which statistical chains were forged in a way to bring about desirable futures. Those two cases strongly differ in the stability of those chains but converge in their central aim of paving the way for a particular future to come. The examples include the tampering of polls to boost the ÖVP party's standing in the lead up to the 2017 Austrian legislative election, as well as the fabrication of a poll purporting that American musician Kid Rock was the top choice for a senate seat in Michigan.

Throughout this presentation, I first develop the concept of the ‘power to forge stable statistical chains’, to then describe the socio-technical shifts and their implication that

occurred in the field of opinion polling throughout the last two decades. After this, I will exemplify those aspects in drawing on the aforementioned case studies before exploring some of the effects on the public perception towards polls.

Patterns in practice: cultures of prediction in the pharmaceutical industry

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The widespread integration of predictive computation such as machine learning into workflows across different sectors raises questions about how these techniques are understood and experienced within the cultures of different contexts of practice.

Previous research on cultures of prediction has tended to focus specifically on the dynamics around prediction itself e.g. stabilization and legitimacy of predictive knowledge claims (e.g. Fine 2007; Daipha 2015; Heymann et al, 2017) and public responses to predictive claims (Pietruska, 2018). In this paper, we shift focus to explore how different cultures of practice are engaging with the growth in adoption of predictive techniques in the pharmaceutical sector; a sector with a long history of AI adoption and hype cycles going back to the mid-20th century (Schneider, 2019; Sellwood et al., 2018).

Specifically, we focus on the interaction of pharmaceutical industry practitioners' beliefs, values and emotions in their engagements with data mining and machine learning applications (narrow AI) in their workflows. Beliefs we understand as ideas that people assert to be true, recognising widely accepted beliefs as "loose ideologies" (James, 2019; Harrison & Boyd, 2018) or fragmented common sense (Hall, 1987). Values are specific types of beliefs, ones people hold about e.g. what's right, wrong, important or not, while emotions we understand to be "social feelings…conditioned by the culture of society..its norms, values, ideas, beliefs" (Bericat, 2016). While previous research has identified e.g. a range of beliefs people have about data and data-driven predictive technologies (e.g. van Dijck, 2014; Ricaurte, 2019), value systems around emergent tech practices (e.g. Ustek-Spilda et al, 2019), and emotional responses to data and machine learning systems (e.g. Kennedy & Hill, 2018; Eubanks, 2018), in this research we aim to consider these cultural dynamics in interaction with one another.

In our empirical research, we use a combination of interviews, focus groups and observations to understand how these cultural dynamics of computational chemists, medicinal chemists, biologists and scientific managers in one multinational pharmaceutical company are shaping their engagements with the increasingly widespread integration of narrow AI into the drug discovery pipeline. Speaking to the theme of the panel, many of these practitioners e.g. medical chemists, biologists and managers can be understood as audiences for the predictive outputs of the computational chemists. Through exploring a diverse range of practitioners' perspectives, we aim to build a rich picture about what they believe, value and feel about the application of predictive technologies in the pharmaceutical industry.

In the paper, we discuss key emergent themes around practitioners' experience of meaningful work, the deficit of surprise, and the compulsion to keep feeding the machine. Together these findings point to a culture of prediction in which practitioners are engaged in complex negotiation practices with themselves and others about the meaning and function of predictive technologies and how they are shaping expectations of meaningful work and investment practices within the sector.

Merchants of Transparency: Algorithmic Visibility as a Service

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Global supply chains promise lead firms a competitive advantage compared to more local forms of sourcing. The flipside of this promise are challenges in managing the risk of disruptions at a distance. Companies increasingly find themselves subject to public scrutiny, regulatory interventions and growing competition, increasing the need for "transparency" (however defined) of supply chain activities, both for internal management processes as well as towards external audiences; more and more, companies are using predictive analytics and similar technologies to that end. The confluence of these trends has recently led to a new, third actor (in addition to companies and critical audiences) entering the field of supply chain risk management: what we call "merchants of transparency".

This new stakeholder group shapes and shifts the definition(s) of "transparency" (thus far negotiated between companies on the one side and NGOs, media, governmental bodies on the other side) through the services and technologies they offer. Much existing research on supply chain management is mainly interested in the ideal form of transparency for ensuring a steady flow of goods and treats transparency as a characteristic or feature of organisations or processes. In parallel to and building on Harness, Ganesh and Stoll's recent contribution on visibility agents (2022), we instead understand and analyse transparency as a kind of service. To understand transparency from this viewpoint, we fundamentally have to study the different stakeholders and actors involved in its execution – first and foremost the aforementioned "merchants of transparency", but audiences also play a fundamental role, as the transparency demands strongly depend on the societal role of the intended recipient of the information made transparent.

Empirically, we draw on material from an ongoing research project on Predictive Risk Intelligence (PRI). PRI is a new type of tool for risk management in supply chains. At the heart of PRI lies the idea that by algorithmically analysing publicly available data – such as social media posts, news reports, open government data – disruption risks can be rendered visible in a way that allows for anticipatory and preemptive action. We analyse how the "merchants of transparency" offering PRI and prediction-related technologies as well as other services to support supply chain risk management and fulfil newly legislated due diligence obligations frame, market and execute their understanding of transparency, how this aligns

with definitions and expectations by both companies and audiences, and thus arrive at a nuanced theory of transparency as a service rendered and implemented between these three stakeholder groups.

Artificial Intelligence in the energy and mobility sector

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The rise of artificial intelligence (AI) is associated to narratives and visions of the future that claim to reduce complexity through predictability. Especially when it comes to the energy and mobility sector, the increased possibilities to analyse huge amounts of Data are said to enhance "objectivity, precision, predictability, and consistency in decision-making" (Vandycke & Irungu 2021). Future studies have shown how visions, expectations or imaginaries are shaping scientific and technological developments (van Lente and Rip 1998) and seek to manage complexity and uncertainty (Beckert 2016). The multiple and contested future visions around AI (Barais & Katzenbach 2022) provide rich insights into the role of distinct orientations towards the future (Beck et. al) and how they are shaping what developments are considered relevant and urgent, possible, or inevitable. Our contribution is centered around two research questions: Which expectations towards the future are created by which actors concerning the use of AI in the energy and mobility sector? What is the relationship between these expectations and the actual use of technology, and to what extent are promises actually achieved?

Our contribution is based on two case studies containing document analyses and interviews. For the energy sector we investigated which promises are associated with the use of AI in the smart grid, with the focus on the integration of renewable energies. For the mobility sector, we investigated the role attributed to AI-based autonomous and connected driving in the context of the mobility transition, using the example of autonomous minibuses in rural areas.

We show the narrative construction of AI futures in two different sectors, which are associated with high expectations towards achieving climate protection goals. Thus, we contribute to a reflection of AI narratives regarding the proportionality of the use of AI and climate goals in the respective sector (van Wynsberghe 2021). Of particular interest to us is how the respective narratives envision solutions for sector-specific sustainability challenges and how those expectations aim to manage uncertainty in complex socio-technical transformation processes.

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Technological expectations of 5G in the UK

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Leading up to and during the rollout of 5th generation (5G) mobile networks around the world a diverse set of actors expressed a wide range of expectations about the technology and its potential societal impacts, relating to topics as varied as enhanced mobile broadband, national security, public health, and enabling various smart technologies. Utilising the concept of technological expectations (Borup *et al.*, 2006; Konrad *et al.*, 2016), this paper conducts a large-scale document analysis of UK newspapers, policy documents and industry documents from 2012-2020 (n=752). I identify technological expectations about 5G expressed in the corpus, and track them over time. Different levels of expectations, strategies used to boost the credibility of expectations and the performative effects of expectations are also analysed. The emerging findings of this analysis include the dominance of issues of cybersecurity in the news media; expectations for how 5G will transform mobile connectivity; broader expectations for 5G as an enabler of wider digital transformation (i.e. ‘smart everything’ or the ‘4th industrial revolution’); visions of desirable futures based on efficiency and convenience and associated assumptions about users; and counter-visions based on concerns over health, consent and privacy.

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Just a bunch of trunks – political gaming as a means of apprehending technological innovation processes

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In the winter term 2021/22 students attending the university lecture "Futurology" were introduced to an unconventional teaching method. The so-called "Mammoth Game" was meant to provide them with a better understanding of the socio-political processes and factors surrounding and influencing technological developments. This presentation shall briefly describe the concept of this political game and how it unfolded.

Developed in the 1950s the term political gaming refers to simulations of political processes, where players take over the roles of stakeholders within a controversial situation, and act according to their assignment. With various roles pursuing various interests and providing diverging perspectives, this approach promises to exemplify some of the complexities ensuing from and shaping political situations, which are beyond the sphere of influence of single actors. Doing so, such games not only try to simulate events but also to predict their potential developments and outcomes.

The course itself, while being open to all disciplines, was solely attended by students from computer science related programs. Though political gaming being a highly uncommon method of teaching in general, but particularly unusual for information science, constant student engagement in the game indicated that there were no reservations against a method originating from another culture of knowledge.

Providing a scenario that combined a real and ongoing innovation process with a fictitious project, the Mammoth game described events in which a corporation had successfully applied CRISPR/Cas9 technology, to introduce mammoth genes onto an elephant species, thereby making them more resistant to cold weather conditions. As a next step this US-based company had started a cooperation with the Russian government to release a herd of these mammoths on an island in the North-West of Russia. With the scenario laid out and only few rules limiting the possible actions, the students were split into nine groups, each representing a different actor, within the game, such as governments, NGOs, or economic entities. In addition, one group called game leaders - consisting of the course teacher and two student members, was responsible for advancing and overseeing the game developments.

The game was played for more than two months and by the end it was subject to both a qualitative and a quantitative ex-post evaluation, to assess, how it was perceived and whether it proved itself to be an adequate method of teaching and illustrating the accompanying dynamics of technological innovation processes, with both questions being answered positively. As the players were concurrently also the game's target audience, it

achieved its objective of exemplifying how innovations can be met with and hindered by socio-political factors external to the invention process itself.

Explanatory note: The game was introduced in autumn 2021 – a few months before the Russian attack on Ukraine – with these developments not in any way considered nor anticipated in the scenario. The actors were chosen as they seemed to provide for an interesting political confrontation and not for a potential military escalation.

Does AI transform the research culture of natural and engineering sciences?

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What is the relevance and significance of artificial intelligence (AI) and machine learning (ML) in recent science and research cultures? Will “an AI system win the Nobel Prize”? Although the vast majority of narratives in public and scientific discourses are nothing but exaggerations fueling various Baconian techno-optimistic hypes, AI and ML is, indeed, a rapidly growing field that has a huge potential to transform the sciences and the research cultures—this is the basic thesis I want to put forward and elaborate in detail.

In my presentation, I will (1) give an overview of recent AI and ML techniques and (2) draw on some (ambivalent) highlights in climate research and life sciences. (3) In order to analyze the recent transformation in a sound way, the respective understanding of science is crucial. I provide a reference system for analyzing the transformation by laying out a pluralist understanding of science. I refer to four criteria such as (a) predictability, (b) technical-experimental (re-)producibility, (c) testability, and (d) explainability. I also give distinctions between different scientific disciplines. (4) Then, I show whether and to what extend the four criteria experience a change—or not. AI and ML induce: (a) an increase of prognostic orientation without the requirement of a fundamental theory or a causal model (criteria a); (b) a limited need for technical-experimental (re-) reproduction but AI and ML make enable computer simulations and provide ambivalent Baconian capacities of interventions and actions (criteria b); (c) a replacement of traditional testing methods as well as a development of new testing options (criteria c); (d) a reduced interest in theories, models, and explanations, although AI and ML are still interlaced with (a certain type of) causation—therefore, correlation does not replace causation in general (criteria d). (5) I will come back to the case studies and show that the success of AI and ML has a flipside. Not only are the new objects that are now accessible by AI and ML techniques (e.g. the climate system or bio-systems) complex, non-linear and self-organizing, but also the new AI and ML processes themselves. They remain a black box, are widely opaque and difficult to interpret and explain. To put it in a seemingly paradox way: They predict, but they are (as object systems) unpredictable. This could give rise, as I will elaborate, to epistemic risks concerning the quality of scientific knowledge. (6) I will close the presentation by reflecting on AI- and ML-technologies in general. Since AI and ML techniques remain largely opaque, a qualitatively different kind of technology, a late-modern type, is emerging. I will characterize this type and show that we are faced with a dynamic, productive, adapative technology that in its technoscientific core is complex, non-linear, unstable, and self-organizing. This novel

technoscientific paradigm of a late-modern technology challenges our established concepts of technology and of scientific instruments and apparatuses, including our prediction and control capabilities of technical systems.

How Predicative Cultures Create Probation Subjects

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This paper argues that previous discussions about the social effects of predictive data technologies, on the one hand, and the subjectivizations of datafied society, on the other, have paid too little attention to the fact that probation has become the central logic of subjects in the data society. To this end, it is divided into the following sections:

Socio-technical Context
The creation, collection, processing, and analysis of digital data is increasingly understood as a solution to problems of various kinds. What is now considered knowledge work is highly dependent on data structuring and its predictive extrapolation. These developments are fueled by the centrality of predictive information to the neoliberal project. Data presented in the form of public rankings, comparison tables, or simple click and like statistics are both official and popular forms of knowledge.
Data processes that at first glance seem to promote transparency, provide information, and help sort out turn out to be very powerful social practices upon closer inspection. This is because data affect individuals and groups through their predictive power. Individuals are encouraged and even required to work with this information and engage in its own production.

Desideratum
Data surveillance enables predictive profiling, in which an individual's future behavior is calculated and preventive action is taken thereafter. Numerous studies critically examine these developments and their social implications. So far, however, less attention has been paid to the fact that data and their predictive use prompt humans to think about, perceive, and ultimately classify themselves in certain ways.

Conceptual Framework: Subject theory
Every society structures itself, among other things, through its own subjects. As cultural categories and schemes of self-identification and identification with others, or even (ideal) types of becoming a subject, they make demands on the individual members of society, the fulfillment of which makes them become the kind of people that the respective social order presupposes. The channeling, filtering, interpretation, sorting, and evaluation of data for the purpose of prediction is no longer merely transaction or interaction, but necessarily also a recursive creation of subjects. Against this background, it is important to ask which subjects and forms of subjectivation the datafied society is producing.

Logic of Probation and Probation Subjects
Predicative systems necessarily generate a logic of proving: since the prediction itself is defiantly uncertain, actors must either fulfill it or strain to disprove predictions that are

unfavorable to them. With predicative systems, therefore, individuals are always confronted with the imposition, inherent in the logic of the system, of having to permanently prove themselves. The talk illustrates this by means of so-called pay-as-you-life systems. Here, body and health become data-based projects, whose quality or degree of deviation from the prediction are always only certified on probation. Body and health-oriented behaviors are always acceptable only until the next review.

Discussion
The talk concludes with a discussion devoted to both the conceptual question of how the logic of probation fits into the STS canon and the sociopolitical implications.

B.15: In, out or something in between: Inclusion and belonging in digital spaces

Session Chair*:* Linda Nierling, Karlsruhe Institute of Technology, Germany
Session Chair*:* Poonam Pandey, University of Vigo, Spain

Get your voice on the App Store

Yu-Chen Lin
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Smart mobile devices and various apps have become daily necessities and occupy a lot of our time. As encapsulated by the slogan, "there is an app for that!" almost anything imaginable is available as an app. Since the launch of the Apple App Store, there has been a growing trend to develop assistive technologies – technologies that are typically seen to be designed for people with disabilities – as apps. It is hoped that creating assistive technologies as apps will make them cheaper and more easily accessible. Augmentative and alternative communication (AAC) technologies, aimed at assisting people with communication difficulties, is one type of assistive technology being developed as apps.

Based on qualitative research on the development of AAC apps in Scotland, I shown the many challenges AAC developers face when developing AAC apps, such as providing products and services at low prices and only via app stores. Many of these challenges result from the requirement to adopt the mainstream business models of the app stores. In addition, I suggest that the trend of developing AAC as apps has contributed to a disproportionate focus on providing ever greater choice of AAC apps within the marketplace and widening the scope of potential consumers, resulting in AAC products and services becoming more commodified: by which I mean each function and service of AAC can be charged with a price. Drawing on the framework of platformization, I argue that this trend has led: a) to a shift away the long-term relationship between speech and language therapists, developers and users that used to characterise the AAC field; and b) a change in how AAC developers frame their products, users, dis/ability and accessibility. This study on AAC apps further signifies that platformisation not just transforms the labour process, economic activities and technological development but also the society’s imagination and understanding of human bodies and the boundaries of what counts as normal.

Digitalization in agriculture and the question of inclusion in India

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University of Vigo, Spain

Over the past 5 years, different international donor agencies such as the world bank, USAID, and FAO (with a long history of engaging with the agricultural R&D in the global south) are rallying in support of digital agriculture as the next 'big' thing (WB 2017, USAID 2018, FAO 2022). Proponents see numerous promises in the use of robotics, artificial intelligence, and internet of things to implement precision in agriculture. Along these lines, the Ministry of Agriculture and Farmers' welfare (MoAFW) in India has designed a policy blueprint (IDEA – IndEA Digital Ecosystem for Agriculture) for developing a digital ecosystem for agriculture in India. The policy aims to enable a digital ecosystem that 'improves the welfare and income of farmers, increases productivity and efficiency in agriculture and allied sectors and unlocks new opportunities for innovation' (GOI 2021). The future promises of digital agriculture, as advocated by the above mentioned international and national agencies, aim to target and benefit small holder, marginal and women farmers.

This paper uses a decolonial, feminist, STS lens to unpack the promissory imaginaries of digitalization in agriculture and the question of inclusion of marginal women farmers. Based on a critical reading of history of modernization of agriculture in India we will ask if the ongoing policy attempts around digitalization would empower or further marginalise small holder women farmers. As a conclusion we will argue that in order to be inclusive, digitalization of agriculture in India has to engage with the question of social, environmental, and epistemic justice.

Holding the Tension between Technological Pathways and Societal Needs – A critical Reflection on a Technology Oriented Real-World Lab

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The real-world lab "Robotics AI" at the Karlsruhe Institute for Technology offers stakeholders and citizens of Karlsruhe the opportunity to experience embodied AI by interacting with humanoid robots. They are invited to give feedback, reflect on the functions humanoid robots currently have and imagine capabilities they wish humanoid robots had. In four use cases (museum, hospital, kindergarten, schools) we organize several real-world experiments to discern hopes, fears and expectations, and our humanoid robots are adapted to meet the needs that have emerged.

While pioneering a technology oriented real-world lab, we encountered a range of challenges. We expound on three areas where conflicts and tensions arose, that may serve

as a starting point for discussions on the development of research approaches tailored specifically for technology oriented interdisciplinary real-world labs.

1) Planning vs. openness

Research in our real-world lab holds the tension between flexibility and rigid planning, as we aim to generate reliable insights for the scientific community on the one hand and adhere to the rules of the university on the other hand. For example, given that vulnerable groups participate in some of our experiments, we have to follow particular ethical standards that have to be evaluated and approved by a university committee. In real-world experiments however, discoveries and in-depth knowledge of stakeholders tend to evolve in iterative cycles. The required detailed experiment plans are prone to hamper the openness and flexibility that foster emerging insights.

2) Real-world experiments vs. development paths in robotic AI

Another tension lies within experimentally exploring societal transformations based on real-world needs and given technical development paths that simultaneously flank and restrict possible solutions. Robotic AI is developed in complex processes, where just-in-time adjustments are impractical and technical possibilities are shaped by earlier design choices. Bischof et al. (2022) proposed an integrated method in which the context is thoroughly assessed first and then prototypes are developed in iterative cycles taking the feedback and specific needs of the users in the given context into account. Such an approach with continuous intervention and feedback loops has merit. However, it cannot be applied in our real-world lab where we work with several different use cases. We follow the concept of "mediated interaction" (Hornecker et al. 2022): through interactions with practitioners in cultural and educational institutions we unearth their expert knowledge.

3) Transformation: where to?

Research in the current real-world lab approaches has a clear direction: "A Real-world lab is a transdisciplinary research and innovation experiment, located in specific geographic or thematic societal contexts, to facilitate experiments for a transition towards a culture of sustainability" (Parodi et al. 2022:1). However, the case of technology oriented real-world labs is more complex, since the goals are initially unclear and users may even have conflicting expectations. Böschen et al. (2021:291) outline characteristics of sustainability and technology oriented real-world labs, but do not offer a unified vision. We posit that reflecting on potential transformation directions for technology oriented real-world labs and working towards a unified vision for real-world labs in general is a worthwhile endeavor.

Belonging as a Relevant Success Factor for E-Government?

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This contribution addresses the range of expectations towards e-government of both public administration and citizens, where meeting expectations can enable a stronger sense of belonging to one's state and partly even to one's own society. It turns out that a certain

degree of self-efficacy in the shaping of one's own living environment can strengthen self-identification with the state and thus enable a strong sense of belonging, covering a basic need of the human self. This belonging is articulated by repeated references to types of mutual reliability. Interestingly, the data indicates that the expressed requirements for digital and analog administrative procedures differ. In digital spaces the aspects of transparency, efficiency and safety are more pronounced, whereas analog administrative procedures are often characterized by the interviewees as personal assistance, helping with weighing decisions for individual cases and the opportunity to ask unstructured questions. The themes of a situation-related feeling of powerlessness, perceptions of being just a number, as well as the supposedly incalculable discretionary powers of the administration further support this.

It is further indicated that trust, obligations, and reciprocity play decisive roles in the sociotechnical negotiation processes between citizens and the administration. Citizens are obligated to communicate case-specific data correctly and completely, whereas the authorities are obligated to process concerns properly and responsibly. This exchange gives rise to mutual dependencies, which in turn leads to implicit expectations of the other party. The interviews indicate, e.g., that the respective counterpart should reciprocate in terms of the swiftness by which data can be entered or processed digitally. For citizens an accelerated way of submitting digital forms appears to imply accelerated administrative procedures.

Our research suggests that, in addition to the perceived added value, flexible online and offline administrative procedures, as well as transparent processes, can be decisive success factors for e-government. Success factors are not only seen as the generally propagated increase in efficiency through digital tools, but also as the possibility of ensuring inclusion of the most diverse groups of people in terms of access and person-specific handling. Through an increased proximity to citizens, but also more rights of co-decision – which can at least explain a mutual attitude of expectation – a kind of increased sense of belonging is indicated.

These findings are based on a series of guided interviews with German citizens which have experienced administrative interaction in the past 12 months. For comparison and reflection of views we also use findings from participant observations with administrative personnel performing the administrative routines of birth registration, registration of a new residence and unemployment registration. The empirical approach and its evaluation are based on the research logic of the Grounded Theory Methodology following Strauss and Corbin. The purpose of this study is to show why and at what levels e-government can promote secure, humane and responsible sociotechnical exchange processes. The limits and range of responsibilities of authorities are also explicitly discussed. This approach enables further aspects of digital and analog cooperation to be presented in detail, based on possible consequences.

In- and Exclusion in Online-Meetings

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The climate crisis and mobility restrictions from the COVID-19 pandemic have led to a boom in online meetings. For sustainability and environmental reasons, it is crucial that this form of communication continues to be used extensively after the pandemic, thereby reducing traffic and pollution. In light of this development, it is important that online meeting technologies facilitate inclusion and belonging in digital spaces. Virtual communication offers advantages and opportunities: For example, it makes it easier for people with limited mobility to participate; shy people may find it easier to get involved (Hammick & Lee 2014). However, virtual meetings can also exacerbate existing inequalities, for example: Women are more likely to be overlooked or ignored in online meetings (Armentor-Cota 2011, Connley 2020). Members of individualised cultures are more likely to ask questions and communicate more openly, precisely and expressively in online-courses than members of collectivised cultures (Seufert 2002; Liu 2007; Kim & Bonk 2002). For those with a different first language, online communication often creates an additional barrier due to less non-verbal communication and varying audio quality (Arellano 2020). Moreover, age and education level can influence receptiveness to technology (ÖIAT 2014; NeXR 2020; Buchebner-Ferstl, Geserick & Kaindl 2020; Spectra Marktforschung 2018).

This is why, as part of the FEMtech project FairCom, we wanted to take a closer look at how inclusion and exclusion occur in online meetings and what it takes to make online meetings more inclusive, both in terms of software and in terms of moderation and facilitation – with a user-centered approach. Therefore, we acquired teams from work, education leisure contexts that meet online. During the acquisition process, care was taken to ensure that the team members covered as many diversity characteristics as possible in terms of age, origin, educational background and gender in all its diversity.

These teams were observed in meetings, then the team members were surveyed online via questionnaires and in-depth interviews were conducted with all facilitators and selected team members in order to find out as much as possible about the current usage behaviour of participants and facilitators (e.g. contexts, functions) of online meeting software, exclusion mechanisms, good and bad practices, challenges and wishes for improvement - both from an external and internal perspective.

The results of this comprehensive survey of user needs and exclusion mechanisms will be presented and discussed in our contribution. Furthermore, we want to give an outlook on ideas for solutions that aim to increase inclusion in the digital space of online meetings and that have been developed in a highly participatory process together with different and diverse user groups.

Exploring the routinisation of inclusion in an AI predictive analytics start-up

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This paper presents a case study of processes of inclusion in the innovation of a supplier ranking feature of an AI-enabled predictive analytics software program in an Austrian AI start-up. The processes for inclusion were developed in collaboration with the start-up firm, with the aim of operationalising AI ethics principles and guidelines into organisational practices. The tool builds on the burgeoning research on the translation of AI ethics principles into concrete suggestions for how firms can incorporate inclusion, fairness and transparency into their products and services. The distinguishing feature of the tool is that it focuses on organisational and technical actions to incrementally build a lasting organisational culture for continuous reflection on and mitigation of AI innovation consequences which compromise social and ethical norms. In the pilot study, we found that reflecting upon direct connections between the firm's product and both proximate and distant stakeholders (for example, workers outside the firm, customers and suppliers not directly connected to the firm) changed both the ways in which the firm addressed inclusion in the feature and made plans for further assessment of exclusionary consequences of its innovations.

B.16: Digitalization of Society, Society and AI

Session Chair: Bernhard Wieser, TU Graz, Austria

Science on Assets. Making Scientific Communities Platform-Ready

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Looking back 30 years, science, technology, and innovation seemed to be a quite well arganged field with clear boundaries between research communities, state administration, and the private sector. Today, the digital transformation of science accelerates. New information technologies such as machine learning and cloud computing fundamentally change the institution and practice of science. This process is driven by a multitude of actors and oscillates between platform and infrastructure as organizing principles, making it difficult to decipher purposes, interests, and cultures that dominate the current state of affairs. Studies of various kinds began to investigate this mess, mostly focusing on science communication (publishers, repositories, and academic social networks) and research practice (crowdwork and citizen science platforms). With my talk, I like to broaden the focus, consider the pivotal governance practice of science funding, and tie in with the long-standing question of how the endowment of science with information technology is related to the deepening financialization of science.

For this purpose, I will draw on my ethnographic investigation of the Decentralized Science community dedicated to elaborate alternative ways of managing, organizing, and governing science based on distributed ledger technology. I will start with a short note on the platformization of science, outlining processes and drivers. Against this backdrop, I will present the case of Molecule, which aims at transforming the governance of scientific communities. I will outline the problematization of the status quo in the life sciences, e.g. siloed data, credibility and replication crisis, stagnant IP application, misdirected funding, and describe the solution Molecule provides. Its core idea is to platform organizing scientific communities around research topics by providing tools based on cryptographic transaction protocols and digital markets to govern research funding and to manage rights and permissions to IP and research data. I will explain the idea with an example and describe the funding process in which research proposals are jointly drafted, commented, and voted upon by scientists, entrepreneurs, investors, and other stakeholders like patient groups, guiding research agendas more closely. Furthermore, I will describe the concept of IP-NFT that allows to capture knowledge claims and enables the operation of legal rights, data access, and economics around research projects and communities.

With my talk, I want to provide insights into current science technology innovations and give an idea of how such innovations relate to changes in the financial structure and community organization of science. I want to sensitize for how techcraft of science platforms turns science institutions and practices into techno-economic objects of calculative governance, evoking a political-economy of digital science that calls for further investigation. More broadly, I want to present the case of an innovation platform that utilizes assetization protocols to enable epistemic communities to capture and manage knowledge claims, thus incentivizing self-organization, shared ownership, and open participation in new ways.

Automated for the people? a problem-oriented assessment framework to stimulate critical AI literacy

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The use of artificial intelligence (AI) is driven by many expectations and has enormous effects on working environments in the medium term. A basic premise of companies to employ AI-technology is to boost efficiency of workflows which increasingly affects the role of knowledge work. Ongoing discussions on the various ethical issues related to AI are important but tend to remain on a rather abstract level often neglecting practical problems. Particularly as regards the (in-)compatibility between the behavior of AI systems and working practices in particular application contexts.This mismatch refers to the risk of automation bias (cf. Goddard 2014), which as I argue, aggravates with the broader use of AI. Referring to deep learning approaches, I speak of deep automation bias (DAB): a meta-risk of the societal use of AI due to increasing complexity, opacity and irreversibility of AI-automated sociotechnical practices (Strauß 2018/2021).

