Book of Abstracts

20th STS Conference Graz 2022

Critical Issues in Science, Technology and Society Studies

2 – 4 May 2022

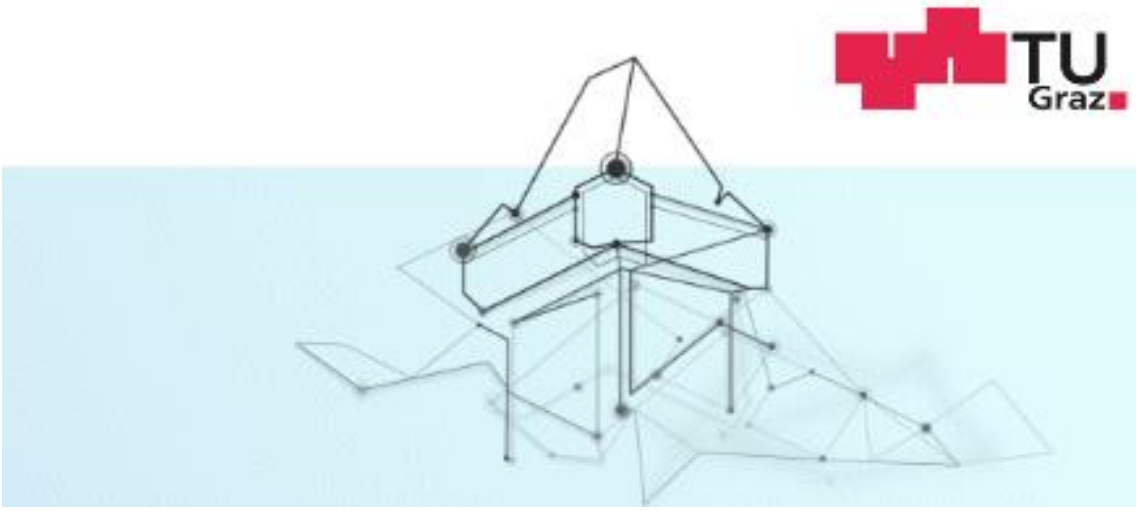

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Table of Content

Cancelled Sessions: A.7, B.2, B.7, B.9, B.11

Keynotes

Dare More Rationality? Science and Democracy in the Coronavirus Crisis

Alexander Bogner
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A crisis rarely comes alone. In the Coronavirus pandemic, the health crisis has evolved into an economic and care crisis which eventually culminated into a political crisis of confidence. Scientific expertise plays a central role in political crisis management. As a result, science itself becomes a political issue. While some, fearing the rule of the experts ('expertocracy'), take flight into an anti-rationalistic counter-world, others would like to reduce democratic politics to the search for and implementation of scientific truths. The lecture will discuss the tension between science and democracy that is building up in the shadow of the ongoing crisis and how it can be dealt with constructively.

Two Challenges in Agnotology

Naomi Oreskes
Harvard University, Austria

In recent decades, scholars such as Robert Proctor, Londa Schiebinger, Charles Mills, Michael Smithson and myself have argued that we cannot adequately understand the production of knowledge if we do not also understand the production of ignorance. In recent years, the problem has become pressing as the world faces existential crises, such as climate change and the Covid-19 pandemic, where disinformation has exacerbated the crisis and stood in the way of effective policies and actions.

But there are several obstacles to studying ignorance. An obvious one is the difficulty of studying what is not there, or was not done, not said, or not achieved. But there are less obvious difficulties as well, two of which I'd like to focus on today. One is the perception that agnotology is conspiratorial: that it is solely concerned with malevolent forces, like the tobacco, chemical, or fossil fuel industries, conspiring to deny information about their dangerous consumer products. This perception is easily corrected: deliberate denial and deception are part of the purview of agnotology, but they do not exhaust its scope.