Implementing AI-systems implies structural and organisational changes in institutions affecting social and cultural practices; and AI-driven decision-making has various direct and

indirect effects on individuals.This is particularly given in working environments, where individuals need to interact with AI-systems. Working with AI basically implies being confronted with novel forms of automation that incrementally alters the practices of knowledge workers.Depending on how AI is designed and implemented this can aggravate DAB and related unintended consequences of AI-based automation.

To ease this wicked problem, the paper argues that there is need for critical AI literacy to better comprehend how AI affects practices of knowledge work and develop corresponding approaches. Based on former work, a problem-oriented assessment framework is proposed that supports detecting eventual mismatch at different levels. This analytical approach aims at strengthening critical AI literacy with respect to user practices and fostering the general explicability of AI to deal with its risks in a constructive manner. The approach will be empirically tested within the research project CAIL, funded by the Austrian Chamber of Labour.

Understanding the digitalization of work in the steel industry using the sociology of work, industrial sociology and STS

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Although AI models can automate several tasks, some concerns have been raised during the last years due to the uncertainty about their usage in critical domains like manufacturing. AI applications and machine learning can result in opaque processes and outputs from the point of view of workers. Due to the great impact of the predictions on decision-making processes (e.g., in manufacturing), it is important to develop mechanisms and techniques that will provide necessary information to the users about the reasoning process of an AI model.

The ALCHIMIA project aims to build an AI platform based on Federated Learning (FL) and Continual Learning (CL) to tackle energy consumption, waste and emissions in steel production, and to build replicability and scalability of the ALCHIMIA solution across the European metallurgy industry. Explainable AI and AI-on-demand platform integration are important aspects of the ALCHIMIA project. A human-centric philosophy is guiding the design of the ALCHIMIA system, to ensure that workers' capacities and skills are augmented by the envisioned AI system through symbiotic robotic collaboration, instead of trying to achieve a completely automated production process. The project considers the social and human aspects of inserting new digital technologies in the workplace using a mixed methods approach to provide a 'human factor' analysis of the novel digital technology insertion, as a real-world industrial scenario for the green deal. The focus is on how the actors (i.e., workers and stakeholders more in general) are involved, to understand and navigate the barriers and enablers to innovative digital hub technologies based on federated learning, including addressing issues related to trust and AI applications in the workplace and the ALCHIMIA solution's compliance with the EU Ethics Guidelines for Trustworthy AI.

The ALCHIMIA project is starting with the elicitation of the requirements of stakeholders, including shop-floor workers, to provide a solution that will be human-centred. Social scientists are leading the work which is aiming to understand organisational and employment

implications (e.g., work organisation, worker autonomy, decision-making, tacit knowledge use, skill use, safety) of the ALCHIMIA system, including emerging skills and training needs, which will serve as key requirements for the whole project. Potential workplace issues that could arise from the ALCHIMIA system include increased surveillance, skill needs, and job displacement.

This paper reports on an ex-ante survey and interviews with workers at three steel plants in France, Spain and Poland, and at a foundry in Italy (where the scalability and replicability of the developed solution will be validated). The research team have backgrounds in the sociology of work, industrial sociology and STS. One of our aims is that these fields can be brought together in the ALCHIMIA project to develop a joint perspective of the digitalisation of work in industrial organizations. As sociologists and STS scholars, our presence in the interdisciplinary ALCHIMIA project will allow us to examine how AI as complex sociotechnical systems are situated within the practices that they emerge from (Hoffman, 2015; Mackenzie, 2015, 2017; Jaton, 2017, 2020; Joyce et al., 2021).

Seeing Digital Transformation Through the Eyes of Consultants: Additive Manufacturing (3D Printing) as a Field of Geopolitics

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A growing body of literature examines the discursive and functional roles of Management Consulting firms in matters of private and public governance. As a recent study by Eckl and Hanrieder (2023) pointed out that these firms curate specific perspectives, engage in reform processes, and advance particular agendas in a subtle manner that renders them immune to accountability.

The area of digital transformation represents a convergence of diverse private and public interests, and management consultancies play a crucial role in this landscape. It is important to understand the impact that these consulting firms have on shaping the discourse and direction of governance in digital transformation. By curating specific perspectives, they influence the decision-making processes and contribute to the construction of dominant narratives. The potential consequences of such actions need to be thoroughly considered and evaluated, given the significant role that these consulting firms play in shaping the future.

This paper aims to analyse how the ‘Big Four’ consultancies view organizational and societal continuities and change due to digital transformation in the fields of industrial manufacturing and production. The paper focuses on the core narratives that play as the drivers for digital transformation that lead to the emerging structures of organizing forms, on how new structures or forms gets integrated to the existing organizations, and on the socioeconomic and geopolitical aspects that go beyond the technical and managerial prescriptions. Based on the qualitative analysis of the primary documents like publications, brochures and reports on Industrial Additive Manufacturing (3D Printing) by these consultancy firms, this exploratory paper analyse how these firms intent to configure actor constellations and politics of scale.

This work engages with three distant strands of scientific literature in the overall area of digital transformation. First, it contextualizes the setting with which the progressively increasing role consulting firms play in the realm of public and private organizations, that in turn are deeply transforming the organizational and social ordering. Second, the paper empirically engages with the thematic and advisory prescription that Big Four consultancy firms propose in the realm of digital transformation, especially on the platform centred organization in the industrial production, and the transformation that are envisaged in the future of manufacturing. Third, it engages with the sociopolitical questions of digital transformation in general, and manufacturing and related sectors (like supply chain/ logistics) in particular.

The question, in other words, is whether and how discussions on digital transformation by the consulting firms engage with the applied as well as the geopolitical/ socioeconomic questions that are deeply embedded in the manufacturing and related sectors. For example, as our empirical case illustrates, it is interesting to analyse how do the firms engage with the rhetoric of 'technological nationalism' when proponents of additive manufacturing puts forth localized production as a means to overcome geographical uncertainties or even addressing aspects of outsourcing.

Julian Eckl & Tine Hanrieder (2023) The political economy of consulting firms in reform processes: the case of the World Health Organization, Review of International Political Economy, DOI: 10.1080/09692290.2022.2161112

Working from Home Divide: Increased Flexibility and new Social Inequalities

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The COVID 19 pandemic has made working from home (WFH) an integral part of the labour market with the potential to reduce daily commuting and overall traffic. This is especially true for high-skilled individuals who can do their work from home, as their activities are often highly digitized and thus independent of time and place.

Against this background, we ask (a) how the daily mobility of high-skilled individuals has changed as a result of WFH and (b) how they use the greater flexibility enabled by WFH in other areas of their lives. We address these questions using a mixed methods approach. First, we applied a difference-in-differences model to uniquely comprehensive mobility data of the German population aged 18 and older spanning the years 2017 to 2022 to analyze how WFH has changed daily mobility patterns. Besides different social groups, we also distinguished between different mobility purposes to determine whether a reduction in commuting has led to an increase in, e.g., daily mobility related to running errands. Second, we conducted 24 semi-structured in-depth interviews with high-skilled individuals who work from home about their personal experiences with WFH. Using qualitative content analysis, we have derived several dimensions of how WFH improves their quality of life.

Our results show that, first, high-skilled individuals are able to reduce the number of miles traveled each day through WFH, saving time over the course of the day. Second, high-skilled

individuals use this increased flexibility to invest in four domains of quality of life: Health, care work, social relationships, and their careers. As our qualitative and quantitative data suggest, time savings and more flexible work help high-skilled individuals increase their time wealth and improve their quality of life. Consequently, WFH reinforce existing social inequalities between the highly skilled and others.

COVID and global organisations' socio-technical imaginaries for the future of education

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COVID has been treated as a disruptive crisis providing the opportunity to transform education systems with the promise of technologies employed during school closures. It also allowed new global actors such as multinational technology corporations to promote their visions for the future of education through global partnerships and development aid. Meanwhile, international organisations including UNESCO, the OECD, and the World Bank have long competed over their respective missions for education and development, employing socio-material governing strategies. However, historical and power relations underlying their current digital transformation initiatives have not been explored in depth in the field of Science and Technology Studies.

This paper aims to understand global organisations' visions for the future of education responding to COVID in terms of their historical legacies, the politics of their governing strategies, and underlying agendas. It examines three oraganisations above, considering their historical and current influences on global education policies. It adopts Jasanoff's four phases of the construction of socio-technical imaginaries and Auld and Morris' three-act narrative as analytical frameworks and interpretive comparison as the research method. Three key research objectives are as follows. Firstly, this paper explores global organisations' historical missions and visions for the future of education prior to COVID and how they promoted them since the post-war period. Secondly, it investigates what visions of education and policies they promoted to address COVID, illustrating how they used the story of crisis and data in producing so-called scientific policy knowledge. Lastly, it examines how they promoted these visions and policies in practice, focusing on global partnerships and development aid.

This paper critically addresses how global organisations have played influential, but often controversial, roles as policy experts in the global governing system of education. It will claim that their current visions may be digital variations of their historical socio-technical imaginaries that led the modernization projects. It will further argue their potential distinct agendas, comparing types of technologies and their roles promoted for the digital transformation of education.

From fear to beat: Mapping the Standardisation of Mental Health in A.I-Powered therapeutic systems

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Since the end of the last century, Artificial Intelligence (AI) has taken centre stage at the techno-scientific and industrial level, revolutionising the digitization processes that were already taking place (Haenlein, 2019). This has generated a transformation in the way we make decisions (Bahón, 2022) in various areas of social life, including predictive processes and algorithms that support shaping the social in areas that before were reserved just for human beings. One of the fields with the most development in the process of incorporating AI is the health sector (Glauner, 2021) both at institutional(Stanfill, 2019) and diagnosis levels (Mansour, 2021).In this field, Social Sciences have focused their concern on the ethical dimension (Coeckelbergh, 2021), studying the possible consequences, problems, and challenges that algorithmic models could generate in the decision-making process. Although these studies are highly relevant and necessary, they do not give a concrete and situated account of the way in which these standardisation and algorithmization processes are built in the initial stages. Because of this, in recent years a series of empirical works have emerged that, responding to this question, have focused their interest on the "in situ" construction processes of standards and predictive models (Crawford, 2021; Dourish,2022; Davis, 2020; Schatzki, 2019; Barney, 2021; Gurumurthy, 2019); Graham, 2017; Taffel, 2021). Related to this last line of empirical work, we intend to trace the network of materialities that make AI production possible in the field of mental health and we analyse how it is infrastructure based on specific processes in local projects. For this, we have carried out a focused ethnography of a Spanish project that incorporates AI and Virtual Reality in the treatment of Claustrophobia Starting from the hypothesis that AI is not an isolated artefact but rather an emerging one from a heterogeneous network of actors (among which the processes of standardisation have a central place) and the relationships between them.The results of the research show how the supposed optimization in the treatment of mental health (mainly conducted by outsourced engineers) from the application of AI supposes (1) the standardisation of mental illness in a series of discrete variables of a symptomatic nature (2) the translation of these symptoms into quantifiable physiological variables (3) the choice of sensors that can recognize these variables (4) classification of normality criteria for these physiological variables and their correspondence with mental health parameters. These processes suppose (1) a simplification of psychological theory and therefore of psychic experience that raises questions about the biases that this could generate and (2) generates what we call "a sensorized social", reducing the social experience only to what can be recorded by a sensor, which raises questions regarding not only standardisation but also aspects such as data traceability and transparency in the construction of the algorithm and the consequences of decisions that are apparently only technical but involve a whole series of social effects that affect various stakeholders.

Potential Influences of AI-Assisted Decision-Making on the Actualization of Ethical Principles in Care: Results of a Qualitative Study

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AI-based technologies inhere the potential to optimize employees' workflows (e.g., by supporting task allocation, helping to evaluate employees´ performance and behavior, or assisting employees in carrying out tasks) but they also create new challenges, including ethical ones. Increasingly, algorithms underlying AI technology are able to imitate human problem solving and can therefore be associated with a shift in agency from humans to machines. This also applies to technologies developed for the support of healthcare professionals. While reliable predictions cannot be made at this stage, it is likely that AI technology, and in particular clinical decision support systems (short: DSS), will gradually complement or replace the ability of healthcare professionals to make complex decisions based on a wide range of information. Possible influences of technologies on social structures and practices as well as the moral norms manifested therein are currently not systematically assessed during the technology design process. One of the reasons for this could be that the principles referred to in existing ethical guidelines for AI are usually formulated in a highly abstract way and without reference to the local phenomena of potential fields of application.

In my talk, I will present results of an interview study that complements ethical principles considered relevant for the design of AI technology in health care (i.e., beneficence, respect for autonomy and justice) with direct stakeholders' conceptualization of the principles. By means of scenario-based semi-structured interviews focusing on moral decision-making situations occurring in everyday nursing care, we encouraged participants (15 caregivers and 13 care recipients) to reflect on possible influences of AI-based DSS on the realization of their concepts of the considered ethical principles.

The study results shed light on how the use of DSS might affect social structures, practices and existing power dynamics in specific care contexts. Correspondingly, the results provide prospective information on which concepts of the investigated ethical principles should be given particular attention in the design of AI technologies to safeguard the moral interests of stakeholders in the nursing sector. Finally, our results suggest that the principles' definitions should not only be specified but may also need to be expanded by requirements that are characteristic of the nursing context.

Note: The abstract is based on a manuscript ("A Context-specific Analysis of Ethical Principles Relevant for AI-Assisted Decision-Making in Health Care") submitted for journal publication.

Examining framing of Responsible AI in India: An Analysis of NITI Ayog's 'Towards Responsible AI for All' and NASSCOM's 'Responsible AI Resource Kit'

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Emerging technologies such as Artificial Intelligence (AI) and Machine Learning (ML) are anticipated to have significant social, economic, and political impacts. In response, governments, technology corporations, and civil societies globally are exploring and developing governance mechanisms for the socio-technical changes brought about by the introduction of AI in various domains, including healthcare, and manufacturing. The notion of of "Responsible AI" has received much attention in this regard, with both regulatory discourse in Europe and the US and self-regulatory approaches from “big tech” companies such as Google and Microsoft. Responsible AI refers to an alternative approach to AI, in which the social and ethical aspects of these technologies ought to be reflected upon during the development and integration process. For example Google points to its four principles in developing its AI systems: Fairness, Interpretability, Privacy, Security.

The discourse surrounding Responsible AI encompasses a range of principles, tools, and techniques from the tech community, academia, governments, and non-government organizations. Drawing on the rich Science and Technology Studies literature and socio-technical perspective, this study shifts the focus from the Global North to the Global South and examines the framing of "Responsible AI" in India through a case study of two prominent standard-setting initiatives launched by the government think tank NITI Ayog and industry organization NASSCOM. The study employs a situational analysis approach and triangulates the analysis of public documents, and web materials, as well as social media posts such as Tweets and examines how these cases frame Responsible AI and influence the development and use of AI-based innovations. The study also explores the individuals and processes involved in shaping these standards and the extent to which diverse views are incorporated.

This empirical investigation contributes to an STS understanding of the relationship between policy-making and industry self-governance mechanisms and the framing of the social, political, and economic implications of AI. It may also reveal that while Responsible AI is part of the broader policy-making and industry discourse in India, it may easily become a mechanical implementation of rules and a technological solutionism that does not address issues of justice.

A Pathway towards Co-creating Responsible Standards for Digital Equity: A Case Study of Digitization of Women’s Transit Safety in India.

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It is well established that pre-existing biases of the socio-technical landscape get auto-embedded in algorithms leading to the persistent digital reproduction of social biases. Biases in the algorithms have a much higher potential for creating inequities due to the speed of

diffusion and coverage. To break the vicious cycle of biases, responsible standards are required which can act as a yardstick. However, standardizing for wicked problems has been Achilles's heel and such a process effectively demands the multimethod approach deeply rooted in interdisciplinarity. Gender biases are one of the most prominent categories of existing biases in digital technologies. Gender biases are clearly reflected in the algorithms used in reproductive technologies, health technologies, employment and marketing platforms. There are two potential approaches to counter gender biases in algorithms. One is a gender audit of the algorithms to identify and filter the biases. This approach relies on opening the black box of the algorithms from the perspective of, who designed the algorithms, why particular algorithms and how it was designed. Another approach is to adopt a gender-responsive pathway for ideating and actualizing particular algorithms. This approach focuses on the intervention before formulating logic for algorithms. However, the meaningful application of both approaches requires a guiding framework setting standards for gender equity. In this context, the **primary objective** of this research paper is **to provide a methodological pathway for responsible co-creation of the standards for gender equity in digital technologies**. The research paper seeks to answer the question of **how to co-create inclusive responsible standards of gender equity for the digitization process.** The biggest challenge is ensuring the participation of the high-vulnerability groups as often high-vulnerability groups have a wide information and knowledge gap regarding the existence of the biases. To address the research question, the paper utilizes both primary and secondary data. Primary data is taken from the field survey done in Delhi, as a part of a larger project on women's safety in transportation. The survey was designed by using a modified **Responsible Research and Innovation Framework.** The survey has used a **mixed-method participatory approach**, where qualitative methods included, in-depth interviews and focus group discussions and quantitative methods included statistical modelling using SPSS software. The universe of the field survey was women commuters of Delhi, belonging to different ages, classes, educational backgrounds, reproductive cycle stages and locations. Paper provides a pathway for harmonious intersectional reconciliation of diverging interests for responsible standards of women's transit safety.

Data Space and Data Waste

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The establishment of an EU-wide common, interoperable mobility data space and local/national urban data spaces, to facilitate access, pooling and sharing of data from existing and future transport and mobility databases is forwarded as key to secure the benefits of data for the mobility sector and for society at large. *Urban* Data space is conceptualized as innovative form of data sharing at scale to enable new services and products that require interoperability, standardization and seamless flow of data on the respective scales. Especially in the field of urban mobility, digitalization and the use of "Big Data" promise to advance sustainability transformation. The technology is still in an early phase of development and until now, research of it has focused on technical aspects of its implementation and not considered possible impacts in a social context.

The promised bright future of data space are imbued with increased risks. Some of the problems are tackled by technological and legal instruments. However, less spoken about is the problem of data waste: the generation, management, risks and cost of unused and unusable data. Autonomous mobility for instance will generate immense amounts of data. If data is the new oil, data waste may be called the new CO2.

This paper presents exploratory research on data waste. Beyond conceptualizing data as „dark" and „lost", we suggest a more nuanced typology: *Grey data***:** Data that the user had created and is aware of, but does not use; *Dark Data*: Data that a user has created and is unaware of or is lost; *Gradient data*: Temporary or meta data, used for other reasons than the data has been created for; *Metabolic data*: Data that the 'system' has created and is black boxed. Data waste is a temporally and spatially situated sociotechnical assemblage: a complex of automated and human processes as well as technological operations; much of which is occluded by the workings of configurations and technical operations. Thus, it is not an anthropocentric entity (useful/not-useful for the human; physical object/material out of the cultural orbit). Data waste is not raw information not useful anymore; it is always already a sociotechnical assemblage that is mobile (dispersed in the network in various forms) and multiple (permanent and temporary at the same time). Data waste is a modus operandi of the configurational assemblage: tradeoffs require socio-political and socio-technical considerations. Data waste is a semiotic-material entity dispersed in a configurational network of a sociotechnical apparatus. This apparatus is energy consuming and data waste is related to such consumption in complex ways.

We suggest that data waste creates manifold risks: (1) resource waste; (2) data breach; (3) sustainability; (4) bias. FAIR, CARE and DARE principles, suggested to govern data space, do not disallow data waste. Our paper will analyse these principles and suggest modes of remedies, as well as call for responsible research and innovation (RRI) inspired modes of addressing the problem by anticipating impacts, reflecting on risks, including and engaging key stakeholders, and offering space for co-created solutions.

Feminist Activism in AI Standardisation Processes

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The last years saw various efforts to integrate socio-technical aspects into regulations of Artificial Intelligence (AI). On a national level, the German Institute for Standardization (DIN) developed a "Standardization Roadmap Artificial Intelligence" which was presented to the German government in December 2022.

The DIG*IT*AL working group of the German Society for Gender Studies was instrumental in the implementation of the roadmap by making numerous interventions from a feminist, intersectional perspective. We found, however, that, while the organizers went great lengths to integrate contributions from business and industry in the final draft, the participation of scholars and representatives of civil society was significantly hampered by a variety of structural and procedural factors.

In our presentation, we will identify the hidden mechanisms of inclusion and exclusion underlying the decision making processes in heterogenous expert groups. We will use the example of the standardization roadmap to show how AI regulations are strongly dominated by Euro- and androcentric perspectives privileging a "human-centered AI". In our talk we will deconstruct this humanist bias and contrast it with an alternative approach informed and infused by post-humanist and queer-feminist concepts.

Stream C: Towards Low-Carbon Energy Systems and Fighting Climate Change

C.1: Kincentric Ecology and the Energy Transition; Achieving Net Zero Carbon will Require Mainstreaming Nature Connectednes

Session Chair*:* David Richard Walwyn, University of Pretoria, South Africa

Overview of Historical Antecedents to Kincentric Ecology - Introduction to the Panel Discussion on its Importance to Energy Transitions

David Richard Walwyn
University of Pretoria, South Africa

The development and adoption of low carbon energy systems are clearly of the utmost importance is maintaining stable ecosystems and avoiding extreme climate change. However, many countries are failing to meet their emissions targets and there seems to be little substantive progress towards the energy transition. Global emissions of carbon dioxide have reached record levels and show little evidence of multiple resolutions to cut greenhouse gases.

It is argued that a primary cause of environmental damage arises from the human/nature relationship or nature/society dualism established by the Enlightenment and the development of capitalism (Moore, 2015). Alternatives to the nature/society dualism have existed historically, including Ukama,
Sumak kawsa, Pachamama and iwı´gara, and are common to many indigenous cultures. The ontologies cover a broad spectrum, from spiritual to cultural and material, but share a common feature that Nature or the environment is to treated with reverence and respect, to be protected and preserved rather than exploited and harmed, a relationship which could be describes as “environment as family” or kincentric ecology.

In this session, the panelists will present and discuss different perspectives on kincentric ecology, and how a reshaping of the nature/society relationship can play an important role in achieving the energy transition, including the framing of socio-technical imaginaries based on the concept of interconnectedness, indicators of kinship ecology, pedagogies for raising awareness of nature connectedness, approaches of indigenous people towards the environment and how these practices can be incorporated in a new ontology, and the influence of environmental awareness on human behaviour. The introductory remarks, which form the basis for this abstract and presentation, will cover the historical antecedents, and whether these antecedents could be the starting point or precedents for a new normative set of meta-rules, from which future decisions on energy technologies and systems would be made. It is argued that net zero carbon is not ultimately a technological change, it is a value-based transformation that invites the mainstreaming of kincentric ecology.

Green Discourse, the Energy/Materials Ecosystem, and Technologies of Environmental Care

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Green discourse purports to express science whose theoretical, observational, and normative elements are in accord: climate change caused by legacy industrial infrastructure that converts energy and matter in linear modes that produce waste can be ameliorated by new infrastructure that converts energy and matter in holistic modes that yield zero waste. In important ways, however, the elements of this syllogism are in discord. Green discourse models society as an *energy/materials ecosystem*, and while other forms of physical and biological essentialism align with and reinforce the capitalist social order, with its ontology of morally acceptable imbalance, implementing the energy/materials ecosystem within this ontology has caused serious *epistemic vertigo*. Policymakers have coped with the costs and complexities of closing the circle of the energy/materials conversion chain by focusing on particular infrastructural components over others and signifying them as *technologies of environmental care* worthy of public support. These privileged objects perform important ideological work demonstrating proof of principle and establishing model markets for green goods and services but complicate and even contradict the goal of building the *net-zero circular economy*. This paper, based on original research including a new book (*Age of Auto Electric: Environment, Energy, and the Quest for the Sustainable Car*, MIT Press 2022), explores the instrumentalization of the *energy/materials ecosystem* metaphor in *technologies of environmental care* and analyzes the social/environmental paradoxes these objects foster.

In Search of Connection: a Kincentric approach to law and policy

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The international law response to the Climate Change crisis, much like its response to every other environmental crisis, is a transactional response that focuses on the development of a set of rules, guidelines or commitments towards a transition to low carbon alternatives. The various agreements and commitments such as the UN Framework Convention on Climate Change (UNFCC), the Kyoto Protocol and Paris Agreement are grounded in a scientific approach to climate change which has largely ignored the human and social dimensions thereof. In fact, the early years of the Intergovernmental Panel on Climate Change (IPCC), established in 1988 to collate and assess evidence on climate change, only explicitly acknowledged the relationship between climate change and humans in its 4th Report in 2007. This approach to environmental rulemaking, which has ignored the interrelationship between humans and the environment, has not yielded any significant change. Accordingly, in the almost 30 years since the UNFCC came into force, we have seen very little tangible shifts towards a low carbon environment.

In contrast, a joint report by the International Work Group for Indigenous Affairs (IWGIA) and International Labour Organization noted in 2021 that Indigenous peoples were responsible

for protecting an estimated 22% of the planet's surface and 80% of biodiversity. This level of environmental protection is not matched under conventional approaches to legal protection. Whereas conventional responses to conservation treats humans as separate from the environment, Enrique Salmon in his article Kincentric Ecology: Indigenous Perceptions of the Human-Nature Relationship (2000) argues that indigenous peoples view nature are part of an extended ecological family that shares ancestry and origins. It is an awareness that life in the environment is viable only when humans view the life that surrounds them as kin (as relatives).

This paper argues that a kincentric ecology lens provides opportunity for policy, law and governance to develop urgent and appropriate responses to climate change.

Disassembling high-carbon imaginaries through reconnecting workers' and environmental struggles – the case of Poland.

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The imaginary of coal as the bedrock of Poland's prosperity and stability leads to the environmental movement being portrayed as a western import which lacks understanding of the local context, disadvantages the workers and compromises national energy security. On the other side of the fence, workers, particularly in extractive industries, are often painted as laggards of energy transformation if not outright deniers of the anthropogenic climate change. Research shows that coal miners often adopt the view of their vulnerability as resulting from the western green agenda which allegedly cares about the environment more than it does about the people. A growing number of researchers recognize, however, that interests of these two groups are not necessarily irreconcilable. Matthew T. Huber compellingly argues that maintaining the view of workers' and environmental struggles as incompatible is a strategic move aimed at hindering the possibility for an alliance and thus diminishing the agency of both groups. Using Jason W. Moore's and Timothy Morton's anti-anthropocentric retoolings of Marxist thought, I take this argument further and propose that the crux of the matter lies in the Nature-Society divide and human nature (labour) being subjected to the same forces of capitalist abstraction and exploitation as extra-human nature (environment). Joining this literature with STS, I argue that high-carbon imaginaries inherited from energy production based on extractivism reinforce the distinction between humans and nature. As these socio-technical imaginaries continue to exert power over Polish society's futuring processes, exploitative practices risk being reproduced even after the transition away from fossil fuels. A meaningful transformation which would abandon harmful practices requires, therefore, the disassembly of these imaginaries, starting with the flawed human-nature relationship which lies at their core. In this paper, I reflect on my ongoing ethnographic fieldwork in Polish Silesia where I investigate mutual vulnerabilities of workers and the environment, as well as identify similarities in the visions of desired future of both workers and environmental activists. Borrowing from Anna Tsing, I explore the possibility for the generative friction between the vulnerabilities of these actors, which could lead to a solidary alliance aimed at disassembling the still-powerful high-carbon imaginaries. Taking an anti-

anthropocentric perspective informed by Object-Oriented Ontology, I propose that the recognition of the human-nonhuman interconnectedness can be a productive force for alliances against the core structural drivers of climate change, such as the globalized capitalist economy.

Caring for a just future: multidimensional remediation of post-mining landscapes in Lusatia, Germany

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The remediation of post-mining landscapes is an important, but often overlooked challenge of the transition away from coal. In the region of Lusatia, Germany, open-cast lignite mining causes long-term burdens on the environment, including, but not limited to, adverse effects on water balance and quality. While the coal phase-out is now set into law in Germany, the question of how and by whom former mining sites should be restored is still highly contested. Social and environmental objectives are perceived to be in conflict with economic and structural development and the continued monetary exploitability of post-mining landscapes (e.g., artificial lakes that require large amounts of water to facilitate holiday tourism).

Following Beckett and Keeling (2019), we take a perspective on mine remediation that goes beyond the purely techno-economic process of “cleaning up” and instead include concepts of social justice and feminist theory, framing remediation as a “matter of care” (cf. Puig de la Bellacasa 2017). Based on multi-dimensional justice theory, Lane (2016) offers us a way to evaluate this process on an inter-generational plane by respecting the region’s history and integrating identity struggles into the social arena.

Concerning the open-cast mines in Lusatia, the intergenerational aspect bears special weight due to the more than one hundred villages – many of which located in the original core settlement area of the Sorbian/Wendish people – which were fully or partly destroyed in the process of mining, forcing their inhabitants to resettle. With concerns of energy and job security on the one hand and the history of resettlement and ongoing environmental damage on the other, deep-seated conflicts have evolved in the region over the past decades shedding light on the importance of a multidimensional approach to gain an understanding of the contested socio-cultural identity connected to the process.

We combine this approach with a focus on nature, justice, and time from Ecological Economics (cf. Faber 2008) to develop a framework for the structured analysis of the remediation and the care aspect of the Lusatian post-mining landscape. How is the future of lignite mining sites viewed in the current structural change discourse and policies and what are favoured approaches to their management? How can structural policy address concerns of remediation as a “matter of care” for post-mining sites while considering changing conditions due to climate change? Can the remediation of the Lusatian post-mining landscape contribute to a process of reconciliation between people in the region, and if yes, in what ways?

Our research is based on semi-structured expert interviews and focus groups with affected people from the region, supplemented by a media analysis of the dominant discourse. We expect our findings to be of relevance for other processes of remediation in the context of phasing out extractivist industries.

Citizen Participation in African Energy Transitions

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The sustainable development goal 7 sums up three key requirements for the global sustainable energy transition, namely, to ensure universal energy access, to increase the share of renewable energy in the global energy mix and to double the global rate of improvement in energy efficiency. About 80 percent of the electrification and clean cooking access gap lies with 23 countries, most of which are African countries. Despite the continent's wealth of potential for renewables and growing off-grid market, the continent is sorely underrepresented in transition literature. In particular, analysis on citizen participation in energy transitions is largely focused on European case studies, followed by the United States and thereafter emerging economies (India, China and South Africa). The literature that is focused on Africa largely focuses on: the impact of energy access deficits and regulations on communities; the lessons that can be learned from developed countries in African energy transitions; the setbacks or gaps in African energy transitions; and understanding or changing household energy preferences. Few articles have focused on the community driven social and technical innovation initiatives in the African context. Consequently, little is known about the actual levels of local citizen participation across the technical, financial, and decision-making sphere, and the various African contexts in which participation occurs. To address these gaps, this paper draws on a combined Social-Ecological Systems Framework and participatory literature conceptual frame. The framework is intentionally adaptable to account for various participatory contexts. To date the framework has been applied to several Dutch case studies. Subsequently, this paper has three aims: 1) to provide a deeper understanding of African case studies on citizen participation in energy transitions; 2) to identify areas in which the framework can be improved for other contexts; and 3) to understand the similarities and differences in participatory processes in the Dutch and African context.

The Water, Land, and Carbon Intensity of Electricity Production: The Case of South Africa

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Electricity production has a significant impact on the Water-Energy-Food (WEF) nexus sectors as it requires substantial amounts of water and land, whilst also being a primary polluter of these resources. In addition, electricity production is a key contributor to global CO2 emissions. With electricity production predicted to increase by over 50% by 2050, the

impact of electricity production on water and land resources, as well as the environment, will need to be significantly reduced This is particularly important in countries facing water, energy, and food scarcity and insecurity such as South Africa. This paper therefore investigates the impact of electricity production on the WEF nexus sectors and environment in South Africa. To do this, this paper conducts a lifecycle assessment of the water footprint (WF), land footprint (LF), and carbon footprint (CF) of electricity production in South Africa, by electricity source, and under key scenarios. The results from the IRP 2030 scenario showed that despite a 63% increase in electricity production targeted from 2018-2030 in South Africa, the water, land, and carbon footprints of electricity production would decrease by 29%, 9%, and 5.5% respectively. Compared to the BAU 2030 scenario, it was shown that the water, land, and carbon footprints would be 55.5%, 42.6%, and 41.5% lower in the IRP 2030 scenario, respectively. Overall, the results show that to reduce the impact of electricity production on the WEF nexus sectors and the environment, integrated resource planning, switching away from fossil fuels, particularly coal, and promoting the use of non-hydro and non-biomass renewables is required.

C.3: Carbon capture: Analysing and opening up socio-technical struggles

Session Chair: Kasper Ampe, UGent, Belgium
Session Chair: Michael Kriechbaum, University of Technology Graz, Austria

The CCS in biobased CDR – Regional assessments of bioenergy with carbon capture and storage in relation to other carbon dioxide removal methods

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Carbon capture and storage (CCS) technology faced challenges globally, particularly in Germany where CO_2 storage was banned in 2016. However, political views on CCS in Germany have changed in recent years as the focus shifted from the application of CCS at coal-fired power plants to capturing emissions from hard-to-abate industries (industrial “residual emissions”) and methods for carbon dioxide removal (CDR) such as Bioenergy with Carbon Capture and Storage (BECCS) and Direct Air Capture and Storage (DACCS). Most prominently, the inclusion of BECCS in scenarios presented in the latest IPCC reports positioned CCS as relevant part of carbon dioxide removal (CDR) needed to mitigate climate change. Greater awareness about options for carbon capture and utilization is also contributing to opening up the debate about CCUS.

The interdisciplinary project “BioNET-Multi-stage assessment of biobased negative emission technologies” picks up on these discursive developments by examining the feasibility of BECCS and other biomass-based CDR methods in three regions in Germany: Mecklenburg-Western Pomerania, Central Germany (focused on Saxony-Anhalt), and the Rhine-Neckar metropolitan region. With a relational co-productionist approach, we study how biobased

negative emission technologies are discussed and imagined in these regions as part of climate change mitigation efforts. In a multidimensional participatory assessment of regional feasibility, we discuss the viability of CDR options based on biomass availability, environmental conditions, as well as socio-technical and regulatory factors. Furthermore, we explore the interrelations, trade-offs, and synergies between CDR options from the stakeholders' point of view.

For this presentation, we draw on stakeholder surveys and interviews to analyse the perception and narratives of BECCS and its relation to other biomass-based CDR options like afforestation, rewetting peatlands, soil management changes or long-lasting building materials. Stakeholder assessments of potential technology couplings and biomass flows allow us to understand how biobased CDR is imagined in regional (energy) landscapes and explore the factors that lead to context-specific assessments. In doing so, we additionally examine the networks of actors, regulations, technologies and environmental conditions that shape and frame visions of CCS in the context of negative emissions.

Socio-technical visions of solar fuels

Kasper Ampe
UGent, Belgium

Today, chemical and industrial systems strongly depend on fossil-based energy sources and feedstocks. This type of energy production and the use of fossil carbon as a feedstock in a predominantly linear value chain with low reduce, reuse and recycling rates led to a dramatic increase in atmospheric greenhouse gas concentrations. The current operating models of the chemical and industrial systems thus require fundamental changes.

To confront these challenges, numerous visons are not only being articulated in the IPCC (2022) report, identifying alternative energy sources and feedstocks, different ways to deal with carbon and so-called demand-side interventions, but also in multiple Horizon Europe initiatives (e.g. Processes4Planet, the Clean Hydrogen Partnership and SUNER-C). The latter aims to produce fossil-free fuels and chemicals for a climate-neutral Europe, using 'abundantly available' water, nitrogen and carbon dioxide. With the help of sunlight, it turns these resources into fuels or chemicals in a so-called 'direct conversion' approach (e.g. artificial photosynthesis producing hydrocarbons from carbon dioxide and water) or 'indirect conversion' approach (e.g. producing green hydrogen to synthesise with carbon dioxide). Far beyond these two approaches, however, our first observations indicate that a plethora of visions about the future of the chemical and industrial systems are being developed in SUNER-C, highlighting multiple struggles over the source of carbon dioxide, direct air capture, point source capture, downstream use of the chemicals or fuels etc.

What is more, these socio-technical visions come with specific, intertwined, technological and societal choices (i.e. they are normative; Granjou et al., 2017) and serve as a point of orientation for action in the present (i.e. they are performative; Oomen et al., 2021), which makes it crucial to consider societal questions over whose visions count, who articulates visions for whom, by what ends and with what effects.

Given the socio-technical nature of ostensibly technological approaches, this paper asks how actors associated to high-level chemistry and industrial projects, such as SUNER-C, interpret the future of solar fuels and what the identification of these socio-technical visions implies for such large-scale research initiatives? To answer these questions, we use a framework that helps to map socio-technical visions by distinguishing between meanings (e.g. the framing of the issue), knowings (e.g. the knowledge required), doings (e.g. the technology used) and organising (e.g. the required governance arrangement). Regarding methods, we are conducting interviews with key actors in the project, which are high-level scientist and companies, as well as societal actors such as environmental NGO's and unions. Additionally, we draw from participatory observations and document analysis.

Networks of expectations and visions in the policy discourse on hydrogen technologies in Germany – longitudinal and multi-actor perspective

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Governance towards sustainable transitions must cope with the uncertainties related to radical innovations, not only regarding various performance criteria of technologies, but also their future applications, or even the sectors that may be most affected. A case in point are the past decades of policies related to hydrogen that had not only to navigate through multiple phases of shifting expectations including phases of hype and disappointment, but also shifts in perspective of which particular transition the technology is supposed to contribute to: a transition in energy, in mobility, the building sector, the chemical and steel industry and more (Budde & Konrad 2019; Yap & McLellan, 2023). Germany is an interesting case, as policy support for hydrogen technologies has been comparatively stable for almost two decades despite changing expectations and visions, in contrast to other countries whose policies have been more volatile. Against this background, this paper studies how the German policy discourse and governance of hydrogen technologies evolved between 2005 and first quartal of 2023 on the federal level and addresses the following questions: How did the expectations, visions and narratives of German policy actors regarding hydrogen technologies in different sectors evolve over time? How did the dynamics of expectations relate to policy support? Which expectations and visions were especially performative in converging political actors' strategies and triggering policy measures? What congruences and divergences did the networks of expectations among German political actors exhibit?

Conceptually, paper builds on the sociology of expectations (Borup et al., 2006), in particular the networks of expectations (Budde & Konrad 2019), and the tentative governance (Kuhlmann et al. 2019) approaches. Methodologically, research questions are addressed by conducting discourse analysis (Keller, 2013; Hajer, 1995) of policy documents (strategies and programs). The results are presented in form of semantic networks exhibiting the change of expectations over time.

The findings of our study provide insights about the role that future expectations and visions play in the governance of sustainable transitions. The multi-sectoral and multi-technology focus of this study offers insights to the discussion how transition policy can cope with the

various technological and sectoral expectations and coordinate multiple transitions simultaneously (Andersen & Markard 2020). Moreover, the longitudinal perspective on governance can provide insights on how policy actors could reflexively deal with dynamics of expectations and find a balance between adaptive and rigid governance strategies (Kuhlmann et al., 2019). Furthermore, the findings of this study can also help to better understand the policy incumbents and the logic of policy-internal arenas of expectations by identifying conditions under which different policymaking actors converge in their perceptions of future and take common decisions about future strategies (Bakker et al., 2011; Turnheim and Sovacool, 2020).

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Innovation pathways of local energy communities for novel energy infrastructures and -markets

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The energy sector is currently in a state of transformation. In the pursuit of reaching higher degrees of sustainability of energy generation and consumption, new forms of infrastructures and market designs are imagined by core stakeholders in the energy sector such as energy

producers and distributors, regulatory institutions, and citizens. These stakeholders set a focus on developing novel energy infrastructures that are characterised by higher degrees of sustainability, decentralisation and citizen engagement, and are anticipated to foster the implementation of renewable energy generation in local environments such as communities and individual households.

Alongside these conceptualisations, new technological devices are imagined as integral parts of these infrastructures and should be implemented to create local and digitalised market designs and energy production. Some energy sector stakeholders perceive blockchain technology and blockchain-based platforms for energy management and -trading, as a means that provides great potential for the digitalisation and transformation of energy infrastructures. It is depicted as a technological structure that enables a revolutionary re-structuring and transforming of the, traditionally centralised, ways in which energy is produced, distributed, and managed towards more decentralised forms with multidirectional relationships. However, this promised potential for sustainability and achieving decentralisation must be critically assessed, as well as questioning the need for blockchain technology for managing and distributing energy in the first place.

This paper investigates the governance of socio-technical transformations, examining changing power relations in the context of novel local renewable energy infrastructures. It will analyse how the technical construction and implementation of such infrastructures develops with relation to the network of stakeholders in the energy sector. Based on a set of empirical cases of pilot projects and local energy communities (Netherlands, Spain, Australia), this paper provides a typology of innovation pathways, analysing a range of governance arrangements and imagined futures for local energy communities. Different innovation pathways, against various (shifting) backgrounds (grassroots, business, municipal-administrative) are derived and contrasted: *Municipality-Managed*; *Cohesive Communities*; *Privatised Platforms* and *Entrepreneurial Exploration*.

Understanding local communities as sites of experimentation in which the ongoing transformation of the energy sector plays out, this paper assesses forms of governance such as arrangements of power, relationships between actors, forms of conflict and cooperation. Critically examining the implementation of blockchain-based energy infrastructures within them and their imagined disruptive potential, hereby serves as an illustrative example towards examining these changes in power relations, forms of agency and interactions within the network of energy sector stakeholders in this context.

C.4: Grassroots movements for energy transition – energy citizens in action

Session Chair: Elisabeth Unterfrauner, Centre for Social Innovation, Austria
Session Chair: Judith Feichtinger, Centre for Social Innovation (ZSI), Austria
Session Chair: Maria Schrammel, ZSI GmbH, Austria

Understanding “community” in renewable energy community initiatives

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In both academic and public discourses increasing attention has been paid to renewable energy communities in light of their potential contribution to a more socially and environmentally just energy transition.

However, a recent literature has stressed that the social advantages of the energy community model are often more assumed that proved (Creamer et al. 2019). At the same time some authors have recently noted “a weakening of scholars’ attention to “transformative” notions of community emphasizing collective and grassroots processes of participation, to the benefit of “instrumental notions” (Bauwens et al. 2022). This trend runs the risk of placing excessive emphasis on the market value of these initiatives. This is evident for example in the growing attention to the concept of business models in the account for energy community diversity (Reis et al., 2021).

Our contribution tries to address this “social gap” in the literature by presenting preliminary results of an empirical study on Italian renewable energy communities. The focus on Italy is particularly interesting and timing because most of the research on community energies so far has concerned Northern European countries. However, as highlighted by Magnani and Carrosio (2021), recently innovative experiences of “energy civism” have emerged in Italy. In particular in the last two years an explosion of initiatives has been witnessed as result of implementation of the Renewable Energy Directive RED-II (2018/2001/EU).

On the basis of qualitative analysis of 15 cases of renewable energy communities, the goal of our research is to try to better understand the communitarian dimension of this kind of social innovation, i.e. the actual social impacts for both the members and the territorial community. This involves considering for all the cases analysed such aspects as: the distribution of economic benefits among members and on the territory; the forms of participatory governance; the way the energy poverty issue is addressed; the ability to develop multi-stakeholder territorial networks.

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Barriers and facilitators of creating energy communities in selected EU countries

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The energy transformation enables achieving climate goals and reducing CO2 emissions due to the growing risk of a climate catastrophe. The international agreements as the Paris Agreement signed at COP 21 in 2015, and the European Green Deal (EGD) approved in 2020 set goals for the transfiguration of energy systems. Citizens are a vital and indispensable element of the sustainable energy transition. Citizens' engagement in the processes of change includes energy communities (EC) and energy citizens (Ec). The EGD Just Transition recognizes EC and Ec rights to clean, affordable energy. Including citizens in the decentralization of energy systems boost its security. Citizens' engagement in energy transition reduces the risk of citizens experiencing energy poverty.

The paper debates the issue of the capacity of civic energy in selected EU countries. The paper is a part of the research conducted in the EC2 project implemented under the H2020. Researchers analysed the economic conditions of the ECs in Austria, Spain, Germany, the Netherlands, Poland and Italy. Selected countries are characterized by different levels of maturity in terms of the development of energy communities and energy citizenship. The development of the civic energy movement encounters barriers that hinder its vitality and scalability.

Citizens' energy transition gained additional importance with Russia's attack on Ukraine. This aggression has led to a reduction in the supply of fossil fuel energy to the EU and high volatility of fossil fuel prices and, consequently, electricity and heat for citizens.

The aim of the article is to identify key barriers and facilitators for energy communities in selected EU countries. The aim is to gain a systematic understanding of the economic/market conditions that shape energy communities and the emergence of energy citizenship. The research question that guided the work is: What are the key barriers and facilitators of the creation and development of energy communities in selected EU countries?

Triangulation of research methods was used in work. Both desk research, a survey addressed to experts and co-creation workshops with energy communities were conducted. The study was conducted from December 2021 to December 2022.

The current economic system operates with concepts and imaginaries such, as market, producer, consumer, and competition, financial value. Energy citizenship or community remain non-mainstream categories. This construct of the current economic paradigm, in fact, undermines the flourishing possibilities of energy citizens. From an economic perspective, we identify other barriers in the management and financial scope that hinder the development of energy communities and their potential impact on the energy transition.

The key findings of the article include specified barriers and facilitators influencing the formation and functioning of both energy communities and energy citizenship, classified according to several sections. As a result, a matrix was created that considers the policy and civic levels, and the management and economic and financial levels. Within the management level, barriers and facilitators in the area of organization, behaviour and fairness were identified. The economic and financial categories, barriers and facilitators in the area of efficiency, investment and sources of financing were assigned.

Contributing factors of collective energy initiatives as action arenas for advancing energy practices and achieving positive social and environmental impacts

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The role of citizens is increasingly being recognized as central for supporting the energy transition and decreasing environmental degradation, an issue that is exacerbated by the current challenges of rising energy prices and record-high fossil fuel industry profits. Instead of being passive consumers, citizens are utilizing the advancements in the distributed energy technologies and are increasingly taking direct energy actions - from producing energy and more effectively managing their demand, to forming energy communities and taking other forms of collective actions. Such collective actions geared towards energy not only hold the potential of speeding up the energy transition, but they can also transform the energy system to achieve greater citizen participation and advance energy justice.

Considering the role of citizens and collective initiatives in supporting the energy transition, understanding the individual and collective factors that contribute to their emergence and consolidation is important for providing support from a policy perspective. As forms of collective energy initiatives (CEIs), energy communities (ECs) can be regarded as action arenas, since they include the interaction of individuals and groups to produce certain outcomes and impacts that are not only related with decentralized energy production, but also with improving community ties and achieving positive environmental and social impacts. While environmental benefits can be easily conceptualized and measured, social impacts are harder to be accounted for, as a standardized social impact assessment approach for energy communities is missing. In order to provide a way of grasping social impacts of energy communities, we combine several frameworks, theories and concepts including but not limited to the energy cultures framework, the energy justice framework, the social capital theory along with the community empowerment, development and resilience concepts.

To understand the factors that contribute to the emergence and consolidation of collective energy initiatives and to outline their environmental and social impacts, we survey more than 30 CEIs in 13 European countries as part of the H2020 ‘ENCLUDE – Energy Citizens for Inclusive Decarbonization’ project. The results show that individuals join CEIs to live more climate-friendly while the barriers they are faced with in their CEIs are related with high fluctuations of number of members, lack of technical knowledge and lack of access to funding. In terms of the impacts, majority of the survey respondents experienced social and environmental benefits since joining the CEIs, from increased access and uptake of

renewable energy technologies to strengthened belongings and greater social support and empowerment in the community.

Policy recommendations to strengthen energy communities and energy citizenship in the EU

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Participation in an energy community is one of the most pronounced expressions of energy citizenship. From a legal point of view, the definition of energy communities relies on the RED-II and the IMED Directives. Citizen Energy Communities (CECs) and Renewable Energy Communities (RECs) are defined under the IEMD and the RED II Directives, respectively. Both Directives aim to improve the uptake of energy communities and to facilitate the integration of citizens into the energy system as active participants in an efficient manner. Although the two Directives share many similarities, they have also some distinct differences. In order to gain a systematic understanding of the legal conditions that shape energy communities and the emergence of energy citizenship, an analysis of the legal framework was therefore required. A legal study aimed to identify barriers and facilitators for energy communities and energy citizenship based on the analysis of the legal framework for energy communities and energy citizenship as well as four Co-Creation Workshops with citizens which took place in spring 2022. The legal analysis, in conjunction with the co-creation workshops, could identify major barriers as well as facilitators to citizens' activity and engagement in energy communities.

It turned out that the transposition of REDII and IEMD at Member State level is complex and depends on many factors. Directives are not implemented uniformly by all Member States. Each member state takes a different approach to implement these Directives. Yet, not only on the Member States level but also on the EU level, improvements can be made.

Against the background of the scientific study, recommendations for different policy makers can be elaborated. This means that the results of the scientific work have to be translated into a simple and more accessible language; they have to be shorter and more understandable. However, it is important to communicate results well and make the results easier without oversimplifying or overcomplicating.

For this purpose, policy briefs were therefore chosen to improve the transfer of knowledge from the scientific sphere to society and with the aim of informing society, especially policy makers. The policy brief presented has attempted to provide an overview of shortcomings at the European level (e.g., generation plant ownership and accessibility, construction and maintenance of the system, lack of regulations for smart meter rollout, obtaining information on energy communities, different legal administrative steps to set up an energy community) and to explore in further detail the kinds of actionable recommendations that can be made at

this level to facilitate and accelerate a just and sustainable energy transition (e.g., Transfer of plant ownership, allow for a complete smart meter rollout, establish a one-stop-shop or an official information point/website).

Can energy citizenship flourish in developing countries :Examining evidences from India

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The energy sector is witnessing a much-needed transformation in India in the direction of renewables over the years (Burke et al, 2019; Rathore et al., 2019). By the end of 2022, the installed capacity of renewable energy reached 30% of the installed capacity overall (MNRE, 2022). Largely fuelled by solar capacity additions, the optimism around solar energy in India obscures critical challenges around sustainability and justice in transition (Sareen and Kale, 2018; Bedi, 2019). The meteoric rise in solar capacity in India has been led by utility scale infrastructures and solar parks which perpetuate regimes of power centralisation and bureaucracy associated by fossil fuel regimes (Yenneti and Day, 2016; Avila, 2018). Decentralised rooftop solar which is found to be more suited for fulfilling objectives of energy security, energy affordability, and energy democracy has failed to pick up pace in India (Joshi and Yenneti, 2020; Smith et al., 2015; Thapar and Sharma, 2017). Of the 40GW of rooftop solar envisaged as part of the Jawaharlal Nehru National Solar Mission, the installed capacity for rooftop solar stands roughly at 20 GW (MNRE, 2022).

The neocommunitarian discourses of innovations in socio-technical systems (Geels and Schot, 2007) and sustainability transitions (Turnheim et al., 2015) emphasise the role of energy citizens and community energy in a bottom-up renewable energy transition. Over the last decade, such approaches have multiplied in the United Kingdom (Seyfang et al., 2013) USA (Pitt, 2010) and some European nations including Denmark and Germany (Walker, 2008; Fait et al.,2022). Energy citizens are yet to be recognized as important stakeholders in the energy transition framework in India. This study analyses the potential for citizen engagement in energy policy by assessing citizen's perception on renewable technologies and their desire to financially contribute in community energy initiatives. Specifically, it answers the following questions- a) Is there a market for community energy investments in India? b) What are the factors that influence citizen engagement in community energy initiatives? c) What are the barriers faced by citizens who want to engage in community energy projects.

A questionnaire to elicit answers for the questions posed above was designed using focus group discussions, on-site collection, and representative interviews. The pre-survey was first conducted in an urban township of Kolkata (India). The final survey collected 209 complete responses obtaining responses about socio-demographic profile of the respondents, various environmental and attitudinal constructs (using theory of planned behaviour) and their willingness to pay for community energy projects. The study finds a low willingness to pay for community energy projects even though the environmental awareness and the attitude towards sustainability of the respondents were found to be very high and positive (average of

4 on a 5-point Likert Response Format). It thus calls in focus the need for policymakers in developing countries to design novel cost effective solutions to incentivize energy citizenship.

C.5: Actor-based inclusive energy-secure transition in Europe

Session Chair: Javanshir Fouladvand, Utrecht University, The Netherlands
Session Chair: Özge Okur, Delft University of Technology, The Netherlands

Emerging roles in the mainstreaming of renewable energy communities

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Earlier work has shown that renewable energy communities, as forms of social innovation (Dall-Orsoletta et al., 2022), have the potential to contribute to sustainability transitions in the energy system (Caramizaru et al., 2020; Dóci et al., 2015) and to serve as drivers of sustainable development (Otamendi-Irizar et al., 2022). In line with these findings, the European Union has assigned these new energy actors a prominent role in its 'Clean-Energy-For-all-Europeans-Package' by expecting them to actively contribute to ecological, social and economic goals to advance the energy transition (Directorate-General for Energy, 2019). However, the actual implementation of energy communities could disappoint these high hopes: While part of the actors may aim to act as systems entrepreneurs (Schlaile et al., 2021) or engage in local collective action (Gregg et al., 2020), studies showed that others' interests in energy communities can be limited to ownership and financial return (Reiner et al., 2014). Although financial benefits are an important driver for energy communities that have the potential to transform energy systems (Dóci et al., 2015), the varying goals and expectations of actors in the diffusion of energy communities may impact their transformative character. Most research has neglected this change of former niche phenomena in a mainstreaming process (Wittmayer et al., 2021) and imputed 'transformative goals' to actors in energy communities, thereby potentially rendering expectations for the 'transformative potential' of energy communities overly optimistic. With the present study, we aim to increase the current understanding of how individual actors in and around energy communities understand and construct their roles in the energy transition against the backdrop of these high expectations. We study the case of Austria, where only recently, legislative changes enabled the formation of renewable energy communities. Since then, over 90 energy communities have been established (status of October 2022; E-Control, 2022), marking a current diffusion process. Beyond extensive desk research, we build on participant observations in four community meetings in fall 2022, twelve in-depth interviews with actors in energy communities and intermediary actors, as well as news articles on energy communities, documenting the formation of a dominant public discourse around the novel phenomenon in Austria. More concretely, we ask for the expectations raised towards renewable energy communities from different stakeholders' perspectives, for practices adopted by energy communities, and for material, social and symbolic resources available to

energy communities. Taking a discourse-theoretical approach (Chouliaraki & Fairclough, 1999), we consider discursive and non-discursive practices (dispositives) to shed light on the meanings that actors give energy communities, and adopt a critical-realist perspective in examining the constructed roles in the context of these meanings. Our study of constructing roles in the current formation process of energy communities provides a basis for understanding subsequent adoptions or adaptations of actor roles in energy communities. Moreover, our findings challenge the taken-for-granted assumptions and contribute to recent calls to provide a more nuanced understanding of energy community actors' roles in the energy transition (Biely et al., 2022).

Social acceptance of hydrogen technologies: Germany's hydrogen strategy on shaky ground?

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Given the rising demand for renewable energy in the wake of a global energy transition, green hydrogen is increasingly seen as a bearer of hope for a climate-neutral energy supply. Germany, for example, has recently begun to revise its National Hydrogen Strategy and ordered new measures for a market ramp-up of green hydrogen technologies (BMWK 2022). For the success of a comprehensive societal transformation process such as that of the energy system, social acceptance plays a crucial role. Only with the support and active participation of society is the expansion of hydrogen and thus a successful energy transition and climate protection policy possible (Huijts et al. 2012). The overall early stage of an envisaged market ramp-up of hydrogen offers the opportunity to consider social acceptance at an early stage. While research on social acceptance of emerging technologies has gained momentum in recent years and concrete applications of hydrogen such as hydrogen fuel stations (Emmerich et al. 2020) have been investigated for social acceptance, there is a research gap concerning social acceptance of hydrogen technologies in general. Against this background, we carried out a study to investigate the social acceptance of hydrogen technologies in general and in comparison to different application cases using Germany as an example. In a first step, the current state of knowledge on social acceptance of clean energy technologies was evaluated and central acceptance factors for hydrogen identified. Based on the results, a quantitative population study was carried out to validate the identified factors. Beyond that, following calls for more explorative research (Scovell 2022), qualitative surveys with actors from science, business, politics, and society were conducted to uncover further contextually relevant factors. In the course of this mixed methods approach, concrete recommendations for general acceptance could be derived, at the center of which are a positive cost-benefit ratio and positive affect. Against the backdrop of specific political, cultural, or socioeconomic characteristics that differ from one region to another, further factors can be derived for local acceptance, first and foremost public engagement.

Analysing the role of green hydrogen in Germany's energy transition

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Objectives

The decarbonization of economies and societies is operationalised i.e., through the energy transition. The Paris Agreement, EU and national targets establish a clear emission reduction pathway for most European countries towards climate neutrality. Technically, policy makers have several choices for how to operationalise such decarbonisation pathways, i.e., through massive electrification of demand sectors or heavy reliance on (green) hydrogen as an energy carrier, amongst others. Several factors might advocate in favour or against certain pathways, hence the policy makers choice is difficult.

A central issue for the energy transition and the future energy system is security of supply. The issue of intermittency of renewable energy technologies (RETs) such as wind or photovoltaic, that undoubtedly dominate in the future energy systems, poses a critical challenge. Hydrogen is often proposed to solve such problems, because in comparison i.e., with electricity, it is much easier and cost-efficient to store. Nevertheless, the exact role of hydrogen in future energy systems is heavily disputed (often associated with the champagne versus tablewater discussion).

This study systematically and comparatively analyses the role of green hydrogen in future integrated (sector-coupled) energy systems throughout selected decarbonisation pathways.

Methods

A scenario-based energy system modelling approach was chosen. A set of 5 scenarios was defined, including an electrification and a hydrogen scenario, with the purpose to provide the analytical foundation for the comparative assessment. Within each scenario, the usage of hydrogen as an energy carrier was optimized (i.e., the use of hydrogen is a model result) from an overall system cost perspective (that was minimized). For the energy supply side, the model Enertile was chosen. The model optimises RET and electrolysis capacity expansion, corresponding electricity and hydrogen generation as well as the associated cost, quantifies European energy trade flows by balancing demand and supply under consideration of transport infrastructure, amongst many other things.

Results

The results show that green hydrogen has a very specific role in the future energy system. Hydrogen is used where its inherent features (i.e., storability) provide most system value. This is related mostly, but not exclusively, to backup, stabilising or flexibility-providing functions. For example, all scenarios require a certain amount of hydrogen for the provision of electricity (especially in winter or to cover peak demand situations) or heat in heatgrids (to provide flexibility).

Conclusions

Several policy implications can be derived from the results. First, Germany can produce large amounts of hydrogen domestically, where RETs provide cheap and abundant electricity (in

the north). Second, Germany needs large volumes of inter-seasonal hydrogen storage. Third, Germany will be a massive importer of hydrogen. Several European regions can supply this hydrogen, such as the Iberian Peninsula, northern European countries and the Balkans. The UK could also be a large hydrogen exporter, if RET expansion is large and domestic demand is not very high. European hydrogen from above-mentioned sources is cost-competitive the world market. Fourth, as Germany only has very limited impact onto policies in other European countries, the best option is to activate several possible import routes.

Public perception towards renewable heating systems and natural gas

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The use of natural gas for heating purposes is one of the most polluting sources, and it is becoming more expensive and inaccessible. The problem is being addressed on the communitarian level, where guidelines such as the Green deal are unifying and creating cohesion between the single national experiences; in the relevant Dutch case, the energetic transition is focused on the Climate Plan, which strives to cut the emission level by 49% by 2030 compared to 1990. The impact of the transition on the physical environment will be considerable: cities and landscapes will change, resulting on a renovated energetic (and economic) management of dwellings located in communities capable of producing, storing and consuming clean energy locally.

This research aims to understand the individuals' opinions, concerns, and motivations towards heating systems in the built environment, particularly (1) the reduction in consumption of natural gas and (2) the adoption of clean and affordable resources, through the implementation of renewable heating systems (e.g., solar thermal, heat pump, etc .). For this purpose, an online survey is designed and conducted among individuals, whose expected behaviour is based on attitudes, subjective norms, perceived behavioural control and intentions, following the dictates of the Theory of Planned Behaviour (TPB), with the integration of personal moral norms and descriptive norms of the respondents. These values have been confronted with two sets of control variables: demographic and socio-economic variables, and the current state of the respondents' heating system .

The respondents' answers (of which 50% are Dutch) for reducing natural gas consumption and adopting renewable heating systems are analysed using the TPB. The results indicate that although individuals mostly have a positive attitude towards natural gas and renewable heating (thanks for example to more opportunities of developing a business, or higher degree of independence), the perceived control has a considerable negative effect on the individuals' behaviour. Therefore, the main barrier to adopting renewable heating is a lack of money, knowledge, and time. Furthermore, the results also show that subjective and moral norms appear quite neutral in the adoption of renewables, but it has a positive effect on the reduction of gas consumption.

The two sustainability approaches within heating systems (i.e. natural gas consumption and adoption of renewable sources) have been positively accepted , representing the willingness of a large part of the population to support the energy transition policies through the renovation of heating systems. As regards the neighbourhood level, almost 70% of the respondents are willing to adopt renewable heating systems in the form of an energy community, and further 20% are interested in taking part as leader and supporter of the community.

With the extended results, it is also possible to make policy recommendations, tailored for a specific societal group, which could more positively react to governments' implementations for the transition in heating systems, such as subsidies or benefits for the smart renewal of residential spaces (i.e., boiler rooms, thermal insulating materials) and for the installation of new renewable systems, such as solar panels and heat pumps.

From parity to degrowth: Unpacking narratives of a 'gender-just transition'

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Sustainability transitions have magnifold gender dimensions. Mainstream energy pathways represent, for example, mostly dominant male perspectives while perspectives of others, especially of women, are largely left out. The implementation of low-carbon technologies impacts gender and social equity in intersectional ways. Without explicit attention to gender, sustainability transitions risk reproducing the inequalities that exist in the fossil fuel based economic system. As a result, calls for a 'gender-just transition' have become more and more frequent in the political arena in recent years. The paper explores different narratives of a 'gender-just transition' by applying a policy narrative analysis. What notions of a 'gender-just transition' are being used by which actors? The lense of analysis through which the narratives are analysed are different currents of feminist theory. I analyse in how far aspects of (1) liberal feminism, (2) socialist feminism, (3) intersectional feminism, (4) queer feminism and (5) ecofeminism can be found in the 'gender-just transition'-narratives. The analysis is based on a set of 50 policy documents and websites on 'gender-just transition' acquired through (1) a grey literature search, (2) 4 explorative expert interviews and (3) an analysis of publications by participants of online webinars and podcasts on the topic. The sample compiled for the analysis is balanced by actor group, country and political orientation, so that the spectrum of narratives is as broad as possible. Several different 'gender-just transition'-narratives can be derived. Business actors refer, for example, more to the "economic opportunity"-narrative emphasasing the economic chances for women that transition could bring (e.g. more women in higher positions in the renewable energy industry than in the fossil fuel industry). In contrast, grassroots actors have a much broader vision of a 'gender-just transition'. They make strong use of the 'ecofeminist'- narrative and emphasise that for the transition to take place, there needs to be a general revalorisation of reproductive activities associated with femininity and a shift away from growth-oriented economies. The paper makes a contribution to the transition literature by showing how demands for gender justice

weave themselves into the just transition debate. By comparing political demands by various actors, the paper also shows to what extent alliances could be formed for the implementation of a more gender-equitable energy transition.

An actor-based discourse analysis: Mapping the actors in the German Energy Transition

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The energy transition is an important step towards a more sustainable and equitable energy future, and it requires cooperation and collaboration among governments, industries, and communities. However, the energy transition is also a highly debated topic in the public sector, with numerous different perspectives as well as countless myths, misinformation and prejudices. Not least because of this, it is an intense field of discourse.

This contribution gives an insight into a discourse analysis of the mediadiscourse on the energy transition in Germany. Three online news portals were selected due to their reach, name recognition and public trust. Within four weeks 91 articles were collected across these three online news websites according to the search terms “energy” and “electrical power”. Based on grounded theory, a coding system was developed and iteratively revised. Coder validity was ensured through two coders and additional spot-checking (of ten articles) by another coder.

Initial analyses of the data indicate that the mass media discourse on the energy transition in Germany is determined by and illustrated based on different influential groups of actors. Among them are German politics, in particular, the governing coalition, industry and business actors (primarily the energy sector) and private households. An actor-based map indicates the relations between the different actors.

In the data examined, these groups of actors are often given responsibility for finding solutions in the context of the energy transition. Economic and political actors tend to appear in the context of short-term financial and long-term regulatory solutions. The electricity and gas price brake adopted in Germany during the observation period plays a special role here. Meanwhile, private households are often mentioned in connection with short-term measures in the consumption or handling of energy. Sustainability strategies such as sufficiency, efficiency and consistency are relevant for all actors.

The presentation of the German energy transition in a comparison of the three news portals shows overlaps in topics and reoccurring themes across a wide range of areas. Thus, a major focus of reporting across the media was on financial aspects, particularly in connection with the current challenges in energy supply against the backdrop of the war in Ukraine. Nevertheless, the analysis of the data also reveals differences in the way the energy transition is presented in terms of content, tone and level of detail.

The paper illustrates how the media discourse is shaped by and with different actors. The paper serves as an example for practitioners in politics, media, and communication experts. Moreover, the findings reveal that additional research is needed on how public discourse in the media shapes narratives and creates opinions.

C.6: Transition to Sustainable Energy Systems: The Case of Communities, Citizens, Households and Niches

Session Chair: Jürgen Suschek-Berger, interdisciplinary Research Centre (IFZ), Austria

Spatial diffusion and niche shielding dynamics: wind power development in China

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This paper contributes to the understanding of path creation by developing niche shielding concept.

The concept of niche has been widely adopted in sustainability transitions studies, such as strategic niche management (SNM) (Schot et al. 1994, Kemp et al. 1998, Weber et al. 1999, Hoogma et al. 2002) and multi-level perspective (MLP) (Geels 2002, Geels 2004, Geels and Schot 2007). Niche has been conceptualised as a set of rules, distinguishable from dominant rule sets, which offers a protective space that nurtures radical or path-breaking innovations (Schot and Geels 2008, Smith and Raven 2012). Niches could be constructed through passive shielding based on a pre-existing selection environment or market niches (Schot and Geels 2007, Smith and Raven 2012). SNM studies argue that actors can proactively construct niches through strategic interventions (Kemp et al. 1998). When radical innovations emerge, they generally cannot compete with mature technologies in the market (Schot et al. 1994). The government could proactively set up regulations, subsidies or taxes (Geels et al. 2017) to generate protective spaces that benefit these radical innovations (Schot and Geels 2008). The feed-in tariff, for example, has been recognised as one successful policy instrument that has contributed to the global rapid diffusion of renewable energy (Fell 2009, Sovacool 2010, Alizamir et al. 2016). As renewable energy technology has matured, the feed-in tariff has been slowly reduced in many countries, finally leading to the great success of renewable energy (RE) diffusion (Alizamir et al. 2016). However, there have been cases where the rapid reduction of tariffs has caused a dramatic drop in the installed capacity of renewable energy or resulted in government expenditure being much higher than budget, as observed in the case of Spain's feed-in tariff in 2006–08 (DB Climate Change Advisors 2009). It raises the questions: how to proactively construct protective spaces through strategic interventions? When and how to phase out these temporary strategic interventions?

To address the two questions, this paper will first develop a conceptual framework. It adds to the existing literature by contesting niche shielding dynamics from two aspects: (i) how niches shield against selection pressure from multiple dimensions of the socio-technical system (science and technology, industry, market, policy, culture); and (ii) how niche

shielding unfolds across multiple scales (provincial, national and global). This paper examines two longitudinal cases of wind power development in two China's provinces, Inner Mongolia and Jiangsu, where present two divergent niche shielding dynamics, as well as on a national scale development. The research findings suggest niche shielding may align in certain dimensions while conflicting in other dimensions across multiple scales. These insights generate crucial implications for when and how to phase out temporary protective spaces for radical innovations. By combing the proposed dimensional and scalar aspects, the paper suggests four scenarios of niche shielding dynamics. It therefore argues for a more complex understanding of niche construction as a dynamic process shifting among these four scenarios, rather than the conventional wisdom of treating it as a linear step-by-step phasing out strategic interventions process.

The empirical analysis of the effectiveness of monetary and non-monetary rewards on electricity savings through the machine learning approach

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In the energy transition path, the citizens as smart consumers, who can contribute to the integration of variable renewable energy into the grid system, are attracting great attention. Enabling the citizens' participation in this demand-side movement, including electricity conservation, diverse institutional measures to stimulate motivations are devised and implemented. To draw meaningful implementations to promote citizens' participation in energy transition as an informed and motivated actors, this study plans to investigate and compare the effectiveness of monetary and non-monetary rewards on electricity savings and the relationship between the effect of these contrasting approaches and individuals' attitudes towards climate change and electricity conservation and socio-economic features. This study mobilized 200 households in South Korea and conducted open experiments to test the impacts of monetary and non-monetary rewards on individuals' electricity savings and attitudes. To respond to the aforementioned research objectives, this study collected participating households' characteristics like environmental attitudes and socio-economic features through online surveys before and after the experiments and the hourly electricity consumption data for two years, from January 2021 to 2022. This study analyzed the collected survey data and the electricity consumption big data using statistical analysis and machine learning. Specifically, this study used Support vector regression (SVR), one of the supervised machine learning methods, to analyze the intervention impacts based on the input of previous days' electricity consumption data, interventions, household demographic information, and temperature. In addition, the correlation between the intervention effect and the household's demographic is analyzed to determine the household characteristics associated with the intervention effects. This study will shed light on how households react differently to contrasting approaches, which may provide implications for the development of strategies to promote public engagement in electricity conservation.

“Fusion fever”: path breaking and clash of sociotechnical imaginaries in the rush for controlling fusion energy

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Pushed on over the last century by the attempt of mastering the power of the Sun and other stars here on Erath (Eddington, 1920; Fowler, 1997; Turrell, 2021), the quest for controlled fusion energy has catalysed increasing interest in recent times, since fusion is considered by and large to be the last source of energy in double, complementary senses: it is the last we still miss to deploy, and it is the last we would need to control for a future of enduring sustainability and energy abundance. The prospects for fusion research appear to be exciting and promising, spurred on by the global need for clean energy, records being broken in current experiments, encouraging results in integrated computer modelling and simulations, but more remarkably by the construction of astonishing megaprojects such as ITER (International Thermonuclear Experimental Reactor) and by the growing proliferation of privately funded start-ups in fusion. At the level of public representation of fusion research as being in the middle of a “now or never’’ and a “Kitty Hawk” moment, it really seems that the more actors and fundings pour into the field, the more progress is made, and optimism grows. This last factor, namely the fervent entrance of outsider private start-ups in fusion research, can be read as a paradigmatic case study of “path breaking” (Apajalahti & Kung, 2022), since the expectations (Brown et al., 2000; Borup et al., 2006; Jasanoff & Kim, 2009) and the promissory discourses elicited by fusion start-ups in the public sphere aim at destabilizing the rigidity, the self-reinforcing mechanisms, and the path dependence on which governmental research and international projects like ITER have necessarily to rely. While in previous sustainability transition research the process of path breaking in the electricity sector has been explored mainly at the intersection of different and antagonistic sources (e. g. fossil fuels versus renewables), in the case of fusion energy it can be observed in action within the same field, with governmental research and private start-ups clashing around the controversy about the size, shape, cost, timescale, management approach for successfully running a fusion experimental reactor. In the search of the most reliable “fast track” to fusion energy, government-run projects and fusion start-ups are advocating two opposite narratives: on the one side that of intensive investment in a huge experiment as ITER, bigger and bigger fusion machines, international cooperation, longer timescales, and shared property of results; on the other side extensive investment in multiple technological configurations, compact fusion machines, shorter timescales, entrepreneurial competition, and patented property of knowledge. Combining preliminary results from qualitative discourse analysis, interviews to fusion scientists at the research front, and insights from an ethnography being conducted in a fusion research centre, it will be shown how these opposite narratives emerging form a path-breaking dynamic internal to fusion research clearly reflect a clash of two underlying sociotechnical imaginaries (Jasanoff & Kim, 2015), namely visions of desirable futures and understandings of social order attainable through advances in the rush for fusion energy.

Stream D: Gender, Science and Technology

D.1: Queer-feminist fictions and technologies

Session Chair: Anita Thaler, IFZ, Austria
Session Chair: Susanne Sackl-Sharif, University of Music and Performing Arts Graz, Austria

Feminist hashtivism: A mixed-methods study on claiming space in public-digital spheres

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Background

Talking about and sharing one's own experiences has a long tradition in psychological and feminist-informed disciplines, as well as in the usage of social media. As the aftermath of the global #MeToo campaign reveals, not only questions of social reconfiguration can be negotiated online but also political change can become possible in digital spheres. Particularly research on gender based violence has shown that online communities increasingly function as a safe space for young FLINTA* persons (women, lesbians, intersexual, non-binary, trans and agender people) to share their experiences.

Research interest

Taking into account, that FLINTA* persons are a highly affected and diverse group at the same time, the question must be raised for whom such “hashtivism“-actions (Larrondo Ureta & Orbegozo Terradillos, 2021; Fitzpatrick, 2022) represent a possibility of empowerment and hold chances of being heard, and how intersectionally inclusive feminist digital movements actually are in practice (Boyd & McEwan, 2022; Galpin, 2021).

Methods and Aims

With the help of a mixed-methods research design, it will be investigated who does (not) participate and why (not) in such collective online practices and how the engagement in a transnational operating feminist Instagram collective - against sexualized violence and on behalf of affected persons - can take place. On the one hand, the relevance and accessibility of feminist digital movements in people's everyday lives will be explored through a quantitative online survey. On the other hand, digital activist practice will be approached using the example of a feminist Instagram collective by means of qualitative participant observation and group discussions. The study therefore aims to investigate the multilayered phenomenon of processing violence through digital participation and its effects on epistemic, social and political change. In doing so, both the opportunities and the limits of feminist online activism will be illuminated.

Contribution

Against the background of the immense number of feminist digital hashtag campaigns (e.g. #MeToo; #WhyIDidn'tReport; #aufschrei; #OIDAitssexism; #catcallsofvie) and the broad response to them, it becomes striking that questions of digital participation and its psychological dimensions are an important and emerging field of research for any discipline concerned with society and technology.

‘Players Gonna Play’: An examination of gender, sex and sexuality in the design of gamified porn

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Wearables and apps have helped to usher in a contemporary era of gamification. Everything from steps, to weight, diet, spending, saving, the news, education and love are calculated, quantified and contextualized through the deployment of game-like design elements. In the realm of the erotic, online pornography is no exception. The webpages of major porn video hosting platforms often have sidebars and banners displaying ads for pornography in the form of a game. These ads for porn games often present as animated loops of hyperbolized sexualized movements and bouncing body caricatures of women that promise expedient climax.

Gamification refers to the implementation of game-like structures into something that is not explicitly a game in order to increase engagement and decrease “consumption barriers” (Abolfathi & Santamaria, 2020; Pelling, 2012). While both gamification and video game studies are well-established across interdisciplinary scholarship, there is a gap in research investigating pornography designed as a game. This paper qualitatively explores the design of pornographic games hosted on online pornography platforms. These pornography games are analyzed through the lens of established game scholarship, philosophy and design. This paper has a two-fold aim: 1) to examine how game structures are implemented in porn games and 2) to explore the implication of gamification on the treatment of gender, sex and sexuality in porn games.

Within game design, game philosopher, C. Thi Nguyen, articulates that games are world building with parameters and scoring systems to communicate to players “what to care about”. Points give players a metric to gauge their success and motivate continued play. While games come in a variety of forms, game design relies on these fundamental components of a goal, constraints and evaluation metrics to present players with obstacles and allow for advancement and increased challenges. Furthermore, the customization of games to specific types of players further heightens immersion, with many games and gamified systems proving to be highly effective at priming and enhancing learned behaviors and beliefs (Anderson & Bushman, 2001; Drenten et al., 2020; Hollett et al., 2020; Kim, 2015; Tondello et al., 2019).

The application of game design structures to pornography prompts significant questions regarding the depiction and treatment of sex, sexuality, gender, the body and consent. This

research analyzes how game rules and parameters are grafted onto sexual interactions in pornography as well as how scoring and game advancement are conceptualized. This research reflects on the broader implications of the gamification of pornography and its depiction of sex, probing the complex ramifications of what it means to “win” in a pornographic game of sex.

QUEERING CONTEMPORARY ROBOT(IC)S – Practicing Sci-Fi-Science

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Even though it can be expected in the future, at this juncture, most people are not personally in contact with robots in their daily lives. Therefore, a greater part of the discourse around robot(ic)s outside of academia is influenced by the genre of science fiction. There, we meet robotic companions, human-robot-sexual/romantic-relationships, robots that free themselves from their developers and want to erase humanity, robots that try to clean up a planet after the destruction through humankind and many more. Still, most of the robots remain in specific binaries or are reduced to particular functionalities.
In parallel, actual contemporary robot(ic)s can be split up into three groups: social robot(ic)s, industrial robot(ic)s and military robot(ic)s. While industry and military robot(ic)s are rather associated with stereotypical masculinity, the social sphere is associated with stereotypical femininity. This manifests both in form and function of the robots.
Both the actually developed robots and the robots imagined in science-fiction are reproducing binaries and perpetuating power structures based on categories such as sex, gender, race, class and/or ability (and many more). Speaking in terms of science-fiction, we are currently doing the groundwork for a dystopia. In order to make it a utopia, an intervention into the discourse and specifically the process of envisioning is needed now.
By experimenting with creative methodologies, a paradigm shift should be reached: What happens when the border robot prefers to be a sex robot? What relations might different robots have among each other? Will they be queerplatonic partners, sex partners, companions? Will they make kin or babies? Can a vacuum cleaner robot be friends with a sex robot? What might happen when form and function do not fit? Will robots trans-form?
Queering contemporary robot(ic)s shall open a space for collective envisioning.

Image engagement and deployment during hormone treatment of trans* persons: standardizing feminization und masculinization through imaging practices

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Medical treatment of trans* persons aims at supporting a change in “gender incongruence” and hormone treatment, in particular, is said to get this change started, be it a feminization or a masculinization. When investigating hormone treatment, images are not only used in order

to deliver a visible proof for research findings in medical publications, they are rather a central site where different states of trans* as well as practices of feminization and masculinization are materially enacted. Using and spreading images that come from MRI brain scans, from scientific and popular image databases is a crucial practice when publishing scientific research results on trans* persons, be it in scientific or in popular media. Images do not only make something visible but rather contribute to how we talk about trans* persons and practices of change during hormone treatment. During post-processing of MRI images, for instance, normalizing and smoothing practices in a binary sense have become a daily routine. Tracing these images through different media I will take a close look at practices of silencing, normalizing and standardizing while talking about research on trans* persons and times of transition. Though, I will also be careful about the possibility of enacting hybrid formations of trans*. Research material will be images (and other modes) in research articles, published in scientific journals and in (Austrian, Canadian and American) popular media, interview data (problem-centered), documents, policy papers and websites. I work with grounded theory, and amend the analytical necessity with multimodal analysis for instance.

D.2: The past, the present and the future of gender equality plans – ready for a system change?

Session Chair: Helene Schiffbänker, Joanneum, Austria
Session Chair: Anita Thaler, IFZ, Austria
Session Chair: Jennifer Dahmen-Adkins, RWTH Aachen University, Germany

From gender equality to inclusivity: Further development of gender equality plans through intersectional gender analysis and reflexivity

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There is consensus in the theoretical and political debate regarding gender equality plans that they have to consider gender in an intersectional way (e.g. EC 2022; Verloo 2006). However, most gender quality plans still focus on inequalities between men and women. Reasons for ignoring diversity categories beyond gender are among others a lack of competence of stakeholders involved in gender equality plan development, anticipated problems regarding data protection (GDPR) as well as data gaps.

As long as these fundamental problems are not solved, an initial further development of GEPs – based on an evidence based, cyclical and reflexive approach (Wroblewski 2022) – towards inclusive GEPs may be based on three components: (1) a gender analysis which is enriched by further diversity categories as a basis for formulating objectives as well as developing concrete measures, (2) comprehensive reflection of excluding mechanisms and (3) an intensified internal gender quality discourse.

A first step to go beyond the traditional gender analysis and to become more intersectional would be to consider information which is usually available like age, migrant background or seniority (duration of being member of the institution). This does not compensate for a lack of information regarding sexual orientation, disability or caring responsibilities. Nevertheless, such an extended gender analysis would allow discussing excluding mechanisms and reasons for inequalities in a broader perspective. Such an approach also avoids attributing inequalities to gender which are caused by other factors (Degele 2008). Consequently, the quality and potential impact of measures developed based on the gender analysis would be improved. If the gender analysis is adopted as described above, also the monitoring has to be further developed and focus on gender in an intersectional perspective. As the monitoring is a basis for an internal gender equality discourse, also this discourse will be broadened in the long run.

The described approach will not lead to an intersectional approach as expected by the academic discourse. However, I assume that it will contribute to a more reflexive development of measures and an increasing awareness for excluding mechanisms beyond gender. This is the precondition to avoid a possible unintended effect of inclusive gender equality plans which I would describe as follows: Without a reflection of structural barriers based on an intersectional gender analysis an inclusive gender equality plan may lead to the unrelated and isolated establishment of measures addressing specific target groups (e.g. staff members with disabilities, migrant background or caring responsibilities). Consequently, each diversity group is provided with a niche, but structures are not challenged and not addressed by specific measures.

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Transforming gender equality plans into intersectional approaches – opportunities and risks?

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The development and implementation of gender equality plans in R&I has been a priority of the European Commission since the 7th Framework Programme and has finally resulted in the introduction of a GEP criterion in Horizon Europe. With the new EU Gender Equality Strategy 2020 – 2025 and the new Policy Agenda for the European Research Area (ERA)

2022 – 2024 the European Commission has introduced a new approach/concept into their gender equality policies taking up scholarly discussions around intersectionality and inclusion. The aim of the European Commission is to make gender equality policies and gender equality plans more effective by taking different axes of inequality into account.

The SPEAR project has developed and implemented gender equality plans in 9 different universities across 7 EU member states, starting in 2019. Some of these universities were already experienced in implementing GEPs whereas the majority of universities need to be considered as newcomers as they were not engaged into promoting gender equality before. The development and implementation of GEPs in SPEAR was accompanied by a critical friend evaluation, which assessed the status quo before the GEP development started, provided reflection on strengths and weaknesses at the time the official launch of the GEPs and finally examined the achievements and learnings from the implementation until the end of the project.

Although the SPEAR project and the GEPs developed in this context do not explicitly focus on intersectional or gender+ approaches, we will (re)examine the data collected for the SPEAR evaluation in respect to intersectionality, diversity and inclusion. Indeed, in the interviews with GEP implementation managers and other stakeholders, it became apparent that universities are also addressing other diversity dimensions (e.g. in the context of Equal Opportunities or Diversity strategies) in their strategies. Our presentation will focus on how the implementation of gender equality plans in the SPEAR project is already embedded (or not) into other initiatives or organisational structures focusing on the promotion of equal opportunities, diversity or inclusion. The data will enable us to reflect on the opportunities and risks emerging from a stronger integration of gender equality into an intersectional approach of inclusive gender equality. Thereby we hope to contribute to a discussion about how to transform gender equality plans into inclusive or intersectional strategies.

How to turn words into action? Status of the implementation of intersectionality in gender equality work in German research organizations

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Hardly any Gender Equality Plan or Concept in German research performing organizations today can do without the buzzword "intersectional". The idea is to illuminate blind-spots in gender equality strategies and to make it possible to address multiple discrimination and different needs in gender-homogeneous groups. But while the added value of this approach is largely undisputed, many questions still seem to be unanswered or answered in very different ways: What does an intersectional gender equality strategy mean in practice? Which target groups should be considered and on what basis is this decided? Is it necessary to collect data on the prevalence of certain combinations of personal attributes for this purpose, and what if this is not possible? Does data protection make us unable to take action? Does specific group targeting stigmatize more than it helps? And if promoting women already did not fit into science's understanding of excellence, how should promoting even

more specific, smaller groups? How can a practically realizable intersectional gender equality measure actually look like? And are these measures successful?

In May 2022, the team of the Central Gender Equality Officer of the Max Planck Society conducted a survey among German research organizations to collect an overview of the state of implementation of intersectional approaches in Gender Equality Plans and Concepts. 48 gender equality agents responded to the survey. This article gives an overview of the results of the survey in order to elaborate what is needed to bring the implementation of intersectional gender equality strategies in the German scientific landscape a decisive step further. The results show that there are single pioneer organizations that provide convincing examples of good practice. Apart from that, the concept hardly seems to be implemented in practice. Above all, it becomes clear that the concept of intersectionality is still characterized by misunderstandings and numerous obstacles and resistances in its practical implementation. At the same time, it shows how crucial the integration of an intersectional perspective is for an effective and progressive gender equality work.

Against this background, the article provides alternative perspectives and strategies to help untie some of the knots, that so far hinder a successful implementation of this essential concept.

The GEP as instrument to foster gender equality and intersectionality – also for RFOs?

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Gender equality plans (GEPs) are of increasing relevance for universities for some time now. While GEPs are instruments for structural change in research performing organisations we witnessed in various structural change projects that also Research funding organisations (RFOs) participated. But what does a GEP mean in RFOs and how can RFOs use a systematic approach to foster gender equality aims?

RFOs are in the focus of our contribution as RFOs are relevant actors when it comes to define equality and inclusion in science. And while we know that some RFOs have been (very) active in implementing gender equality policies for the last decades while others are just emerging in the field of GE (see for instance Husu 2004) we know little about how RFOs proceed when new gender equality measures are designed and implemented. Beyond, we do not know how the GEP and the suggested steps correspond with the different phases of a funding cycle.

We use data from the H2020 project GRANteD to discuss how RFOs can make use of the GEP methodology when fostering a specific gender equality target. To do so, we select one quite recently suggested gender equality measure that RFOs already address, the integration of the gender dimension in research design, research questions and analysis or in innovations (GiRI). This approach, suggested by the EC aims to take gender into account in the knowledge production in all fields.

In our contribution we analyse data from three RFOs in the H2020 project GRANteD and address the following levels:

(1) How do RFOs formally implement the GiRI policy (which regulations are in place, which support is offered, which criteria are set up to monitor the implementation)?

(2) How is this policy applied in practice of research funding organisations and in peer review panels? How do reviewer bring formal policies into practice? What do they look at? Which barrieres for implementation can be identified? What would be needed to support the implementation in practice?

We discuss findings from interviews with RFO staff members on the one hand and panel members and reviewers on the other hand. Against this background, we elaborate what the learnings mean when further dimension are addressed which might intersect with gender. Which challenges do RFOs face when they aim to fund research in an intersectional perspective “as any single category gives an incomplete understanding of inequalities faced by people studied within and/or impacted by the research “(Fritch et al 2022).

Making Young Researchers’ Voices Heard for Equality in GEPs

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This paper is based on the experience of the COST Action VOICES (CA 20193, 2021-2026), a research network of more than 350 members, funded by the European Commission to increase the visibility of inequalities faced by Young Researchers from a gender perspective, and to promote a sustainable dialogue between YRs and stakeholders in the research ecosystem. The action facilitates a community of gender equality practitioners, researchers, and stakeholders, across Europe and beyond, with an important participation of members from COST so-called *inclusiveness targeted countries* or ITC. The paper will explore how VOICES can bring new concepts, new data, and new practice to the discussion on the future of GEPs and intersectionality.

Even if many intersecting inequalities originates in early career stages (Murgia & Poggio 2019), gender equality policies specifically aimed at YR are the blind spot of GEPs (Godfroy, 4S annual meeting 2021). High level of mobility, and diversity of status partly explain this lack of. The definition of YR is itself controversial, and COST has changed its own definition in 2021. Instead of considering the number of years after PhD, it is now based on the age of the researcher, who must be less than 40 to be considered as «young». On one side, it includes research staff without a PhD, but it excludes many «young» researchers who started a second career, or had a non-linear professional life, or work in disciplines where age dynamics are different. VOICES proposes to challenge this definition in a more inclusive way. The balance between countries and profiles, and the priority given to young people from the ITC to fill leadership roles, are part of COST official policies. However, sexual orientation, ethnic origin or social background are not taken into account in this assessment.

Among the six VOICES working groups, all have connections to GEPs. WG1, led by Marta Warat and Maria Lopez Belloso, studies the impact of GEPs on equality among YR. WG2 about leadership, led by Christine Cross and Liudvika Leisyte, studies the participation of YR researchers in the governance, their contribution to GEPs, and the way GEPs addresses

their own needs. WG3, led by Clemens Striebing and Anita Thaler, explores gender and intersectionality as research dimensions. WG4, led by Philippe Liotard and Elif Kaya, explore gender-based violence, all discriminations, and the way they intersect. WG5, led by Victoria Showunmi and Jennifer Dahmen, brings an intersectional perspective to all WGs, and contributes to the design of a renewed conceptual framework, with a stronger emphasis on intersectionality. WG6, led by Maria Brown and Anneleen Mortier, reflects on specific data collection to make inequalities among YR visible, especially in GEPs indicators. Beyond the usual national or institutional perspectives, WG6 will collect data on personal trajectories with an intersectional perspective.

In conclusion, the paper will highlight the main contributions of VOICES at the time of the conference, both on the conceptual framework, the research agenda, implementation issues and policy recommendations.

The role of advisors in gender equity projects

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In almost two decades of gender projects funded by the European Commission, the authors gathered evidence on different practices of organising advisory boards and their contributions.

While gender research projects focus on the analysis and collection of scientific evidence, so called 'coordination and support actions' (CSAs) are designed to implement measures like gender equality plans (GEPs). This the role of advise would understandably differ alongside the nature of gender projects. However, looking back on more than ten gender projects - of both kinds (research projects and CSAs) - the differences are not (only) connected to the type of the projects, but moreover to the working culture within the consortia.

Future challenges in GEP implementation projects (whether they are carried out as EU projects or within individual research performing or funding organisations) can only be met reasonably by involving scientific gender knowledge and respective process facilitating skills. To seek for advice on specific relevant topics will be highly relevant, for instance when asking how GEPs can include intersections of inequities or how co-creation of gender knowledge can be used to overcome knowledge conflicts and gaps.

In this presentation we analyse different models of utilising advisory boards for gender projects and deduce recommendations for future GEP implementation projects.

Furthering gender equality as part of bottom-up university community engagement endeavours. Finding spaces for institutional and systemic change?

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At present, universities are under the influence of multiple institutional logics, which results in the coexistence of multiple, and often conflicting priorities, identities and approaches. Even when reaching out to societal actors, universities mostly operate alongside an “economic development” or a utilitarian agenda. Within this context, initiatives furthering gender equality or addressing further dimensions of social injustices may not result in substantial systemic change (changes that would prevent the continuous reproduction of unjust or unsustainable outcomes).

The present paper is looking for connections between endeavours addressing social justice issues (including gender equality), organizational change and systemic change. We ask how we can create / claim spaces for transformative change at universities and how this interacts with systemic change. We build on theorizes of organizational institutionalization, such as the construction and de-construction of legitimacy (e.g. Suchman 1995, Randles 2017, Owen et al 2021), institutional entrepreneurship (e.g. Battilana et al 2009); and the multi-level perspective of systemic transformation (e.g. Smith et al 2010, Geels 2011).

We demonstrate and critically (self-)reflect on the processes that we created (or contributed to) at the University of Szeged Hungary, Faculty of Economics Research Centre (Hungary). We frame these bottom-up processes as transformative university community engagement (UCE) processes – mutually beneficial cooperation between the university and various further actors alongside a social justice / sustainability agenda. These bottom-up processes embrace participatory action research, service learning, the furthering of equal opportunities at the faculty (including gender equality planning). These endeavours have become institutionalized to various degrees at the Faculty; some also having effects on the university level. The analysis of the case is based on auto-ethnography, and interviews conducted with civil society partners and faculty staff members (all together 32 interviews).

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Getting closer to gender equality through Gender Equality Plans? The case of Italian Universities

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Following the introduction of the requisite of the Gender Equality Plan to access funds in Horizon Europe Programme and, together with gender budgeting, to access NRRP funds dedicated to research, in Italy an increase in the number of universities and research centers adopting Gender Equality Plans has been observed. A further impulse in the adoption of Gender Equality Plans by Italian Universities has also been provided by the Conference of Italian Rectors' Guidelines issued by the Thematic Group on Gender also before the complete European Commission Guidelines were published. In the design and monitoring process of GEPs, Italian RPOs received also support from European Commission-funded projects and training sessions provided within the projects and by the Conference of Italian Universities Equal Opportunities Bodies.

The paper provides an analysis of GEPs adopted by Italian Universities in 2021-2022 as made available on Universities' websites and of the data collected through a survey on the Equal Opportunities Committees of Italian Universities, covering the whole national context, that aims at improving the knowledge of the process followed by each university in the design and implementation of GEP and to what extent the Equal Opportunities bodies have been involved in the design of the Plans and in their implementation.

The aim of the paper is to ascertain GEPs' compliance with the Conference of Italian Rectors (CRUI) and European Commission Guidelines with particular attention on the presence of actions dedicated to the priority areas indicated in the guidelines, the adoption of a monitoring process, the promotion of an intersectional approach, and of a participatory process.

In the GEPs analysis, special attention is also provided to the interconnection of GEPs with RPOs' Strategic Planning and the gender budgeting cycle. Another key question is the impact of the EU-funded projects on the degree of innovation and sustainability of the GEPs that refer to these projects.

The paper allows a reflection on the process of increasing investment by Italian universities on the topic of Gender Equality promotion, the fight against inequalities, and the commitment in favor of diversity support, with the aim of highlighting how much the GEP - as a strategic planning tool - strengthened or accelerated this process. Being the monitoring process in progress, the paper allows also a critical assessment of what is required to make the GEP adoption, not just another regulatory compliance, but the lever to propel institutional change towards better inclusion and enhancement of diversity, already underway in Italian universities.

The gender pay gap at the early stage of academic career: case of Poland

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The scientific community has made a lot of attempts to establish gender equality policies and ensure equal treatment of men and women in academia. They include introducing Gender Equality Plans (GEPs). Some European countries require them at the national or regional level. Starting in 2022, GEP is an eligibility criterion for the participation of research institutions in Horizon Europe. However, it is not uncommon that GEPs fail to raise the question of many crucial dimensions that can reinforce gender inequalities at scientific institutions like, for example, age, field of science, or opportunity to earn supplemental income. Despite all efforts, the gender pay gap in academia is particularly evident and persistent among other inequalities (European Commission, 2019).

With the study of academia in Poland, we aim to draw attention to factors that stiffen inequalities in remuneration between male and female faculty members and that the GEPs should address. We draw on a unique dataset that integrates two administrative registers and covers the entire population of PhD holders who obtained their degrees and were hired at any Polish university in 2014–2018.

There are two main contributions of our research. First, we study gender pay gaps in a different context than most studies in the received literature. Poland has undergone an economic transition to a market economy in the past 30 years, including substantial changes in the academic sector. These involved a rise in educational enrolment, strongly biased towards women, partial privatisation of the educational sector, and several changes aimed at increasing the research productivity and quality of the academic sector. Our second contribution includes the study of various sources of income researchers gain for duties rendered inside and outside academia. In addition, we revisit some of the determinants of gender wage gaps in academia, such as fields of study, the feminisation of the workplace, and the quality of scientific institutions.

Our results show that the pay gap between men and women exists, yet it is relatively low and does not increase in the short run. The gender pay gaps are much higher when we consider all incomes (i.e. earned inside and outside the academy) compared to gaps in basic salaries earned at research institutions. We also find that the gender pay gaps are much higher among graduates of research institutions of poorer quality. Moreover, our results indicate that Science, Technology, Engineering, and Mathematics (STEM) are the most discriminating for early-stage female PhDs.

Although the remuneration of women and men at the early career stage is pretty equitable, with the number of years following hiring or promotion, even slightly lower initial salaries followed by lower rises are likely to cause a significant gender pay gap in the long run. In particular, the institutions that conduct research in STEM should address the problem of inequalities in remuneration. Finally, women should get equal opportunities to engage in activities that may bring them supplemental incomes. Our results can contribute to the development of GEPs that address intersectionality and diversity.

Your Academic Pathway - advancing Palestinian doctoral women students into academia

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The gender gap in Israeli universities between male and female researchers in the academic faculty and in key positions is high and persistent. Israel is still ranked very low at every criterion in the latest “She Figures” Report from November 2021 (https://data.europa.eu/doi/10.2777/06090

The significance of this persistent gap is particularly worrisome, given that in Israel, the percentage of female doctoral graduates continues to increase steadily and stands at 53.09% (the EU average is 47.78%). Even in fields such as engineering and natural sciences, the average Israeli percentage of female Ph.D. graduates is higher by 8 points than the European one.

The most glaring gap in Israeli universities is between the Jewish and Palestinian academic faculty. The Israeli Palestinian Arab citizens are a socially, economically, and politically vulnerable minority group constituting a fifth of the population living in semi-rural peripheral areas. Since their separate school system is in Arabic, students who qualify for academic studies at Hebrew-speaking urban Israeli universities face particular language and cultural handicaps. Palestinian women, in particular, must also overcome their society's conservative and patriarchal -hierarchic stumbling blocs to pursue an advanced academic career. As a result, the number of Palestinian academic faculty is negligible: less than 100 faculty out of approximately 5000 - 2%, with less than 20 women. The almost absence of Palestinian women faculty is particularly problematic given that more than 600 Arabic women are doctoral candidates, showing a rich pool for future faculty.

Your Academic Pathway - is a gender project which has an intersectional focus that aims to advance promising young Arabic doctoral women students into the academic path. It was set up by women Palestinian and Jewish faculty members who are aware of the challenges women in general and Palestinian women particularly are facing in the course of their Ph.D. studies. The program will assist and provide the Ph.D. candidates with the tools, knowledge, and capabilities needed to overcome the obstacles to completing their degree successfully up to the post-doc stage.

The presentation will focus on the design, implementation, and evaluation of the first cohort – 38 students – that began the project two years ago. The achievements of the program are promising. The insights gained from this unique gender equality program for overcoming intersectional challenges will be demonstrated and shared.

our Academic Pathway”- advancing Palestinian doctoral women students into academia.

D.4: Reproductive Justice and Technologies

Session Chair: Elif Gül, University of Vienna, Austria
Session Chair: Doris Leibetseder, TU Graz, Austria

Reproductive technologies and Activism. The case of thermal contraception for people producing sperm.

Elif Gül
University of Vienna, Austria

This contribution takes on reproductive justice and technologies from the perspectives of activist users who use the thermal method to eliminate sperm production as a form of contraception. Using contraception has become a gendered practice that is mainly associated with being female. Birth control methods constitute an important part of everyday life and are one of the most essential inventions of the last century. They enable humans to separate hetero-sexuality from reproduction, however, they have been mainly developed for people who can get pregnant. This puts responsibility only on women, and trans, non-binary people who can get pregnant and simultaneously excludes a big user group from stopping or pausing their fertility. Looking at reproductive justice, the challenges for people with sperm, who do not want to become parents, have often been left out of the discourse. Scientific research has focused on the female body as a means to control reproduction and ignored possibilities like the thermal method for male bodies. In this presentation, I wish to look at the thermal method as one that has been affected by epistemic ignorance/ agnotology and show, how some users are going beyond the possibilities given to them by science and biomedicine to pause their fertility.

Reproductive Justice & Computer Assisted Reproduction: Towards an Inclusive and Ethical AI in Assisted Reproductive Technologies

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Reproductive Justice & Computer Assisted Reproduction: Towards an Inclusive and Ethical AI in Assisted Reproductive Technologies

Computer Assisted in vitro fertilization (IVF), the use of artificial intelligence (AI) and machine learning (ML) in ART has experienced a rapid growth in the last years. Multiple AI and ML techniques exist and are used to improve the performance of ART (Wang et al., 2019)[1]. Each technique brings its own risks such as potential amplification of biases known as ‘overfitting’. As the self-programming of AI is not fully understandable by humans, this constitutes a ‘black box’ and enables an even bigger potential for unintentional bias (Curchoe et al., 2019)[2]. Data justice, algorithmic justice and data feminism are important concepts here.

In this talk we will look closer at the datafication of time-lapse embryo imaging and the consequences of *in silico* reproduction and vision in *in vitro* reproduction (van de Wiel, 2019)[3]. The second example will be an excerpt from the documentary “Freezing Fertility” (2021, Dir. Maren Merckx) about the so-called social egg-freezing and egg donation industry and the use of *Perfect Match 360˚*, an algorithmic matching tool. Within the field of AI and genomics, the challenges that come with genetic matching need to be minimised. This is a computer assisted technique matching the genotypic data and biometric scans (and additionally using a facial resemblance system) of the gamete donor with the intended parent, so the child will have desired traits. Thus, it generates the risk of entering the slippery slope of allowing ‘designer babies’ (Segers et al., 2019)[4].

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Race, Gender, and Reproductive Justice in the U.S. Carceral Field

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Our presentation sheds light on the meanings of reproductive justice for of women and girls affected by the criminal legal system in the United States with an intersectional lens. Only 4% of the world’s female population lives in the U.S., but the U.S. accounts for over 30% of the world’s incarcerated women (Kajstura 2018). With the steady expansion of the criminal justice system’s reach in the lives of women, especially women of color, the justice system plays a growing role in family planning decisions. Research suggests the coercive promotion of LARCs (long-acting reversible methods of contraception) and sterilization for criminalized women, while access to appropriate healthcare and abortions is increasingly criminalized for the general population in the “post Dobbs” scenario. We currently collect data from system-involved women in two strategic research sites (Ohio, Oregon). These two states have a comparable incarceration rate for women, yet very different political contexts and policy structures regarding reproductive justice (e.g., Oregon has codified abortion access, Ohio currently attempts to move towards a strict abortion ban).

In this paper, we want to give a general overview of the situation of women in the belly of the world’s largest jailer and elaborate on how we apply an intersectional lens within the holistic

theoretical action framework of reproductive justice (RJ). RJ includes three primary values: the right to have a child, the right not to have a child, and the right to parent a child in a safe and healthy environment (Luna, 2020; Ross and Solinger, 2017). While we focus on the numerically exploding population of women affected by the criminal legal system, we are operating with an inclusive notion of the category “woman” that includes people with the capacity to get pregnant (i.e. persons born with female reproductive organs with gender-expansive gender identities).

MÁTER MATTER AND THE SPIRIT OF CAPITALISM

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Dictionaries of Philosophy offer detailed historiographies of the term ***matter*** according to epochs and trends of thought. They trace its root to the Greek ὕλη (*hyle*), meaning *wood*, and to its use first by Plato and Aristotle in senses relating to different substances or that primordial and undifferentiated one (Ferrater-Mora, 1994) (Oxford-Blackburn, 2016). However, many people used terms before Plato and Aristotle-and many more afterwards. In Indo-European etymology, ***matter*** **comes from the root *māter:* mother** (Roberts & Pastor, 1996) (Hoad, 2003)**.** From there, Greek and Latin soon derive meanings such as *origin, womb, womb, wood, and matter*. There was a time when they pointed to the same thing with connected nuances. However, philosophy seems to have forgotten the *origin*, the *mātermateria* connection.

Mother does not appear in the reference philosophy dictionaries (Oxford, Standford). There is no historiography. Therefore there is a material-conceptual history that has not been told or does not count for the foundations of how we understand the world or ourselves. **In the current scientific-educational system, the *mother* does not appear as a philosophical or physiological category**, as will be detailed here, showing its absence in terms of scientific knowledge about its changes and transformations, advancing on previous works focused on representation and visualization (Oaks, 2000; Petchesky, 1987).

We will see that mothers and matter have followed a similar process of *desensitization* or consideration as non-agentic entities and without directionality (Bennet, 2010), a process that limits the pre-conditions even to perceive relationships and separations, the changes that shape the conditions for sharing (Rancière, 2000; Panagia, 2014) and that determines the political configuration of today's world.

The mātermateria is *particularity*, that which binds us to a specific time, place, traits and opportunities. To *abstract* comes from the Indo-European root *tragh-*: to pull, drag, or move (Roberts & Pastor, 1996). To drag from its material referent and environment meanings and persons, we may think (a use similar to Tsing, 2015's use of alienation).

It will be argued that the absence of *mātermatter* is the first necessary pillar to sustain us as spirit/soul/mind, as abstract beings: the first and essential step is to posit ourselves as self-created beings. It is the only way to sustain the imaginary of being autonomous beings/separated from the environment, as self-contained beings without historicity that do

not transform in relationships (Tsing, 2015). Conversely, their presence immediately refers us to co-developing with the world at every step.

The current imaginary is counterfactual and increasingly far from empirical evidence. However, it nevertheless guides - and hinders - the understanding of our constitutive processes (being born, growing up) or evolution. These visions are not mere ideas or straw dolls that we are overcoming by rejecting dualisms: they make us materially more *separated* in the process of abstraction that is increasing, as will be pointed out in the paper. This pattern emerges from considering *mātermatter* from the onto-epistemic-ethical gaze of the new materialisms and more holistic visions borrowed from other cultures.

D.5: Future Workshop And Knowledge Partnership Gender-Inclusive Mobility

Session Chair: Eveline Wandl-Vogt, Austrian Academy of Sciences, Ars Electronica Research Institute knowledge for humanity, Austria

Flâneuse. Moving on foot through cities in digital times.

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It seems that the idea of flânerie never stopped being en vogue and in pandemic times it got even more popular. A problem of the method is already visible through the enumeration of its famous representatives: until today white European men are known and cited for walking the city. But since the 1980s, there has been an increasing amount of literature dealing with the figure of the flâneuse. This international interest has risen notably in the last years, as there are various feminist, intersectional and/or postcolonial perspectives that deal specifically with flanerie or walking in cities and the perception, use and appropriation of urban space. For example, Lauren Elkin gave women from the 19th century till today visibility and made the term flâneuse popular, while Aminatta Fornas talked about her experience of walking the streets as a black woman. And while Anna Maria Inglesia wrote about the flâneuse in the Spanish speaking world, a new version of flânerie was born in the German context: flexen. In all these new publications the privileged position of the white European flaneur is deconstructed and the texts describe obstacles on the way but also the importance of the taking to the streets by women*, migrants, black and trans people as well as for example mothers who take their baby out in the pram.
At the same time it becomes clear that also the cities themselves have changed – among other reasons due to processes of digitalization. The smartphone has become a permanent companion and completely changed how we move from one place to another. But also digital screens with advertisements and information line the way through the city, the digital system behind traffic lights regulates the rhythm of it. During lectures that I gave at Berlin University of the Arts and workshops I gave with women* in Mexico City and Berlin as part of my PhD research, we discussed the aforementioned texts and what of the practice of flânerie is useful for us and what has to be changed. We also had practical sessions, walking through

the city on our own and afterwards reflecting together on what had happened. In the following, for an exhibition I invited the participants and other women from different cities to present works that take flânerie as a core element of their exploration of the current urban space. Additionally, I initiated an Open Call. Finally, together with Valentina Sarmiento Cruz, who is currently based in Mexico City, and Anna-Lena Panter, who is currently based in Berlin, we curated the exhibition „Third Space Walk. Flâneuses* between virtual and material urban spaces“ (thirdspacewalk.mirjana-mitrovic.de) which presented various artistic and research-based positions from the lectures, workshops, and the Open Call. The exhibition took place at Berlin University of the Arts in 2022 and was well received. During my presentation at the STS Conference Graz 2023 I will share some insights and findings of this research and exhibition in order to discuss the topic of gender-sensitive mobility and the role of technology in it.

Care or Self-Care

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City, University of London, United Kingdom

The overall question that occupies my work is the role of the maps in accessing the untold stories which are not captured by more traditional methods of data collection, as well as challenging London’s radial cycling infrastructure and gender-biased view of cycling [8] that is reinforced by imbalances in the collected data, such as Strava corpus [6]. For this project, I narrowed my scope to an over-looked subgroup; ethnic minority women who cycle. I worked closely with a female cycling advocacy organization, through which I recruited a small cohort of representative individuals. A combination of technology, visualisation and a qualitative approach have revealed that contrary to expectations, the way these women move in their environment has been misunderstood as it primarily serves as a means of self-care and not care for others.

The gender, racial and social-economic inequalities in active travel are well documented [8, 9, 10]. Recent macro-studies [11] [12] of gender and active travel show the widespread gender inequality and highlight the existing disparity in the cycling uptake by women in countries with a low cycling modal share, like London. While studies exploring aspects of cycling have seen a marked increase in the last two decades [17], there is a conspicuous lack of literature on sub-groups such as ethnic minority cyclists and especially ethnic minority women. This work seeks to illuminate mobility and the role of visualization in uncovering hidden powers and unseen realities of female ethnic minorities. By focusing on the specific sub-group, Muslim and BAME women cyclists, it aims to get away from dominant voices and representations and reach the invisible.

While data visualization has maintained a presence in active travel [14, 15, 16] and has made inroads in situated research [7], it has largely remained removed from the process of data collection and elicitation itself. My mixed-method approach combined ethnographic elements like participant observation, sensor technology tracking and interactive visualization affords data-led but holistic and multi-layered insights. This empirical work presents a new framing for considering the way female cyclists use their environment and what this

environment needs to offer. It is giving a voice to the growing and vibrant cycling undercurrent of ethnic minority women in active travel as well as engaging the citizens-action groups that are supporting mobility (r)evolution.

Stream E: Mobility and Logistics: A Socio-Technical System on the Way to Sustainability

E.1: A mobility transition in air travel? Behavioural and institutional change in the face of the climate crisis and the pandemic

Session Chair: Anna Schreuer, University of Graz, Austria
Session Chair: Alfred Posch, University of Graz, Austria

Institutional actors' perspective on the aviation sector's transition under Paris Agreement timelines

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In 2021, global aviation emissions grew by 20% compared to Covid-impacted 2020 and are expected to increase by an additional 24% by the end of the decade (IEA, 2022). Under BAU, by 2050, aviation emissions are expected to take up 27% of the global carbon budget for 1.5°C (Pidoek and Yeo, 2016). COVID-19's impact on aviation's cumulative emissions has been relatively small given the scale of mitigation needed, with air traffic levels expected to rebound to 2019 levels in 2023 (Klöwer et al., 2021; Fragkos, 2022) there is a need to decarbonise this sector. This research aims to understand aviation stakeholders' willingness to adopt measures to enable a low-carbon transition. To contextualize it further, this specifically set out to explore the viability of green ammonia as a commercial aviation fuel scalable under Paris Agreement timelines. This project serves to shed new light on behavioural barriers and opportunities around adopting alternative fuels within the UK aviation sector with respect to economic, environmental, technological, operational, and policy aspects. Methods include a facilitated stakeholder workshop and in-depth qualitative interviews with actors across the aviation supply chain. Findings are categorised into barriers and opportunities and evaluated using content and thematic analysis. Content analysis indicates that challenges to upscaling green ammonia as a fuel lie in aspects such as fuel storage, transport, safety, certification etc., largely due to on-ground technological immaturity. Thematic analysis provides a layered understanding of specific challenges. Some stakeholders view the 'recovery' period as an opportunity to re-examine behavioural demand-side catalysts that hinder the transition, however, others shun transitionary measures, such as demand management, citing aviation's recent financial loss. Some others believed that even before implementing technical decarbonisation measures, the focus should be on reducing the overall scale of change needed. There is hesitation within the sector because the cost of initiating behavioural change is too high i.e., the sector is increasingly risk averse, especially post-COVID-19. Aviation's inherent nature as a consumer-facing sector implies that 'talk' about decarbonisation is seemingly larger than any action taken, partly due to existing technological and operational barriers. The findings

suggest that the sector is unprepared for the scale and speed in which transition is required. Due to the global nature of international aviation emissions, stakeholders are seeking consensus on the fuel type to align national ambitions that will enable the decarbonisation of both domestic and international aviation emissions. Moreover, even if the sector manages to overcome technical requirements, further downstream challenges such as fuel certification, fleet renewal, and infrastructure transition in airports will take far longer than Paris Agreement timelines – this is a scepticism that is prevalent amongst majority of aviation stakeholders.

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Making aviation more sustainable by feminist perspectives? Reflecting the real and ideal.

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In face of the global climate crisis, aviation researchers work hard to achieve a reduction of greenhouse gas and noise emissions in line with international policy papers like the "Flightpath 2050 vision" of the European Commission (2011) or the "Environmental noise guidelines for the European region" of the World Health Organization (2018). However, technological innovation is not sufficient to achieve sustainable solutions of aviation (Heuwieser, 2017; Lee et al., 2009, 2021; Okonkwo & Smith, 2016; Rothengatter, 2010). Therefore, I want explore how feminist technology studies can complement an engineering research approach in order to find more socially and ecologically responsible concepts of air travel. I refer to empirical results of a research project that investigated "human demands of sustainable aviation" from a feminist STS point of view. The project was part of an ongoing seven-year research cluster that focuses on "sustainable and energy-efficient aviation". Within the cluster, researchers from different universities and research institutes, most of them from engineering, economics, computer science and mathematics, develop simulations and optimization models to investigate economic and ecological impacts of technological and infrastructural modifications of the air transport system. An ethnographic investigation of the cluster showed that sustainability was mainly defined in economic and ecological terms. It predominantly aimed at serving the interests of the aviation industry, achieving the predicted increase of flight demands and at the same time meeting economic and ecological requirements. As a complement and contribution to social sustainability, our feminist research project aimed at integrating marginalized or overlooked perspectives and demands

of passengers and residents of airports into the cluster's knowledge base. For this purpose, we conducted three participatory workshops with participants from the named target groups to reflect and discuss their mobility habits, demands and future visions according to gender and diversity aspects and corresponding life circumstances. Dealing with the Covid-19 pandemic, we hat to transfer the face-to-face workshops into virtual formats. First considered as an obstacle, the situation turned out as an insightful real-world experiment made the participants collectively reflect their habits in the light of immobility experiences during lockdown requirements. Although we had strived hard for making heterogeneous and marginalized voices heard, the 17 workshop participants were all academics living in German cities, which made them a rather homogeneous and privileged social group: All of them shared a high level of ecological awareness and a critical attitude towards consumption. Even though we gained relevant insights into current and future mobility requirements, their integration into the research cluster remained difficult due to disciplinary incompatibility with aeronautics engineering research as well as structural inequalities with regard to human resources of two female researchers and a project duration of one and a half years within a total period of seven years research.

Within the session, I will take our project as a case study to deduce from the real what an ideal contribution of Feminist STS to sustainable aviation could look like and inspire a discussion about how to make technological research and development processes more socially and ecologically responsible.

Air travel and continuous growth – sustainability challenges of Finnish aviation system

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This research aims to study the interlinkages between aviation system, tourism, and economic activity in Finnish context. The aim is to understand which factors support and generate demand for air travel. In this way, we support Finnish aviation sector in its decarbonization targets and meeting national level emission reduction targets.

The study will be conducted by creating an interaction model of the Finnish aviation system with the help of soft systems methodology (SSM). The chosen method enables mapping aviation system´s functions, dependencies between actors and structures in relation to tourism and industry. Insights from interviews with stakeholders enrich the system model created with the help of secondary data.

This study creates an understanding of the Finnish aviation system. More precisely, we construct an illustrative model of the relationship between these key sectors of economy. In this way, providing novel insight into vital societal functions that are interconnected with aviation.

With our study, we focus on sustainability challenges of the aviation sector by applying a holistic system perspective to the Finnish case. Unfortunately, in many locations the development of air traffic and airport capacity is solely based on the projected passenger

growth levels. This research draws attention especially to the air travel volume while keeping in mind the continuous growth goals of the sector.

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Reflections on the development, use and impacts of the TR2AIL tool for 'Tracking, Reflecting and Reducing Air Travel' within a non-profit research organization

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Business travel, particularly by air, often makes up by far the largest part of the carbon footprint of knowledge-based organizations like SEI (Stockholm Environment Insititute). In 2019, SEI set a target of reducing our emissions from air travel by 25% by 2024. To achieve this, we have developed and implemented a tool – TR2AIL – that goes beyond traditional emission tracking to help us plan and reflect on why and how we travel. The development of this tool has been informed by research within SEI to understand the drivers, decision-making and behaviors behind our travel, and investigate what knowledge, support and policies would best transform how we approach business – especially air – travel. This presentation will: share key insights from this research; provide an overview of the TR2AIL tool; describe how TR2AIL has been implemented across SEI's eight international Centres since 2020, including for systematic analysis and tracking of air travel emissions; share what we have learned from the process of implementing TR2AIL for an entire organization; and lay out next steps in the development and scaling of TR2AIL, including to other organizations.

The online TR2AIL tool for tracking, reflecting on and reducing air travel, which has been developed by SEI and partners Quakefire, Tranås Resbyrå, the Tyndall Centre for Climate Change Research, and the Centre for Climate and Energy Transformation, with initial funding from VINNOVA, combines pre-travel planning and reflection with CO2e emissions tracking to

help shift thinking and reduce air travel. Its design encapsulates findings from SEI's 'Prepare for Landing' report, which highlights the importance of reduction targets and indicators, decision support and travel data-gathering, internal and external results reporting, and the provision of enabling and encouraging environments in supporting transitions to reduced business travel emissions.

TR2AIL prompts users to reflect on their travel plans, take steps to optimize their business trips, and set and track their emissions against their individual and departmental targets. It enables departments and organizations to set and track progress against emissions targets (limits), have an overview of staff and departmental contributions to air travel related CO2e emissions, understand the reasons this travel is being undertaken, and easily and accurately collate and report these emissions.

In SEI, TR2AIL has been flexibly integrated with the travel approvals and administration processes within our different Centres to promote forward-planning and discussion of travel choices while also protecting employees' wellbeing. Implementation of TR2AIL is a key tool in achieving our goal to reduce air travel by 25% by 2025, by revealing patterns and drivers of travel and travel behavior, promoting dialogue around why and how we travel, planning more sustainable travel for new proposals, and spurring internal sharing of stories of and tips for alternative modes of travel.

FlyingLess Toolbox flight reduction in academia – a practical guide how to implement flight reduction in an organisation

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Academia is not environmentally sustainable and in particular emissions from air travel are a major issue. Flying typically contributes 15–50 % to the total greenhouse gas emissions of academic institutions which is not in line with the net zero targets of countries and organisations. However, because international exchange – and therefore flying – is deeply engrained in the academic culture, reducing flights is challenging. Although the need for air travel reduction has been emphasized in the literature, concrete guidance how to approach it is largely missing.

In the FlyingLess project, we therefore developed a toolbox to support academic institutions and interested scientists to design their own process and implement the necessary steps towards substantial flight reductions. We used insights from interviews and surveys at eight academic organisations in Germany (see abstract by Merrem et al.) as well as several years of hands-on experience as project manager, implementing flight reduction in academia.

The toolbox consists of modules with facts and figures, guiding questions, a checklist what steps to take to implement flight reduction and a list of potential tools for the change processes.

The modules can be used independently. Specific topics covered are (i) travel reasons (purpose, costs/benefits of (not) flying), (ii) measures to reduce flights, (iii) rationale to reduce flights (net zero targets and implications, comparison of flight emissions from different

universities), (iv) internal and external framework conditions for flying in academia and how they can be changed, (v) specific measures, as well as material covering the theme of (vi) sufficiency and (vii) inputs from environmental psychology.

A checklist covers the most relevant aspects of what should be taken care of by whom. This includes (i) governance, goals, and responsibilities, (ii) operationalisation with data, timeframes, and reduction paths, (iii) the choice of specific reduction measures, (iv) communication concept, and (v) the importance of regular evaluations and the build-up of networks. This checklist is supplemented by a list of success factors and stumbling blocks, based on previous experience, that enable or inhibit the change process.

Guiding questions should help addressing key aspects like “what’s at stake if we do not fly”, “why do we fly and how can we achieve our goals without flying”, “which internal and external players influence the travel decisions and how can this be addressed”, “how does excellent science in the future under the condition of net zero look like”, “who is responsible for initiating and steering the transition process”, and “what technological solutions are there and how much will they contribute”.

The toolbox was developed with inputs from Lars Brischke (sufficiency, ifeu), Hannah Büttner (tool input, Integrative Dialoge), Marcel Hunecke (environmental psychology, FH Dortmund) and Max Jungmann (usability, Momentum Novum).

We hope that this toolbox will serve the broad academic community as a practical guide for organisations and individuals to develop a pathway towards a culture of intellectual hyper- but physical hypomobility.

From Fly or Die to Zoom and Gloom? Scientific conferences in the context of the Academic Flying debate.

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Conferences are a central feature of academic life. However, the face-to-face scientific meeting faces recent challenges. Such meetings, and especially large international conferences, are made possible by air travel, a form of mobility that faces criticism for its carbon emissions and is increasingly discussed in the context of climate change. Furthermore, the longer-term trend of a digital transformation in academia has facilitated the spread of virtual alternatives to face-to-face meetings. The near complete halt of air travel in the context of the COVID-19 pandemic has arguably catalysed these developments and has further solidified the use of virtual meeting technologies. Yet, in-person conferences persist. Why do academics still travel to professional meetings, when virtual alternatives appear convenient and when travel by air has lost some of its former support in both science and society? Recently, joining the calls to reduce air travel in academia for its harmful impact on the climate, there are warnings from parts of the scientific community that a complete stop of in-person conferences puts not only the normal functioning of science but, in its wake, also democratic and open societies at risk. This puts the role of academic conferences centre stage. For STS, however, conferences have historically played a minor role. Seminal

perspectives on science's stratification and reward system have focused for a large part on the role of publications and on interactions of scientists in non-public spaces, i.e. laboratories. What academics do at conferences has been left largely out of view. Some recent works, e.g. in the emerging field of conference studies, suggest that conferences play a relevant part in the negotiation of scientific reputation, as well as socialisation and to some extent knowledge production. The return to in-person conferences after the pandemic conference halt suggests that they are not as easily replaced by virtual alternatives as is sometimes suggested. While this is coming increasingly into the view of the behavioural sciences, sociologically-oriented social studies of science have been largely absent in this debate. In this contribution, we present a research project that investigates the role of academic conferences with regard to doing reputation in interaction through an interpretative approach combining interviews and ethnographic fieldwork at conferences. The aim of the project is to answer the questions (1) what relevance academics at different career stages and in different disciplinary cultures attribute to conferences and conference travel; and (2) how reputation is enacted in face-to-face and virtual interaction at conferences, both in formal and informal settings. A comparative perspective on disciplinary travel cultures allows taking into account context factors such as the internationality of publication and reward systems in a systematic way. Our talk will present findings from our initial literature review as well as discuss some specificities of academic travel compared to other business travel.

Opportunities for more sustainable academic practices – examining virtual, hybrid, and in-person conference formats

Ariane Wenger
ETH Zurich, Switzerland

Academic air travel emissions are substantial, as they often account for a large share of a university's emissions. Conferences are among the most important travel purposes of a university and often require air travel, as many of them take place abroad, sometimes even in other continents. At the same time, conferences are essential to academic practice as they provide opportunities to share scientific advancements, gain visibility, work opportunities, and collaborations, and to build and maintain networks.

Through a combination of behavioural and institutional changes, academic air travel can be reduced by changing current academic practices. The potential of this was demonstrated by the COVID-19 pandemic, which led to an abrupt and radical shift in current academic practices as academic air travel came to a halt and virtual communication became a widespread substitute. The fast switch to virtual communication gave rise to new virtual tools and formats. With the relaxation of COVID travel restrictions, researchers were eager to meet in person again, and air travel started bouncing back to pre-pandemic levels. Nevertheless, some conferences continue to be offered virtually and various options of hybrid formats are used, combining in-person and virtual attendance. These virtual and hybrid formats often result in improved sustainability (reducing a conference's carbon footprint by more than half) as well as greater inclusivity (more diverse attendees in terms of

geographic regions and career stages) compared to previously dominant in-person conferences.

There is little research on hybrid conference formats, as they have only recently been widely adopted. Insights from a study I conducted last year have shown that conference organisers should first clearly define the conference's goals, then choosing the format accordingly. However, there is a lack of understanding of when to choose which format due to a lack of systematic analysis of the opportunities and challenges of different conference formats.

In a mixed-method study, I currently examine four conference formats (in-person, two hybrid formats, virtual). I conduct several virtual focus group discussions with conference organisers from different backgrounds. The focus groups are audio-recorded, transcribed verbatim, and systematically analysed. In preparation for the discussion, participants complete an online survey. Data collection is currently ongoing, so I will be able to present first findings at the STS Conference Graz 2023. I expect participants to mention perceived opportunities and challenges of different conference formats (e.g., networking opportunities, participants' costs, organizational efforts, quality of knowledge exchange) and support their statements with arguments.

Results should demonstrate which conference formats are suitable for which purposes and why. I would like to give an overview of different conference formats that have different requirements regarding academic air travel. The study will contribute to the conference session by providing insights into how virtual communication can support the mobility transition in academic air travel, by identifying the opportunities and challenges of different conference formats that have emerged due to the COVID-19 pandemic.

Stay grounded, go virtual? Potentials and challenges of virtual solutions as a replacement for professional air travel in academia and business

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In view of climate change, all sectors of the economy face the challenge of rapid decarbonization. In spite of optimism over dematerialization that may ensue from the emergence of a 'knowledge society', the carbon impact of knowledge-intensive organizations and businesses has proven substantial – not least because of the way research, innovation and technology development have become so closely tied to the practice of frequent flying. In academia, international mobility and exchange has constituted a cornerstone of academic inquiry already for centuries. Over the last decades, however, easy access to air travel has pushed long-distance mobility of researchers to unprecedented levels. Similarly, knowledge-intensive businesses rely heavily on international networks to shape professional relationships, foster collaboration, and drive innovation across organizational boundaries.

The COVID-19 pandemic, however, forced researchers and business professionals alike to stay grounded and resort to virtual solutions as an alternative to face-to-face meetings. As COVID-related travel restrictions have now largely been lifted, the question arises under what circumstances virtual solutions may be retained in the long term as an alternative to air

travel. This paper therefore explores the experiences made with virtual solutions by researchers and business professionals during the pandemic, and what potentials and challenges they see for a continued reliance on these technologies as an alternative to physical travel. We present and compare the results from a survey among academic staff at three Austrian universities and a survey among Austrian business professionals, complemented by qualitative interviews with Austrian business representatives with key roles in travel and/or sustainability management.

While the willingness to use virtual solutions in academia has risen sharply during the pandemic, their perceived suitability strongly depends on the type of event they are employed for. In particular, a large share of respondents remains skeptical towards the suitability of virtual solutions for academic conferences – the most important reason for academic air travel. While benefits of virtual conferencing, such as climate friendliness, the elimination of travel time or a broad participation base are acknowledged, difficulties in building and maintaining networks, limited scholarly exchange and the lack of full immersion in the event remain core areas of concern. First insights from businesses draw a similar picture, also highlighting the importance of personal meetings for customer acquisition or trust building, for example. Virtual reality technology, however, is perceived as a viable alternative that may become more prevalent in the future, potentially replacing physical meetings such as on-site audits. Our findings thus identify both key areas in which user experiences with virtual solutions fall short of expectations and common demand, as well as more optimistic visions and expectations concerning future developments of virtual solutions.

E.2: Powering (Un)sustainably the Future of Auto-mobility: Unearthing Camouflages, Challenges and Finding Responsible Pathways

Session Chair: Swati Kumari, Jawaharlal Nehru University, India

Problem or solution- mobility innovation policy’s design by comparative perspective in Europe

Monika Woźniak
Jagiellonian University, Poland

The literature analysing innovation policies in less developed countries noticed that their innovation policies tend to ignore the ideas of directing innovation towards solving general problems such as the quality of life or climate change. This may be related to their overemphasis on generating economic growth through innovation policy as the first step in evolutionary development of innovation policies’ framework (Pires et al., 2019; Schot and Steinmueller, 2018). Governments have several tools to choose to set the chosen direction for change - including innovation policies that will respond to grand challenges. They are defined as mission -oriented innovation policies (MOIP) aimed to stimulate research and innovation that face social challenges and trigger changes in the desired direction (Uyarra et

al., 2019; Borrás and Edler, 2020; Kuhlman and Rip, 2018; Schot and Steinmueller, 2018). MOIP's typology of Wanzenböck et al. (2020) use a convergence between problems and solutions in the shape of MOIP. The first type *a problem-based path* is based on a broadly legitimated and defined framework of social problems to solve by innovation policy. The second type is to focus the policy on the development of individual innovations/ solution, i.e. *solution-based path*. The last path is called *hybrid path*, that is a combination of the first two paths.

The main objective of this study is to define the configuration of factors contributing to the choice of path according to the typology of Wanzenböck et al. The following research question was set: what configurations of factors explain the choice of MIP's path compering better and less developed countries in EU?

The state of the literature shows a niche in terms of MOIP' design process (Hekkert et al., 2020). The gap is particularly presents in less developed countries, where there is a lack of empirical research analysing the process of setting innovation policies (Pires et al., 2019).

The study use Qualitative Comparative Analysis (QCA) approach, which enables the analysis of many factors in complex situations and presents results in an understandable way through so-called truth tables that summarize the relationship between conditions and outcome (Schneider & Wagemann 2012).

The policies selected for analysis should be comparable by referring to the same mission and agency's type, so cases are narrowed down to innovative policies aiming at development of sustainable mobility by national innovations agency. The list of factors was proposed by the literature review among conditions influencing development of smart mobility systems.

The analysis will determine the configuration of factors leading to a specific shape of mission-oriented innovation policies and determine the significance of factors used in the analysis. It will verify how previous external domestic conditions, e.g. country's innovativeness, competitiveness or public sector's efficiency, can contribute in choice of MOIP's paths. It will give comparative perspective about countries' policies among European countries, what will provide additional insights for Wanzenböck et al.'s typology (2020). It is anticipated that countries with lower levels of institutional and economic development will opt for the solution-based pathway, particularly where the role of the traditional car industry is important.

Between persistence and change in automobile regions: Foregrounding the role of mobility cultures in responsible experimentation for future automobilities in Munich

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In times of multiple socio-ecological crises and an increasing understanding that established unsustainable mobile lifestyles are part of them, the discourse around a mobility transition ("Mobilitätswende") is receiving conflicting societal attention. In this transformation conflict around future mobilities, dominant car cultures prescribe future pathways and prove persistent against pressure for holistic change and the need to reduce CO2 emissions. Here, the often-promoted electrification of transport represents a shift of the drive train pretending to induce a mobility transition. Yet, the latter is better understood as a necessarily socio-technical transformation, in which the social dimensions of mobility routines and identities play a crucial role and require more attention in future mobility policies. More recently, mobility experimentation has gained attention as innovation instrument that encompasses social questions of transformation. STS has illustrated how experiments of mobility purposefully test the social aspects of the socio-technical interactions (Engels et al 2019; Marres and Stark 2020).

We combine holistic understandings of mobility cultures and STS understandings of experimentation to highlight social dimensions that are often sidelined in attempts of innovating automobility. Based on empirical research on Bavaria including the Munich region, we inquire how mobility experimentation can account for technological and social transformations against the backdrop of persistent car culture.

We show that mobility cultures in Bavaria are conflicted regarding the discourse of the future of the automobile industry. The dominant car culture is reflected in everyday social practices, the mobility system, and industrial culture. While the region faces the challenge of renewing itself towards sustainable mobility beyond private cars, it is repeatedly confronted with its economic and socio-cultural model of success and prosperity. Thereby, actors in Munich try to navigate the experimentation practices on pathways of innovating out of car dependency without fundamentally questioning technological advancements in automobility. We discuss how mobility experimentation in this context foregrounds social practices interrelated with local mobility cultures, whereas the experiments were primarily planned to test technological innovations for globally scalable mobility scenarios.

Uncovering the social practices in conflictual attempts of transforming mobility provides a more robust understanding of how social and technological reorderings mutually shape each other on pathways towards more sustainable mobility. This understanding is crucial to address existing locally embedded mobility cultures in a holistic way and thereby creating responsible pathways of innovation.

How can emerging vehicle technologies tackle the challenges of an aging society? The case of Japan

Gregory Trencher
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Population aging is accelerating across industrialised nations due to declining birth rates and longer lifespans. This poses an unprecedented challenge for medical, economic and social systems along with social vitality. Yet consequences for mobility also looming. Transport providers must adapt to the changing needs of a greying population, whereas the elderly must contend with fewer chances to access essential services after impaired physical functions hamper their ability to drive and use public transport.

Recognising this, scholars have explored how next-generation technologies such as autonomous vehicles, sharing and Mobility as a Service (MaaS) could alleviate such challenges. This literature, however, has limitations. First, many scholars focus on expectations or barriers regarding the hypothetical diffusion of new technologies. Conversely, knowledge is thin regarding innovative mobility services that actually implement these in real-world settings. Second, by focusing on the global north, experiences from Asian countries are missing.

Japan provides an ideal occasion to fill these gaps. As the world's most rapidly greying nation, with 30% of its population aged over 65 or over, its automobile and technology industries are actively collaborating with government to introduce novel mobility solutions across the nation.
By examining Japan's frontrunner experiences, this empirical study aims to deepen understanding of mobility related challenges caused by population aging while elucidating the potential and limitations of emerging technologies to address these. Drawing on evidence from 15 semi-structured interviews with experts and document analysis, the investigation addresses three questions:

1. How is population aging expected to negatively impact mobility users (i.e. the elderly) and transport providers?
2. How could emerging mobility technologies mitigate these problems?
3. What are the limitations of these technologies and what factors hamper their adoption?

Findings reveal that Japan's aging populating is triggering a multitude of intertwined and self-reinforcing consequences for mobility. The elderly are contending with lost access to services and reduced quality of life after surrendering driver licenses or seeing bus operators flee from declining rural communities. Meanwhile, bus and taxi operators along with municipalities are battling with lost income and bankruptcy as populating greying suppresses ridership and creates driver shortages. To tackle such challenges, practitioners and experts expressed high expectations for emerging mobility solutions based on autonomous vehicles and MaaS, with some municipalities trialling self-driving buses, on-demand taxis and van-based medical care. Yet multiple barriers hamper their success and diffusion: low-profitability

due to high costs; restricting institutions; difficulties in changing established practices amongst users and transport operators; reliance on human intervention for self-driving vehicles; and the inferiority of technological solutions compared to existing services.

Three novel contributions are made. Thematically, this study bridges debates on mobility transitions and population aging/elderly welfare, two themes rarely discussed in tandem until now. Empirically, by extracting experiences accumulated from dozens of cutting-edge mobility experiments across Japan, the study integrates practice-based knowledge, addressing the literature's focus on user acceptance regarding the hypothetical diffusion of new technologies. In so doing, it provides future-oriented knowledge on a topic set to receive growing attention due to accelerating greying trends in other countries.

Challenges and opportunities of advanced biofuels from a strong sustainability perspective

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Advanced biofuels are one important pillar of the European targets towards a transition of the transport and mobility sector. The technical utilization of residual and renewable resources seems appropriate to increase the productivity of land while substituting fossil fuels. In this context, residual biomasses from agriculture and forestry are particularly noteworthy, as there are still high available resource potentials. However, the technical potential may differ from the sustainable potential because of requirements regarding the humus reproduction along with several other soil-related benefits when retaining residual biomasses on the cultivation area. Furthermore, the RED II stipulates only vague requirements for operators and authorities to comply with sustainable extraction levels. According to the RED II, feedstock for advanced biofuels are considered having zero burdens up to the point of collection of those resources, neglecting their carbon sequestration potential, the impacts on biogeochemical nutrient flows as well as various other impacts on soil health, soil biodiversity and soil fertility. There is reasonable doubt about the classification of such resources as waste or residues, as some of them clearly meet the criteria of by-products and thus, potentially underestimating the various sustainability trade-offs.

Against this background, it is important to assess the possible contribution of advanced biofuels towards sustainable development from a strong sustainability perspective that focusses on the effects of changes in business-as-usual to ensure intra and inter-generational equity. The extraction and utilization of residual biomasses could either be a promising way of decoupling economic activity from resource use and environmental impact, or a lost opportunity of preserving planetary boundaries and natural capital in the long term. Therefore, a systematic literature review has been conducted to investigate the different approaches of impacts allocation for feedstock for advanced biofuels within life-cycle assessments and to show which aspects of sustainable extraction and utilization potentially remain neglected in the discussion about advanced biofuels. Based on this, the demand for an advanced assessment framework is emphasized, which is capable to address the various

trade-offs from a strong sustainability perspective. The presentation shall contribute to the discussion about the concept of strong sustainability regarding the circular economy of biogenic resources and the challenges of a practical implementation of assessment frameworks for life-cycle sustainability assessments.

E.5: Strong sustainability transitions for the mobility sector

Session Chair: Kevin Joseph Dillman, University of Iceland, Iceland

Sustainable urban mobility transition – the urgent need of exnovation!

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Wuppertal Institute, Germany

The need for a sustainable transition in urban mobility is indisputable against the backdrop of the climate targets and the suffering quality of life in our cities. Such a transition requires a change that goes beyond a technological shift towards new propulsion technologies. Instead, it will be imperative to significantly reduce conventional automobility.

Looking at the automobility regime from the multi-level perspective and discussing different transition pathways, it becomes clear that changes in the automobility regime do not automatically lead to a strong sustainable transition in mobility. Rather, with a view to the path concept of transition theory, small changes in the regime architecture of the automobility regime, a pure shift to new propulsion technologies or to autonomous cars are also conceivable - whereby the car continues to dominate mobility.

Such transitions would not be sufficient in terms of scale, speed and direction with regard to a strong sustainable transition. Against this background, three problem areas are discussed in the field of urban mobility:

1. The innovation-based approaches of politics do not bring the desired progress. Valuable time is lost due to misguided developments. In short, the scale and speed of transition is insufficient.
2. With current changes, there is a risk that progress is reversible, such as changes in the course of the corona pandemic. In short, the absoluteness of change is not a certainty.
3. Currently, developments in different directions are conceivable, such as purely technological adaptations of the automobility regime or parallel structures through innovations, that block or slow down progress to sustainability. In short: The certainty of direction of change is not given.

With exnovation, this contribution presents an approach that ensures a strong sustainable transition in urban mobility. It is argued that besides innovation-based approaches via niche developments, a targeted destabilisation of regime elements is necessary. Such an

exnovation would accelerate the speed of implementation, make reversibility more difficult and define a clear direction of change.

The relevance of exnovation is already discussed in current literature against the background of an existing innovation bias in politics and science. This contribution will go further and show to what extent exnovation can make a crucial contribution to actively shaping a strong sustainable transition.

Methodologically, the findings of transition and exnovation theory are combined and discussed, based on a comprehensive literature review. This paper discusses different transition paths for sustainable urban mobility, argues the necessity of exnovation and outlines concrete starting points for destabilising the automobility regime.

It is shown that **exnovation** is a central approach for implementing a strong sustainable transition in urban mobility. An intended exnovation can help to overcome path dependencies to systematically destabilise the dominant automobility regime, enabling an alternative regime of sustainable mobility to be established in its place. Exnovation can accelerate the speed of implementation of a transition in urban mobility, reduce the risk of undesirable developments including the development of rival parallel structures, thus increasing the certainty of **direction** and ensuring a strong sustainable transition of appropriate **scale** and **speed**.

Of booms, busts, and sustainability: A socio-technical transition study of Iceland's mobility regime and its proximity to strong sustainability

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The need to reconfigure provisioning systems to achieve a good life within the planetary boundaries has been recognized, but few studies have been able to simultaneously capture the change dynamics within such a system while evaluating proximity to a strong sustainability state (safe and just space). Using Iceland's mobility sector as a compelling case study, the effects of significant economic swings and other landscape/innovation developments from 1995-2018 were narrated. The influence of these factors on car ownership, vehicle weight, etc. and the impact of these developments on ecological overshoot and transport poverty/social externality indicators were measured. The potential socio-ecological outcomes of future development pathways were then interpreted, supported by time series analysis. Iceland never entered the safe or just space during the study, and though close to achieving a just space, it never went close to reaching the safe space, pointing to the need to de-escalate Icelandic mobility need-satisfiers.

Who Trusts Automated Vehicles? Investigating Tensions in Automated Mobility Imaginaries.

Thomas Zenkl, Martin Griesbacher
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The ongoing automatization of driving tasks is accompanied by manifold imaginations: Automobile companies promise safer, more efficient, and more inclusive transportation solutions, while expanding their business models of automated vehicles (AVs) into new (datafied) realms, and governmental bodies dream of a “vision zero” to reduce road deaths and emissions to almost zero by 2050. But the rather positive expectations of a safer, more efficient and comfortable individual transportation system come with potential negative effects that manifest in end-users concerns toward automated driving technologies (e.g. loss of autonomy of human drivers, delegation of safety-critical tasks to algorithms, the changing role from driver to a “fallback-ready user”, the increase of monitoring and loss of privacy).

Contrary to a view that attempts to individualise these fears and foregrounds personal experiences and reservations about the automation of driving tasks, we argue for a sociological perspective that emphasises the effects of socio-cultural structures for the explanation of the possible future adoption of AVs and ask what elements are critical for the emergence of societal trust in this new technology, and hence influence the negotiation and adoption of socio-technical transformations. The formation of trust, we argue, is based upon the type of discourses around automatization, as well as the societal problems that are being associated with them. Therefore, by defining trust as a crucial characteristic in the relationship between human and non-human actors, technological innovations must be examined within the tensions of their socio-cultural and socio-technical possibilities and limitations.

Considering the variance of current expectations and anticipated imaginations of future mobility solutions, we ask the question of “who actually trusts AVs?” empirically and point out how expected benefits are distributed unequally within societal groups, reinforcing notions of “digital inequalities”, and transferring them into the domain of mobility solutions. Our study is based on an online survey (n=259) with an analytical focus that not only included the drivers' perspective, but additionally tried to incorporate the often-neglected opinions of other road users. This consideration was based on the insight that societal trust in technologies is also being negotiated by those are only indirectly affected. This becomes particularly relevant when interactions and encounters with certain technologies (such as in road traffic) are difficult to avoid.

As a novel and key explaining factor, we discuss the role of technology affinity for the future adoption of new technologies and reveal the prevalent tensions of anticipated imaginaries that drive today’s expectations towards AVs: A notion of an algorithmically established “posthuman security” that guarantees safety by eradicating human error and the simultaneous perception of automations “overstepping” their legitimate algorithmic autonomy.

Using Real-Lab Experiments to assess possible local mobility transitions in the Ruhr Area

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The success of measures that aim to facilitate sustainable socio-technical transitions depends heavily on the contextual fit. Hence, it is necessary to evaluate measures not only from a theoretical but also from an in-use point of view.

As a campus-scale example, we present an array of three real-lab experiments that took place from september to december 2022. Furthermore, we provide a concept for its corresponding scientific evaluation. The tested measures that were chosen for our experiments derive from results of a large-scale survey with 10.000 participants from the Ruhr Area's three largest universities as well as a series of five participatory workshops conducted with the members of said universities. In these workshops, a variety of different scenarios and measures was discussed with different groups of university members in order to select the most useful and feasible measures in order to facilitate a change in mobility behaviour.

The first selected real-lab experiment was a bicycle hub installed at the campus of TU Dortmund University. It included covered parking spaces for bicycles on campus and off-campus at different PT-hubs, a bike-sharing station as well as a repair and inspection service.

The second selected real-lab experiment was a mobility budget of 120€ per month that could be used to book various transport products by the choice of the participants. The budget was distributed as a virtual credit card via an app. The third selected real-lab experiment was a car-sharing service with electric vehicles installed at the campus of Ruhr-Universität Bochum (RUB). The aim of this service was to bridge highly frequented, but insufficiently connected PT stations to RUB. Scientific evaluation for these experiments consisted of three main elements: An app for mobility tracking that was developed especially for this project, a series of three questionnaires that were distributed before, during and after the test phase and the actual usage data of the offered services.

This presentation gives detailed insights into the concept for the scientific evaluation of these experiments and provides the evaluations' results. With these results, we can show how real-lab experiments can be used as an important instrument to identify possibly successful measures prior to their continuous implementation.

Stream F: Sustainable Food Systems

F.1: Microbes in, for, around Food Systems

Session Chair: Maya Hey, University of Helsinki, Finland
Session Chair: Alicia Kim Ng, University of Helsinki, Finland

Curd fermentation in the Northeast of India: From indigenous food to a laboratory object to a patented consumable

Salla Sariola
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Making curd is part and parcel to indigenous cuisine and a repertoire of cultural practices by various indigenous communities in the Northeast of India. Curd is made from raw milk without starter cultures, by relying on wild bacteria and yeasts as well as the tropical climate to spoil the milk.

A scientific research group based in the region aims to understand indigenous microbiome as the temporal ‘baseline’ of the human microbiome, allegedly untouched by the modern lifestyles that have led to the depleted, modern gut microbiome. The group collected microbial strands from various indigenous dairy farming communities with the intention to understand the diversity of curd microbiomes, comparing the diversity of microbes in the curd microbiome with samples collected from the environment around the farms. While the results showed strong affinity between the microbes in the curd and microbes in the environment, in the lab, the microbes were transformed into placeless samples.

A commercial spin-off from the scientific work on indigenous fermentation microbes, the group turned these curd cultures into intellectual property. They patented a probiotic curd as a longevity-boosting consumer product touted to be able to circumvent the harmful impacts of modernity on urban guts.

The paper describes the various somersaults in how temporality/timelessness, emplacement/universality and tradition/future were constructed in the enactments of the fermentation microbes from the farms to the laboratory and into the consumer chains.

“Your Microflora is Unique. Your Probiotics Should Be Too”: For Recognition of Microbial Labour

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ic term describing the novel technologies, “conceptions of human embodiment, and promissory futures of personalized medicine” that were coming on the heels of the turn to microbiome. Since then, the interest in the human-microbial encounters and entanglements

in metabolic processes only intensified. The current conceptualisation of healthy nutrition, balanced diet and good food cultures highlight the microbial metabolic labour, yet without recognising it as such. Even the SAD diet started to incorporate pro- and prebiotics (e.g. Turnbull, Oliver 2021), and the DIY fermenter rose to prominence as an ambivalent cultural figure (Hey 2020). However, as Maroney warned, the potential vested in the awareness of human microbiome to celebrate “the probiotic ethos” (2020) seems to have been lost in the prevalent healthism, nutritional ableism and human exceptionalism.

Here, we respond to the call and follow labs moving into the kitchens, bedrooms and bathrooms (or other places where we choose to take supplements and inspect our microbiota). We trace concepts and practices of microbiome modulation, diversification of microbiome community or “leverag[ing] gut microbiome’s potential” (Bioactor) through personalized probiotic supplementation and/or modulated diets devised through personalized nutrition plans and apps (e.g. ZOE). Such practices illustrate not only how current approaches to metabolism overflow the earlier conceptualisations of metabolism as “a solely biomechanical processes” (Beldo 2017) and rely on technologies of metabolic intensification, but also might represent “symbiotic engineering” (Folkers, Opitz) that turn to bovine rumen– or as we propose here–human guts as “a new frontier of capitalist expansion to fix the (ecological) crisis of capitalism” while hiding the reasons that made it necessary in the first place.

Yet, since personalized probiotic and personalized nutrition are perceived as future directions in medical and health care, it is important to explore if and how practices of microbiome modulation can open pathways to rekindle the “probiotic ethos” and look for modes of growing awareness to the microbial labour/ers involved in more than human health and nutritional ecologies. Maya Hey has recently argued that “to embody others means to consider their needs [...] to ask what [and how, when, in what combinations] needs to be eaten” (2020) and, to add, what should not be eaten. Leaning against Margrit Shildrick’s concept of “visceral prosthesis” (2021), we want to first identify what forms of “metabolic, ecological and affective labours” (Barua 2018) microbiota perform, secondly what recognition of microbial ‘prosthetic labourers’ could offer to subvert the notion of microbes as a resource in capitalist economies and metabolic entanglements and thirdly, how can we become co-labourers creating solidaristic ecological communities.

Milk kefir: discourse, knowledge and microbial diversity of a "superfood”

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University of Lausanne, Switzerland

For the past ten years, books and conferences dedicated to fermented foods have been multiplying, supported by new knowledge about the intestinal microbiota. Eating fermented foods would not only preserve and strengthen the digestive flora, but also cure certain diseases. One of these popular foods is kefir, whose grains are used to ferment milk or fruit and which are essentially grown and shared at home. Laboratories and industries are no longer the places where microbiological knowledge is developed and shared. In this presentation I wish to present a collaborative and interdisciplinary project that brought

together microbiologists, STS researchers and an online community of kefir practitioners to understand how kefir biodiversity and knowledge around its domestication are produced in the domestic space. I will reflect on the Donna Haraway's concept of "companion species" to think about this connection between microbes and humans in the kitchen.

AMR Standards, Fringe Practices, and Farming Futures: imagining alternative pathways to AMR management in food production

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Antimicrobial resistance (AMR) threatens public and animal health, and the sustainability of food production systems. Since the 2000s, the focus of AMR risk has shifted towards LMICs, legitimising interventionist policies for adopting stewardship and surveillance models (Overton et al. 2021). In food animal production, AMR is predominately framed as one of inappropriate use of antimicrobials, specifically antibiotics, due to lack of user knowledge of antibiotics therapies and poor hygiene practices. The institutional response to AMR has been to develop global policies for standardizing, controlling, and sanitising farm practices, and responses place emphasis upon modernising production systems, improving farm biosecurity, and tightly regulating antibiotic use. However, this framing of and response to the problem overlooks the biosocially demanding settings within which many low-income farmers operate, whereby antibiotic use is but one determinant of resistance. Furthermore, previous – albeit limited – research shows that working with rather than against unruly environments may actually inhibit antibiotic overuse (e.g. Hinchliffe et al. 2018).

The authors, whose backgrounds are anthropology of development, have participated in three separate projects examining animal production and AMR in West Africa (Ghana, Burkina Faso and Benin) and Bangladesh. We have observed farming systems that integrate livestock and aquaculture (ranging from cattle, to small ruminants; from swine to poultry and fowl; or to aquatic species such as shrimp and prawn) with different production modes (e.g. aquaculture with rice production; semi-intensive livestock with pastoralism). Evidence produced by our diverse fieldwork demonstrates how farms in low-income settings operate with high degrees of heterogeneity, along fragmented supply chains, with uneven access to farm inputs and medicines, and thus don’t lend themselves easily to standardisation. Furthermore, farmers adapt their systems to better tolerate the burden of disease and financial loss, introducing modifications on the fringes of standardised farming practices rather than resorting to antibiotic use as the standard method of disease control.

Our argument is not to deny the problem of resistance, but rather to argue against reducing it to antibiotic use and poor hygiene management, which overlooks other AMR risk drivers, or the more ‘probiotic’ strategies farmers adopt to improve the immunities of their animals, their farm environments (be that barn, poultry litter, or pond microbiomes), and their finances. Our case studies demonstrate how the spatial and temporal circulation of bacteria and antimicrobials in animal production systems should be analysed in light of the economic

objectives that social actors set for themselves, that are dependent on the species of animal, bird, or fish being produced, the availability and affordability of farm inputs, and localised knowledge and experience with rearing environments and productivity. With these in mind, we ask rather than modernisation and standardisation of production modes and biosecurity practices, is it possible to manage AMR using an approach that accounts for diverse ecological entanglements and food production practice ecologies (2005), inspired by our observation of the semi-intensive systems in our collective research? And if yes, what political and production models, and forms of intervention should be prioritised?

F.2: From the edge to the core: participatory food environment research in European cities

Session Chair: Alexandra Czeglédi, ESSRG, Hungary
Session Chair: Ewa Kopczynska, Jagiellonian University in Krakow, Poland

Culture.Kitchen: Implementing healthy and sustainable food bottom-up in an intercultural setting

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Culture.Kitchen is an innovative experiment run by Transition Graz[1] - together with two neighbourhood centres in Graz[2], having different social environments. One of these centres operates in the multicultural low-income neighbourhood “Triester Viertel” (formerly it was a worker’s settlement), which is rather “isolated” (physically) and has a bad reputation as representing a societal hot spot within the city. The other centre is situated in a socio economic more diverse neighbourhood, and which does not have clearly defined boundaries due to it’s building structure.

In both neighbourhoods, several activities regarding food have been conducted before the introduction of the *Culture.Kitchen,* e. g. dealing with food sharing, food processing and the improvement of the food supply in the area. The project idea of C*ulture.Kitchen* is based on an examination of the food supply system in the Triester neighbourhood done by IFZ, which included recommendations that Transition Graz has taken up in order to make sustainable food more accessible. The concept of *Culture.Kitchen* is also inspired by the “Kitchen for all”, where food is cooked and served for a donation.[3]

In practice, on each date, someone else cooks his or her favourite dish. Due to the multicultural orientation, these are usually different national dishes. Not only recipes but also the stories of the cooks are discussed. This addresses the social inclusion aspect of the neighbourhood work.

Subsequently, it is planned to integrate questions of sustainable food procurement and health aspects into the Culture.Kitchen. These two aspects are to be addressed bottom-up, taking into account the living environments of the participants and starting from there. At the moment, after 4 cooking sessions, the first aspect of social inclusion is still the main focus. In

the process, different approaches to how health and sustainability aspects can be incorporated are tested.

In this respect, the project is a practical experiment that is to be further developed. Above all, the project still needs to gain experience regarding appropriate settings. The coupling with concrete initiatives of the neighbourhood centers, such as a Food Coop (or the development of a Food Hub) are scenarios for the future.

1 Which is inspired by the community action approach of the Transition Town Movement

2 Neighbourhood work in Graz is a special form of neighbourhood based social work.

3 The focus is not charity, but social purpose.

Everyday food environment of the youth: Applying a PhotoVoice method in Finland

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Finnish Environment Institute, Finland

Youths' involvement in transition to sustainable food systems is important for several reasons. First, youth is a special phase of life where one's personal food-related values are typically reflected on. Second, young people are often fore runners of changes in lifestyles, and they can have new ideas for sustainability. Third, young people are the best experts of their own food environment, but youth often experience that their perspectives are not adequately considered in decision-making.

We present a small-scale participatory research project utilizing a PhotoVoice method on everyday food environment with young people in Finland. The study aims at producing understanding of the young people's experiences related to their everyday food environments as well as the suitability of the method in supporting young people's agency in sustainability transition. The Photovoice method is intended to empower vulnerable groups to enhance their needs and perspectives in societal decision-making by utilizing a documentary photograph, critical group discussions and dissemination of the outcomes of these critical reflections.

We have recruited three different groups of voluntary young people from urban and rural environments. The participants in the groups will study and photograph issues in their food environment that hinder or facilitate them to act according to their values. The groups will also collectively reflect upon their understandings and deliberate potential solutions to more sustainable food environments. In the presentation we will focus particularly on how the PhotoVoice method allowed the participants to share and reveal their personal perspectives and to collectively construct and mobilize knowledge on their everyday food environments. We will concentrate especially on the expression and dealing with vulnerability in PhotoVoice methodology.

Photovoice-based food environment mapping with single parents in the 8th and 9th districts of Budapest

Vanda Pózner, Diana Szakál, Alexandra Czeglédi
Research fellow, ESSRG, Hungary

The food environment is a fairly new concept with several definitions. Turner et al. (2018) attempt to reconcile competing definitions of the food environment, building on the FAO (2016) report, which is rooted in socio-ecological theory. In light of the sociological turn in food system mapping, photovoice is a creative and visual participatory methodology that can be mobilized in low-resource research projects.

In Hungary, there is an increasing number and proportion of new family patterns (i.e., cohabitation, mosaic families, families without children, and single-parent families) that differ from the traditional marriage-based family type (Máté, 2018). In recent decades, the share of single-parent families increased from 7% to 14% (Harcsa–Monostori, 2014). Therefore, in the PlanEat EU Horizon 2020 project, we started working with single parents, predominantly single mothers, in one of the most vulnerable districts of downtown Budapest. The aim of the research is to understand their perspectives, struggles and needs in relation to the local food environment in the 8th and 9th districts of Budapest.

To better understand their perspectives, a three-step mixed methodology allows us to collect (1) quantitative data on the food environment and (2) qualitative data on participants' subjective experiences and perceptions through photovoice-based visual storytelling. The qualitative participatory methodology builds on the dimensions of the quantitative survey to gain a deeper, more reflective understanding of food environments.

The combined methodological approach allows researchers to include the availability, accessibility, price and socio-cultural aspects of participants' environmental food supply and environmental practices and promotion. The qualitative-participatory methods complement the quantitative method and reflect the three food environments integrated into the survey (home food environment, food purchasing/purchasing/home growing environment and dining environment).

“Food itself is not a problem here”. Lessons from researching and designing transformations towards more inclusive food systems

Ewa Kopczynska
Jagiellonian University in Krakow, Poland

Food security is a widely shared social value and a rationale of transformations towards more sustainable food systems. Groups with limited access to nutritious and culturally acceptable food are often target of public interventions, NGOs, bottom-up activities and informal, everyday coping strategies. However, these interventions and initiatives are usually standardized and focused either on managing the consuming bodies (education, biopedagogy) or on food itself (food aid). In my presentation I argue for engaging wider, heterogenous social-material compositions which shape eating experience. Applying participatory techniques and taking a closer look at food aid practices in real-life setting unveils the role of food arrangements and non-food material objects. These arrangements are not merely a company for food, but they co-define the eating situation.

Social practice theory provides the theoretical frame for the heterogeneity of eating experience: as a bundle of bodily activities, mental activities, material objects, meanings, knowledge, sayings etc. (Reckwitz 2002). Actor-network approach helps to grasp the active status of non-human and non-food actants, like tables and plates, packaging, TVs and refrigerators, but also pandemic, hygiene regulations, weather etc.

The presentation draws on research of food aid in Krakow (NCN, 2018-202) and ongoing project on eating behaviours of children with low socioeconomic status (EU, Plan'Eat 2022-2026). It hypothesizes that when designing more sustainable and inclusive food systems, we need to widen the focus from education and food to more complex arrangements. Diversity of these local arrangements need to be recognized and re-organized for and with the groups being part of them.

F.3: Food Justice in Alternative Food Networks: theoretical, empirical and transdisciplinary perspectives

Session Chair: Sandra Karner, IFZ, Austria
Session Chair: David Steinwender, IFZ Graz, Austria

Agroecological Transitions: A Systematic Literature Review of an Emerging Field of Research

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Transitions from conventional agri-food systems to more sustainable systems involve adaptation processes through a combination of technological and policy changes, involving multiple actors. The European Union, for example, has set up programmes to support Agroecological Transitions, expecting that these will produce environmental and social benefits, ensuring the viability of the farmers and the agri-food systems. The concept of Agroecological Transitions has been adopted as the way forward to reduce the negative impacts of agriculture and agri-food systems on ecosystems. However, there is a lack of knowledge on understanding how these transitions can be implemented on a landscape scale. This review aims to provide an overview of the scientific literature on "agroecological transitions", to understand how the available evidence is structured and to point the way to future research. This article is based on a systematic bibliometric review using the Scopus and Web of Science databases, with the term "*agroecologic* transition**". These databases provided a total of 320 documents. After refinement, which was intended to select only papers published in English, discarding duplicates, 106 documents remained and composed the universe of analysis. The Vosviewer software was used for the analysis, and the state-of-the-art mapping provided us with the main keywords of the documents, and their cooccurrences, as well as the bibliometric network of the authors involved in the publications. The articles that explore the idea of "agroecological transitions" have their centrality in the

word "agroecology" (with 44 occurrences), and three other main descriptors stand out: "sustainability" (24), "management" (22) and "systems" (17). The possibility of mapping the authors' network in co-citation, offered by the software, shows that they group into eight clusters. By the criteria of reading and analysing the content of the articles, we conclude that there are different patterns underlying the idea of agroecological transition. We identified that: 1. the first cluster connects articles by the relation of agroecological transitions to social movements and the political sphere; 2. the second cluster groups publications that emphasize the role of cooperation between actors for the development of agroecological knowledge; 3. the third considers the choices and motivations of farmers in adopting, or not, distinct techniques and practices; 4. The fourth relates agroecology to pedagogical aspects of knowledge diffusion; 5. The fifth approaches agroecological transitions from a territorial focus; 6. The sixth deals with the transdisciplinarity of agroecological transitions; 7. The seventh brings together works that employ the sociotechnical system's framework; and the last, whose publications are connected by the use of indicators, criteria and tools to assess sustainability. We conclude that the idea of "agroecological transitions", in scientific communication, is still recent and is concentrated around a few themes. On the other hand, the articulation with contents from other areas points out that there is a transdisciplinary character, relating it to new concepts. This also provides several research possibilities, especially in the economic and technological field of transitions. In the future, the development of policies should focus on improving the implementation of instruments to circumvent the barriers that have hindered transitions to agroecology.

A Socio-metabolic Research (SMR) Perspective on Food and Nutrition Security in the Caribbean

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Socio-metabolic Research (SMR) is a concept rooted in systems thinking that offers a suite of methods to investigate resource-use patterns in space and time, and their dynamic feedbacks with the political and social dimensions. This talk will introduce socio-metabolic research (SMR) to illustrate the Caribbean's vulnerability with respect to food, nutrition, and societal wellbeing. Frequently exposed to shocks, the Caribbean is one of the most disaster-prone parts of the world exposed to climate-related extreme events such as hurricanes, droughts, and flooding. From being a net exporter of food, the Caribbean underwent a transition in the 1970s to become a net food importer. The region currently imports 83% of its food requirements in monetary terms, and is only 67% food self-sufficient in physical terms, dropping from 78% in year 2000. At the same time, 67.5% of the population faces food and nutrition insecurity, in contrast to the global average of 27.6%, with moderate to severe health consequences. Policies incentivizing cheap food imports has undermined local food production capacities, making the region susceptible to disruptions in food supply, the impacts of which are socially unequal and lasting. The talk will end by highlighting inherent “socio-metabolic risks” arising from the availability and circulation of food resources.

Perceived justice of the Dutch food system transition

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In the Netherlands a transition of the food system is ongoing as increasing numbers of initiatives aim to shape a more just and sustainable food system. To ensure that the transition is just, it is important to evaluate its progress, or lack thereof. We developed a conceptual framework based on recognition, distributive and procedural justice adapted to food system transitions to capture different perspectives on justice. We recognise that food systems and the transition process itself shape, and are shaped by, the local context. This highlights the need to evaluate the justness of the transition with those locally affected by the transition. How do local actors perceive the justice of the current transition towards a sustainable food system?

In our case study area of the North of the Netherlands we used purposive sampling to engage with a total of 27 actors from across the food system, including producers, processers, consumers, and financial and educational actors. They were either personally involved in the food system or played an active role in the region through their organisation. In an interview we asked them (1) which initiatives and changes in the food system were they aware of and (2) whether they thought these were making the food system in the region more just or unjust, leaving it to them to define justice. We identified justice conceptualisations that emerged from the responses and compared these with the conceptual framework we developed.

Respondents were aware of different types of initiatives including Community-Supported Agriculture and consumer-led and producer-led Alternative Food Networks. They also discussed changes in government and financial regimes. Overall, respondents were critical of the ongoing transition for producers, future generations, low-income households, and non-humans amongst others. Most perceived the food system becoming more unjust rather than more just. Respondents held plural conceptualisations of justice that at times contradicted each other. For example, some considered it just that there is increased support from consumers to buy sustainably produced food but at the same time felt it was unjust that producers had difficulties to create a viable livelihood due to current markets and political and financial constraints. Also between participants there were contradicting conceptualisations. For example, some perceived it a justice obligation that Dutch farmers produce food to combat hunger elsewhere in the world whereas others considered this unjust as it disrupts local markets. In comparison to the conceptual framework few respondents mentioned procedural (in)justices.

This study evaluated the justness of an ongoing food system transition with local actors. It identified different ways in which the current transition has addressed injustices, but also that it has reproduced existing injustices and created new ones. The plural and at times contradicting justice conceptualisations that emerged show it is important to make these

different perspectives on justice explicit. As the food system transition continues, a dialogue process that brings together these different perspectives will help to ensure a just transition.

The Model of Open Cooperativism: the Case of Open Food Network

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Panteion University, Athens, Greece

This presentation is part of the research program “Techno-Social Innovation in the Collaborative Economy”, funded by the Hellenic Foundation for Research and Innovation (H.F.R.I.) for the years 2022-2024. The presentation showcases the Open Food Network (OFN) as an open-sourced digital platform supporting short food supply chains in local agricultural production and consumption. The presentation outlines the research hypothesis, the theoretical framework and methodology of research as well as findings and conclusions.

Research hypothesis: The model of open cooperativism as a vehicle for systemic change in the agricultural sector.

Theoretical framework: Research reviews the OFN as an illustrative case-study of the three-zoned model of open cooperativism (Bauwens et al. 2019; Kostakis and Bauwens 2014). The OFN is considered a paradigmatic case of the model of open cooperativism inasmuch as it produces commons, it consists of multiple stakeholders including ethical market entities, and it is variously supported by local authorities across the globe, the latter prefiguring the mini role of a partner state.

Methodology: Research employs Ernesto Laclau and Chantal Mouffe’s discourse analysis - elements, floating signifiers, nodal points, discourses, logics of equivalence and difference - to analyse the breadth of empirical data gathered through literature review, digital ethnography, a survey and in-depth interviews with core OFN members. Discourse analysis classifies OFN floating signifiers, nodal points and discourses into four themes: value proposition, governance, economic policy, legal policy.

Findings: OFN floating signifiers align around the following nodal points and discourses: “digital commons”, “short food supply chains”, “sustainability”, “local”, “the elimination of intermediaries” and “systemic change”. The current research identifies a lack of a common ground of what the discourse of “systemic change” would imply on the premises of the OFN’s value proposition. The lack of a common mission may be detrimental to the formation of a common strategy that would be perhaps deemed necessary to bring about systemic change in agriculture.

Conclusions: Drawing on Laclau and Mouffe’s discourse theory of hegemony, research introduces a chain of equivalence by aligning discourses such as “agro-ecology”, “commons-based peer production”, “partner state” and “ethical market entities” under the model of open cooperativism, the latter juxtaposed against the current hegemony of neoliberalism, which articulates discourses such as “market fundamentalism”, “privatization”, “green growth” and “the capitalist state” to promote corporatism and entrepreneurship. Research makes the case that for OFN to further agroecology and challenge the current hegemony of industrial agriculture, it is vital that it opens up its supply chains into equivalent sectors of the economy,

civil society and politics to form a chain of equivalence linking together ethical market entities, the commons and a partner state around the model of open cooperativism.

Strategies towards democratic food citizenship for all in alternative food networks

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There is a growing scientific consensus about the need for collective responsibility to act on food issues that support the development of sustainable food systems. Although participation in the political community may be challenging to exercise, almost utopian, it is argued that democratic engagement gives individuals a sense of belonging, responsibility, and empowerment that may encourage them to commit to the environmental and social sustainability of food systems. In contrast to the identity of people as merely passive consumers, movements such as food justice offer a place for learning and practising democratic food citizenship – i.e. active citizens concerned with the public interest and community good. Democratic food citizenship addresses inequality in food systems, their environmental effects and health issues and enhances diversity within food systems through the adoption of democratic principles and practices in food systems. There is a large body of literature examining how alternative food networks provide spaces for practising democratic food citizenship. However, despite their efforts to be inclusive and accessible, alternative food networks have been found to often promote narrow and elitist strategies at the expense of other societal interests and groups. So far, researchers have mainly focused on examining concrete types of alternative food networks and their underlying values and democratic practices. This study adds a more analytic perspective on how different types of alternative food networks approach social inclusion as a crucial dimension of democratic food citizenship. To this end, it explores the strategies different initiatives (such as community gardens, community fridges, food banks, community cafés, food co-operatives, or food partnerships) employ to promote democratic food citizenship among vulnerable, marginalised or discriminated social groups. Using the city of London (UK) as a case study, this research uses an ethnographic approach that melds different qualitative methods (i.e., participant observation, qualitative interviews and document analysis). To guide empirical research, I propose an analytical framework for democratic food citizenship that differentiates four propositions: (i) truthful, sufficient, and comprehensible information about food and food systems; (ii) reconnection, integration, and mobilization of different actors; (iii) participation in collective action; and (iv) participation in food governance. The results show various strategies for promoting democratic food citizenship depending on the targeted groups (e.g., LGBTQ+, black people, economically disadvantaged people, immigrant women). However, there seem to be some common basic approaches such as inclusive language, a consciousness of biases, overcoming stigmas and cultural, mutual respect. Findings from this research also illustrate the importance of cross-sectoral and cross-level collaboration among alternative food networks as well as with other institutions and organisations to promote the participation of vulnerable groups and marginalised communities in food governance.

CoopsForFood: Addressing social exclusion of alternative food provision schemes

David Steinwender, Sandra Karner
IFZ Graz, Austria

Marked-based alternative food provision schemes (AFPS) such as farmers' markets, farmers' shops, box-schemes and on-farm sale as well as community-based alternative food provision schemes such as food-coops, CSAs, community gardens and community owned grocery stores, have found their niches in our case study area in the city of Graz, Austria. These schemes have been attributed to have some potential to transform the food system.

However, now, some years after they have been established in their markets, empirical data can be collected in order to investigate whether they can actually redeem their ascribed potential. Looking at the socio-economic and cultural background of members resp. consumers of AFPS's in Graz, one can see that they lack of social inclusiveness.

Barriers regarding the participation of, for example, low income consumers or people with migrant backgrounds have multiple and interlinked causes, which IFZ has been exploring in the course of two research projects: 1) the accessibility of a farmer's market was examined in the scope of exploring potential improvements of the food supply system of the Graz Triester Neighbourhood, 2) in 'CoopsForFood'[1] further exploration of these barriers have been made in order to develop a framework to increase the social inclusiveness. For this, an AFPS-model (we call it 'super coop') based on food hubs[2] connected by a multi-stakeholder cooperative was developed.

The paper discusses the potential and limits of this super coop in regard to identified barriers such as time, space, price and belonging.

1 Funded by Klima- und Energiefonds - Project consortium: IFZ, RCE Graz-Styria, the cooperative union 'Raiffeisen Styria'

2 such as the 'Lebensmittelpunkte' in Berlin

F.4: (M)eating the future: technologies, materialities, and politics of food

Session Chair: Désirée Janowsky, Technische Universität Darmstadt, Germany
Session Chair: Martin Winter, TU Darmstadt, Germany

Cultivated meat as a technology "to save the world"

Clara Wieghorst
Technical University Chemnitz, Germany

Cultivated meat is presented as a technology that not only has benefits on an individual level for both animals and humans but also on a global one: for individuals, it eludes or at least minimizes the suffering of animals and is potentially healthier for its human consumers than meat from slaughtered animals which tends to be contaminated by antibiotics or involves the danger of transmitting diseases (which can lead to pandemics as the past years with COVID-19 have shown). Globally speaking, the cultivation of meat can reduce the amount of greenhouse gas emissions produced by animal farming which has a huge contribution to global warming. Thus, the cultivation of meat seems to be a technology which can solve different problems at a time. Consequently, it has become a promising emerging industry that has attract the attention of investors.

My talk seeks to test different STS vocabularies to describe how cultivated meat as a technology to improve the world ("Weltverbesserungstechnologie") functions. Are we dealing with a kind of solutionism that could be described as a 'socio-technical imaginary' (Jasanoff 2015)? Or is presenting cultivated meat as a technology to improve the world a problematization, i.e. the first step of the four moments of translation articulated by Michel Callon (1984)? How does Callon's sociology of translation enhance our understanding of cultivated meat? Where, if at all, can we find the moments of interessement, enrolment and mobilization? What kind of insights can be gained from Annemarie Mol's (2021) appreciation of the eating human as being entangled with and dependent on its non-human environment? What kind of actor-networks can be observed when edible and inedible entities connect to eventually become a steak? How may these actor-networks challenge what usually counts as nature and what as culture?

Drawing on my fieldwork at conferences and on interviews with experts who work in the cultivated meat industry, I would like to give some preliminary answers to these questions. The aim is both to better understand how cultivated meat will shape the future of food for a more sustainable world and to sharpen the STS vocabularies we have to grasp this future.

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Synthetic Meat as Promissory Assemblage

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Meat production is pointed as a resource-intensive industry that needs transformation when addressing the efforts against Climate Change. However, its consumption has been increasing worldwide in the past decades due to the growth of the middle classes and the consequent changes in food consumption, especially in the Global South. This increase has motivated technopolitical innovations in the field: synthetic meat emerged, promising solutions to the most devastating impacts of dietary protein production. We conceive synthetic protein production as a promissory assemblage, dissecting three interlinked sectors. (1) Environmental: In response to livestock's high water and carbon footprint, the industry promises to reduce the environmental impact of global protein production. (2) Ethical: Aiming to shift consumption habits, the industry promises less animal suffering and killing. 3) Health: Given strict regulations for quasi-laboratory ways of production, the synthetic protein industry promises to reduce the risk of future zoonotic events and to use bioengineering to make meat healthier. While this promissory assemblage could deliver some positive impacts, we wish to highlight other, far less calculated risks, such as the amount of energy demanded to upscale the production process, the supply chains of mediums, and the securitization of laboratories in order to avoid contamination. We argue that, as a promissory assemblage, synthetic meat includes a set of uncertainties and unexpected and unintended outcomes which, paradoxically, nurture the cultured meat industry’s promissory lure. Our contribution is based on expert interviews with scientists, food designers, investors, and politicians, as well as visual analysis of synthetic food products’ promotion. Looking at synthetic meat as a “cluster of promises” (Berlant, 2011), we side with attempts within STS to imagine an alternative techno-scientific future for meat production and consumption.

"Show them More than the Bloodstained Apron" - Criticism, Recognition and Changing Values in the Butcher's Profession

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After the industrialization processes of the 19th century extended to meat production, its quantity and availability has greatly increased. In the process, it has become a symbol of technological progress, growing wealth and prosperity (Kassung 2021). Today, however, the food is increasingly coming under criticism: it is associated with harmful consequences for the environment, linked to physical illnesses, and the ethics of animal husbandry are also being questioned in the context of animal rights movements. The re-evaluation of meat as a

foodstuff and the production conditions associated with it does not leave the butcher's profession unscathed. As a result of this change in values, the butchery trade finds itself in a structural crisis and is subject to increasing pressure for legitimacy. This is evidenced not least by the decline in butchery businesses in Germany and the unpopularity of the training profession. In order to withstand this legitimization pressure, the skilled trades are developing various strategies to increase appreciation and recognition against the backdrop of a changing and polarized market, according to the thesis of this presentation. The concept of social space (Bourdieu 2015 [1985]) and micro-sociological approaches that consider the negotiation of recognition in stigmatized occupational fields (cf. Hughes 1958, among others) serve as a theoretical frame of reference. Against the backdrop of growing criticism, there is an attempt to revalue meat by staging and aestheticizing it as a healthy and culturally valuable food. Negative consequences of meat (production) for health and the environment are thereby negated by recourse to pre-industrial fictions of the butcher as a local provider. The profession of the butcher is constructed as a masculine cultural profession with which values such as innovation and dedication are associated. This paper examines the strategies of re-staging the profession and opens a perspective on the changing values in the field of food production.

F.6: Various Perspectives on Sustainable Food Systems

Session Chair: Sandra Karner, IFZ, Austria

The Sustainability of South Africa's Agri-Food Trade: The WEF-LEC Trade Balance

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More sustainable and efficient resource use is a prerequisite for the survival of our species and our planet. Two key problems facing sustainable development and resource use are a lack of frameworks available to quantitively assess them and the 'silo approach' to resource management. To combat these problems, and ensure the sustainability of our planet, transdisciplinary and transformative approaches in resource management, development, and utilisation are required. In addition, new frameworks, and analysis techniques, will need to be developed to assess sustainability. The first goal of this paper is to develop such a framework. We therefore propose a new framework called the Water-Energy-Food Land-Economy-Climate (WEF-LEC) framework. This is an all-encompassing framework for the assessment of sustainability, in particular sustainable resource use, and focusses on assessing the sustainability of production.

Prospects of shrinking arable land, limited water availability, and climate change, together with a rising global population, pose formidable challenges to future food security. Trade in agricultural and food (agri-food) products will be a crucial component of adaptive responses to future food insecurity. Agri-food production and trade have a significant impact on water, land, and energy use, whilst also having large environmental and economic consequences.

Given the substantial, and wide-ranging impacts, frameworks which comprehensively account for the impact of agri-food trade are required to support sustainability. The second goal of this paper is to utilise such a framework to assess the sustainability of agri-food trade. To do this, we use our newly proposed WEF-LEC framework and assess the sustainability of agri-food trade in South Africa. We choose South Africa as it is an agri-food exporter, whilst also being a resource constrained, developing country aiming to reduce its environmental impact. We utilise and adapted EIO-LCA model to determine the impact of South Africa's agri-food trade on the WEF-LEC framework. Despite exporting 25% more food than they imported in 2020, we show that the production of South Africa's agri-food imports required 65% more water and 44% more land than exports. Further, imports generated 98% more CO2 and 103% more PO4 emissions than exports. Finally, we show that South Africa generated 64% more value from their agri-food exports than imports.

Food system and biodiversity loss: preliminary results from a systematic literature review

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Notwithstanding its recognized importance for human life, biodiversity i.e., the diversity within species, between species and ecosystems, "is declining faster than at any time in human history, and perhaps as fast as during any mass extinction" [1]. As recognized by several scholars, the food system is one of the main drivers of environmental degradation [7] as well as the observed biodiversity decline [2].

Agriculture contributes to habitat destruction and biodiversity loss by converting land and therefore modifying natural ecosystems on which the survival and thriving of wildlife species depend. Moreover, agriculture intensification reduces the quality of available habitats [1]. Freshwater wildlife is affected by agriculture due to water extraction while water quality is reduced due to soil and farm chemical run-off. Marine ecosystems are damaged by downstream pollution (fertilizers, pesticides, etc.) and fishing [1]. Moreover, the food system indirectly drives biodiversity loss through its contribution to climate change, accounting for roughly 30% of all anthropogenic emissions, with animal agriculture alone accounting for 16.5%. Climate change impacts biodiversity by changing habitat suitability for species, which are induced to move to a different location as other species move in, affecting the resilience of ecosystems [1]. These impacts are the result of the tenets that have prioritized higher food production and lower prices, for the support of the global population and economic growth, over planetary health, which has led to the externalization of the costs of food production on the environment [1].

At the same time, food production is strictly dependent on biodiversity and the services that it enables because it directly supplies food and because it sustains the underlying ecosystem processes that make agriculture possible, such as water supply, soil fertility enhancement, pollination, and natural pest control [1]. Biodiversity is indeed an "enabling resource", a factor influencing the productivity of natural capital [3]. Other than supporting and enabling food

production, it provides and enables multiple benefits to humankind i.e., ecosystem services [5].

Being such a complex issue, a systematic literature review (SLR) is employed to understand the main aspects addressed in the literature and classify them according to emerging alternative narratives. Methodologically, literature is initially selected following the four steps of the PRISMA protocol: identification, screening, eligibility, and inclusion [6]. Then, relevant literature is clustered through a bibliometric analysis conducted with R studio, which allows for identifying core research areas or authors, as well as their relationship [4]. In particular, science mapping techniques are used to gain a comprehensive understanding of arising topics and narratives – through words co-occurrence networks, and to identify countries' contributions to the topic – through co-authorship analysis. Clusters are then analysed qualitatively to gain a deeper understanding of the identified impacts of the food system on biodiversity. This in turn will allow pointing at those changes in the food system that need to occur so that it meets the needs of the growing population while remaining within the planetary boundaries.

Plant-based diets as a social innovation - How their diffusion process can be better understood considering the personal involvement of the individual

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The protein transition promoted by the United Nations and the Food and Agriculture Organisation of the United Nations can contribute to achieving some of the Sustainable Development Goals (SDGs), such as "Zero Hunger" or "Climate Action". Social innovation addresses social problems and aims to improve social services. Some of the solutions proposed by social innovations are sustainable for some societal challenges such as climate change, among others. But although there is great interest on the global stage in promoting plant-based diets in order to achieve some of the Sustainable Development Goals (SDGs), the results of the diffusion of such diets are unsatisfactory. Scholars propose to untangle this effort by addressing the challenges of diffusion of social innovations.

This research work aims to better understand the diffusion of social innovations, such as plant-based diets, which may induce socio-psychological concerns in potential adopters due to their personal involvement. In this sense, this research postulates that communication between the prior adopter and the potential adopter cannot be considered a sufficient condition to trigger the process of imitation and subsequent adoption. In this sense, special attention is paid to the imitation processes that may depend on some attitudinal characteristics of the potential adopter.

An exploratory, inductive and theory-building effort has been carried out, based on a cross-analysis of three different adopter profiles (Gen Z, Gen Y and Gen X), with a total of 69 semi-structured interviews. Generations Y and Z are more likely to consume plant-based foods and specifically, Generation Z is the most interested in them. For Generation Y, wellness is a key element in their daily lives and plant-based diets have an established penetration in this

age range. Social innovations generate different attitudes in the adoption process, some of them related to socio-psychological aspects of potential adopters. But it is noted that the conversion from trial to repetition remains low; therefore, trying plant-based diets is no guarantee of adoption.

After the analysis, it is observed that social norms, i.e. traditions and even parental feeding education can be a barrier to adoption. Furthermore, if the potential adopter does not dare to experiment and step out of his/her comfort zone or he/she experiences some kind of internal disharmony (cognitive dissonance), these mental and psychological states may prevent him/her from adopting a plant-based diet even if there are prior adopters in his/her close social network. Finally, it is observed that the individual's close social network may modulate the comfort zone and/or cognitive dissonance of the potential adopter, encouraging or discouraging his/her decision to imitate.

Thus, effective adoption of a social innovation may require personal involvement of the potential adopter. Therefore, the imitative act will be successful if the potential adopter overcomes his or her comfort zone and/or cognitive dissonance. This research paper outlines a new conceptual framework for understanding the effects of evolutionary processes of communication and imitation on the diffusion of social innovation. Furthermore, new socio-technological perspectives on the theoretical and practical implications for the effectiveness of the diffusion of social innovations emerge.

Designing Healthy Circular Food through Citizen Engagement in Research and Innovation at University: an experimental approach

Igance Adant, Joaquin Esteban Landazuri
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Scientists have widely acknowledged that our food systems (FS) pose significant strain on the environment and have adverse effects on both health and livelihoods. To support the transition towards sustainable FS, it is imperative to revise research and innovation (R&I) practices, by supporting, among others, the development of Circular Oriented Innovations (COI).

How can research and innovation (R&I) processes be adapted to ensure that the potential impacts of FS on citizens' socio-economic condition, environment, and public health are considered and integrated by researchers and innovators at an early stage in their work?

While there is a growing interest in establishing bidirectional exchanges between society and academia, there is little evidence about the added value of citizens engagement in R&I processes at university to produce better scientific knowledge and evaluating potential impacts of innovations.

This raises questions regarding the appropriate methodology for understanding the role of citizens in R&I, and how to effectively modify research processes within and outside of universities. These challenges become even more significant when considering the implementation of Healthy Circular Food (HCF), that is food incorporating a significant waste fraction.

To evaluate the effects of citizen engagement on scientific knowledge production at universities, we designed and conducted an experimental study that tested protocols for involving citizens systematically in the research process. The experiment centered around Algorella, a microalgae-based pesto produced with brewery waste and vegetable oil production by-products. The target audience for this product included vegetarians, vegans, and elderly individuals who are deficient in vitamin B12.

In this experimental setting, 23 citizens from the Brussels Capital Region (BCR) participated in parallel workshops implementing a Design Thinking approach. Throughout and after the experiment, researchers had access to comprehensive observations and records of citizens' activities. This allowed for a meaningful comparison between the knowledge generated by and with citizens and the existing knowledge held by the innovators before the experiment.

Our analysis shows what knowledge is created through these (experimental) protocols. Firstly, it reveals the key needs identified by citizens regarding Healthy Circular Food (HCF) and compares them with needs prioritized by innovators. Secondly, it sheds light on the variability in food consumption choices in (BCR - an aspect that was previously overlooked by innovators. Thirdly, it highlights the connection between individual needs and collective interests that citizens addressed in an innovative food product, allowing for a more comprehensive evaluation of the innovation and its impacts on both individual health and the wider social and environmental implications that matter to citizens. Finally, it emphasizes that co-creation is a challenging process, as citizens may struggle to shift away from a market research mindset in such settings, requiring additional protocols to facilitate their participation.

In conclusion, our results demonstrate that involving citizens in research and innovation for HCF at universities can contribute to the creation of complementary knowledge that enhances the understanding developed in the university labs. Rigorous written evaluations and feedback protocols used with innovators confirmed this. We discuss the limitations of our study and outline future directions for research.

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Stream G: Life Sciences, Biotechnology

G.1: Hope, Hype and Lowering Expectations in the Life Science Industry

Session Chair: Armin Spök, TU Graz, Austria

Two steps forward, one step back; Low expectations as the conservative wing of coalition for innovation and technoscience; Surfing on the wave of high expectations

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Recently within the STS literature, there has been a call for increased attention for sociology of low expectations, following mostly Gardner, Samuel and Williams (2015). Gardner, Samuel and Williams (2013) use the example of Deep Brain Simulation (DBS) as recovery technologies while arguing for their framework's usefulness. They position it within “political economy of hope” research, which points out that biological citizenship is the main structure shaping the form of expectations (Brown 2015, Novas, 2006), Although within the low expectations work, it is rightfully claimed that the “recalibration” for the individual patient is an important element, understanding the development of the intervention technologies still requires vanguard visions of Hilgartner (2015) and sociotechnical imaginary at large of Jasanoff (2015), due to the promise of technological novelty of the techniques of intervention. In other words, the technological infrastructure that low expectation recalibration targets still move within broader societal vanguard visions and technoscientific imaginaries.

As a practical example of the above framework, I will present two different research cultures in the making of biotechnology (Sample and Altinok, forthcoming), MCELS (Multicellular Engineered Living Systems) in the USA and REBIRTH (From REgenerative BIology to Reconstructive THerapy) in Germany, and will compare their respective discourses. I will do this through the aid of philosophy of science research on the making of objects, showing how various kinds of users of the same framework and concepts interact through different meanings of the same technological visions. Following the previous analysis (Altinok, forthcoming), I will claim that recalibrated and not recalibrated versions of technoscientific expectations constitute different wings of the same discourse coalition. Within the case study, the discussion to the field of objects in the making, particularly those without regulation bring about new challenges (Haddad and Gottweis, 2013). With respect to these technoscientific objects, the doubt in the “use” of the technologies of intervention with a very strong belief in the engineering, makes the object side of the innovation within technoscientific imagination up. The expectations that are embedded within the function of the objects are being carried through an entity realism towards the objects, by being conceptualized in a way that is relatively context independent, or context free (Hacking, 1975). The more practical aspect of recalibration, with respect to truth being a necessity within patient groups and collectives due to their epistemically superior position with respect to the experts – usually researchers – in terms of outcomes, necessitates similar low

expectation regimes. Overall, this case shows that, since there being many different kinds (as in directions or ways) of solution, and high expectations through vanguard visions being the norm of everyday life within the techno scientific societies, such “attractive” high level promises (Brown and Michael, 2003) might be necessary as well within the general structure of promising, fulfilling the task of the dual nature of expectations of technoscience in action, requiring calibration always within its modus operandi.

“The crucial role of biobanks” and the persistence of fragmented collections of biological material: expectations and frustrations in the making of a Greek network of biobanks

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Biobanks have emerged as a ‘new’ type of institution that collect biological samples and associated data that may be used in biomedical research beyond the confined site of their production, by outsiders. They constitute a key infrastructure in biomedical research and are embedded in discourses full of promises about future human health. As infrastructures, biobanks can be hidden, while their practices may be considered mundane. At the same time, biobanking practices are in need of harmonization and standardization at a national, regional and global level. Moreover, biobanks are complex infrastructures as sites of interaction between the public, patients, researchers, physicians, bioinformaticians, regulators, policy makers and companies.

Our paper focuses on the project to develop a “Greek network of Biobanks”, named BBMRI.GR, while exploring the ways biobanks have been developed in Greece and, more specifically, the ways different types of biorepositories/collections have positioned themselves in a biomedical/research/clinical landscape formed by publics, patients, researchers, regulators, research institutions, clinical facilities and industries. Since there is no national biobank in Greece, the project sought to interconnect the smaller collections of biological material and to connect Greek biobanks with the BBMRI-ERIC (the European research infrastructure for biobanking and biomolecular resources in health and life sciences).

For our study, we employ a multi-method qualitative approach, studying archives and documentary sources as well as news items, and conducting interviews in different biobanks (disease-specific and generic collections) in Greece. Our research is ongoing and our aim is to explore the contingencies in the biobanking initiatives.

We pay attention to the biobanking practices of different biomedical research centers in order to attend to the heterogeneity of biobanking and to the local practices employed. While the different collections of biological material seem fragmented, at the same time project-driven biobanking activities have grown, as they connect to large-scale projects, for instance, on Precision Medicine. The overall discourse on creating a network of biobanks (and possibly a national biobank) is embedded into a rhetoric of expected public health benefits and economic growth. When specific benefits are articulated, they connect to clinical trials and

new diagnostics that are coupled with private interests. To date, the BBMRI.GR has not fully materialized.

Our aim with this paper is to demonstrate the contrast between the promissory discourse on biobanking as a national infrastructure and the persistence of local practices in biobanking activities. By exploring the concrete practices of biobanks at a national setting, the hybridity of their configurations and context-specific technoscientific expectations, we hope to contribute to a better understanding of the complexities of making biobanking 'valuable' (Aarden, 2021).[1]

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Can we afford personalised medicine in future European health systems?

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The paper aims at introducing the options of personalised medicine (PM) as part of European models of care and what implications personalised medicine treatments and diagnostics generate in terms of affordability and payment. While PM solutions offer new prospects to critical diseases, they pose a serious challenge to the current health systems. Accordingly, the paper opts for a discussion for reconsidering such health systems.

Background

In an era of persistent and increasing pressure on health care budgets across Europe due to demographic change, unbalanced national age pyramids, increased demand of care and rising health care costs, personalised medicine is the hope of many patients, health experts, and policy makers to find and implement more efficient and effective ways to cure diseases. Personalised medicine aims to optimally match patient and treatment by assessing the characteristics of patients in which treatments lead to health improvements.

Personalised medicine (PM) is promising as it is expected to increase efficiency through better targeting of treatments. However, while the development of personalised medicine treatments is generally an academic endeavor, its commercialization is usually profit-oriented, reducing the efficiency potential of technologies through high pricing. Commercially marketed products such as biomarkers are frequently priced at the margin, following companies' analyses of 'what the market can bear', rather than based on the health benefit to patients. Therefore, there is a need for alternative approaches considering equity, affordability, payment and reimbursement models that support innovation and link financial reward to health outcomes.

Methodology and empirical base

In our paper we will present some preliminary approaches of the EU funded project HEcoPerMed ("Healthcare- and pharma-economics in support of the International

Consortium for Personalised Medicine – ICPerMed"), including case studies and scenarios of personalised medicine making a difference in future health models in Europe. The project aims at combining quantitative as well as qualitative approaches.

While health-economic analysis and modelling asses the health-economic and quantifiable implications of such PM solutions, a scenario-based qualitative approach relying on a trend monitoring creates four alternative health-system related settings in which PM solutions for the future are assessed. Construction of our scenarios demonstrates future options for financing and reimbursement models for PM in Member States and the EU and provides incentives for the discussion of alternative health care models.

Conclusions

Our research so far points a pressure on the current health system for change in terms of funding and reimbursement models. Current European health systems will not be able to pay for PM in diagnostics and treatments as these solutions will make overall health provisions not cheaper but more expensive. Though it is very likely that major features of the current European social models of care will persist in the future, new features are very likely to be added, some present ones will face the need for change and reform due to the introduction of more personalised health solutions as regular treatments and diagnostics.

Stream H: Teaching STS

H.1: Hype or sustainable change: What remains of the Digital Transformation in Higher Education?

Session Chair: Yves Jeanrenaud, Ludwig-Maximilians-Universität Munich, Germany
Session Chair: Maria Grandl, TU Graz, Austria

Sustainable transformation of intercultural higher education

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In this contribution, we aim to share and reflect experiences referring to our research and teaching collaboration between the TU Braunschweig in Germany and the Indian Institute of Technology Bombay. As university teachers and researchers with expertise in gender studies and design research, we took the Corona pandemic and the accelerated processes of digitalization as an opportunity to create an online course where Indian industrial design students and German students from different fields of engineering with different educational degrees collaborated in cross-cultural teams. We aimed at raising the students' awareness for the problem that current global crises and the ways how they affect local needs to be explored and addressed from multiple perspectives. For this purpose, we offered a virtual-only, research-oriented, project-based learning experience for students and teachers alike, crossing cultural and disciplinary backgrounds as well as the boundary between academia and society. In the course, the student teams had to investigate social groups particularly affected by the pandemic lockdown situation in both countries, and proposed future designs for them. We introduced the students into theories of feminist STS on marginalized and vulnerable perspectives in order to sensitize them for people in society who were not sufficiently considered. As an effect, the student teams explicitly drew attention to women. They decided to focus on primary school teachers who were usually poorly equipped with technical devices and working family women who had to reconcile private and professional duties at home. They investigated their current problems and demands for future solutions with methods of design research like contextual interviews, scenario-based design, participatory design and design forecasting that had to be adapted to deal with virtual-only research conditions. Based on insights into the Indian and German women's daily life, the students were sensitized for cultural differences and developed concepts for digital tools and solutions accordingly that were presented to and discussed with the respective users. At the end of the course, we conducted a survey about the students' learning experiences. One striking result was that the course offered the first cross-cultural exchange for most of the participating students. They did not only enjoy working together in order to accomplish the given tasks. They evaluated the opportunity to reflect on one's own situatedness in cultural, disciplinary as well as personal respects as a challenging, but very rewarding experience. This also included exchanges about their personal situation living as a student under

pandemic conditions in India or Germany. Hence, such courses provide international learning experiences also for those who might not afford to study abroad.

In the conference session, we take this course as reference case for reflecting and discussing about sustainable ways of teaching future researchers, designers and engineers how to mediate between global challenges and local demands by using digital platforms, tools and technology. Finally, we want to provide inspirations for shifting higher education into a responsible practice that might even contribute to overcome social and economic inequalities amongst students by offering opportunities for “internationalization at home” (Mittelmeier et al. 2021).

Teaching Responsible Research, Innovation and Practice

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Many of the biggest challenges facing contemporary societies, such as the climate crisis, digitization, and inequalities in health and disease, are situated on the interface of science, innovation, and society. In order to face them, we need responsible forms of innovation and human-centered technologies. We also need citizens and professionals that are capable of thinking critically about their own practice and who can address social and technological challenges responsibly and holistically. Interdisciplinary teaching that introduces STEM students to social science and humanities thinking can play an important role in fostering responsibility culture and practices: it can help future professionals and citizens to give care to societal values and needs and to anticipate and reflect upon the broader contexts and implications of their work practices.

In this paper, I want to first discuss of what kind of competencies we want to foster by teaching social sciences and humanities to interdisciplinary audiences. What kind of ethos, what kind of capacities to critically think about their own practice do we hope to convey through our teaching? And how do we position ourselves in different academic contexts in order to achieve this? In a second part, I aim to reflect upon my own experiences with teaching ‘Science and Technology Studies’, ‘Gender and Diversity’, ‘Ethics’ and ‘Critical Thinking’ in different academic contexts and to different audiences: What are opportunities to engage different interdisciplinary audience in different academic contexts? What worked well, what didn’t? How can interdisciplinary teaching on responsible research and innovation be implemented into different academic contexts? Through this paper, I hope to contribute to a lively discussion of our own role, aspirations and experiences of teaching social sciences and humanities in interdisciplinary contexts in different academic settings.

Why social transformation makes living labs so appealing for higher education - A social work example.

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The socio-technical conditions of social cohesion are of great societal interest. Since the benefits of social cohesion accrue not only to individuals but also to the community, a focus must be placed not only on exploring digital forms of strengthening social cohesion but also on identifying and advancing best practice measures beyond disciplinary boundaries. This requires innovative teaching formats that meet these needs. The proposed contribution takes up this imperative, discusses corresponding concepts, and is structured in three sections:

1.) Disruptive social transformation.
Higher education is deeply embedded in social structures, work- and life-worlds. This embedding must be taken into account if innovatove digital teaching concepts are to be developed sustainably and successfully. To this end, the contribution refers to social and educational research on the disruptive character of current social transformations in order to distill a catalog of challenges.

2) Living labs as approaches to overcoming professional barriers and exclusionary patterns of thought
A central result of the previous considerations is that there is a disruption of the traditional boundaries between disciplines and that this development must also be reflected in higher education. Living labs are suitable for this purpose not only in research, but also in teaching, both in terms of subject matter and organization. Basically, living labs serve as user-centered test environments that stimulate innovative practices and processes as well as co-create implementable and sustainable innovations by involving conscious users in a real-world environment. As places of research and idea exchange, living labs also connect societal challenges with inter- and transdisciplinary research designs in teaching and bring together researchers, practitioners, and students to evaluate the potential of innovative ideas, as exemplified by social work and STEM disciplines.

3) Challenges and outlook
Finally, the contribution discusses key findings from practice and contrasts them with the requirements elaborated earlier. It ends with an outlook on the future tasks of inter- and transdisciplinary teaching in co-creative settings.

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Welcome to the State of Glitch1

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What role for the imagination to help improve trust and trustworthy AI; and how to regulate AI-related liability ?

Not a conference goes by, or someone will use an example from science fiction to illustrate the dangers of AI. Why people use these images and start their research publications or presentations with a story is that they help audiences especially outside of their own discipline to understand the message they want to get across.Arts-based research (ABR) practices are a set of methodological tools used by researchers across disciplines during any or all phases of research, including data generation, analysis, interpretation, and representation. It is therefore surprising maybe, that the use of art and design in research is not more acknowledged for its role in the research process and its methods more widespread.This paper presents, in the form of a provocation to imagine a future state where the government provides equal rights for all human and non-human actors, an analysis of the role of arts-based approaches to contribute to transdisciplinary, international research on AI and Datagovernance with the aim to provide actionable insights for governments, industry and civil society to ensure trust and trustworthy uptake of AI. After an introduction to the field of arts-based research, it presents examples and findings from research and concludes with a provocation for discussion to further develop and establish the field.

Art, Science, and Technology Studies: Experiential Learning

Hannah Star Rogers
University of Copenhagen, Denmark

Experiential learning in STS takes many forms from out of the classroom experiences to informal science learning with the public. In this session, I will share my experience leading STS courses at environmental and biological field stations and in curating exhibitions on biotechnology-related topics. Case studies will include the Sense of Place course held at Highlands Biological Station in North Carolina, and previously held in Oyster, Virginia at the ABCRC and Mountain Lake Biological Station in Virginia. These formal learning situations will be considered alongside exhibitions at the Fralin Museum of Art, the Gregg Museum of Art and Design, Arizona State University’s EMERGE festival, and online at the University of Pittsburgh, as well as my current context at the Medical Museion in Copenhagen. I will particularly focus on my own research subject: how art contributes to STS, particularly in

pedagogical contexts. By comparing these approaches and considering how to make the most of these possibilities for learners, I hope to inspire you to think about new ways to make experiential learning part of your STS work.