The second issue is more challenging. It is the problem I label "truth without scare quotes." To analyze disinformation, one must have some concept of information. To analyze lies, one must

have some conception of truth. David Bloor and others have powerfully argued that absolutist conceptions of truth fail the test of empirical adequacy. Truth--with a capital T--has been thoroughly problematicized, and rightly so. But in STS, this observation has been sometimes elided into an uncomfortable sense that we cannot speak of truth at all--at least not without scare quotes. For this reason, STS as commonly practiced sits in tension with agnotology.
My argument is that recognizing that absolutist conceptions of truth are incoherent does not imply that no conception of truth can ever be coherent, and without some conception of truth, we are hard-pressed to analyze falsehood. Therefore, I argue that STS scholars need to reengage with the concept of truth in order to be able to engage meaningfully with crucial questions of science in our age that cannot be adequately analyzed without it.

Open Science Beyond 'Sharing'

Sabina Leonelli
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The potential of Open Science [OS] to enhance research quality, reliability, integrity and societal impact has been widely discussed as an antidote to the troubles plaguing contemporary academia. Despite vast efforts to implement OS over the last decade, however, it remains unclear how this vision relates to the highly diverse epistemic practices utilized by different research communities (www.opensciencestudies.eu). OS appears to require the adoption of common metrics, principles, standards and platforms, which threaten to privilege some theoretical perspectives – and related ways of knowing - over others, thus disrupting well-established methodologies and creating divides within and across research domains. I argue that underpinning this emphasis is a vision of OS as "sharing", which colludes with a capitalist framing of epistemology as a matter of ownership and accumulation, with potentially disastrous results for both science and democracy. At the same time, the OS movement represents an opportunity to redesign research governance to better account for the diversity in research environments in which researchers around the globe operate, as well as the potential value of the diverse outputs produced in the course of inquiry - including data, models, software, techniques, instruments and samples. I argue that realising this potential involves embracing a conception of openness grounded in the just governance of different forms of diversity, as well as an epistemology of science focused on the inclusive and imaginative investigation of diverse research outputs rather than their mindless accumulation and unequal compartmentalization. I conclude that unless both the conceptualisation and the implementation of OS become centrally concerned with epistemic diversity and injustice, OS

policies risk acting as a reactionary force which reinforces conservatism, discrimination, commodification and inequality in research.

Postersession

Session Chair: Günter Getzinger, TU Graz, Austria

Local knowledge management and community resilience to climate change of an upland farming community in the Philippines

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Local knowledge is vital in implementing holistic and sustainable climate-resilient strategies. However, it is slowly disappearing due to government programs giving more importance to modern technologies. The study investigates if properly managing local knowledge can increase community resilience by analyzing the relationship between the two variables. Following a descriptive-correlational research design, a survey was conducted among farming households in an upland village in Leyte, Philippines. Spearman's Rho correlation test was used in the analysis. Results show that the community's local knowledge is tacit from generation to application. Their overall resilience to climate change is moderate, being able to cushion shocks and stresses but not for a prolonged period. A significantly weak, positive relationship exists between four local knowledge management processes of generation, storage, sharing, and use, and two resilience dimensions, buffer capacity and learning capacity. Thus, the community's tacit knowledge should be captured and stored through more accessible devices to facilitate robust sharing and more pervasive application.

Mapping Open Science Research (MapOSR) – A Scoping Review as a contribution to further OS development

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In the wake of the Corona pandemic, approaches based on openness are receiving new attention and legitimation in the science system. As practices and concepts in the field of Open Science vary, empirical research on the phenomenon of Open Science is also widely differentiated, comprising different methodological approaches (surveys, interviews or experiments), topics (Open Data, Open Access or Open Methodology), target groups (scientists, librarians or private enterprises), as well as geographical focus. After more than two decades of research on Open Science, the question arises: What do we know and what do we not know about Open Science on the basis of empirical research?

In order to find answers to this question, a community of practice with 9 researchers has been formed in 2020. Under the title "mapOSR" (Mapping Open Science Research), the community is collaboratively pursuing the goal of mapping Open Science research by means of a systematic literature analysis, covering the years from 2000 to 2020. The poster presents the key results of the mapping exercise, describes the methodology and suggests ways towards a sustainable monitoring of empirical open science research. In doing so, Open Data approaches are applied by making the analysed literature corpus openly accessible and available for reuse.

On the one hand, the project of open-collaborative cataloguing of international Open Science research aims at providing responsible actors in the science system with a systematic overview of the aggregated empirical knowledge base on Open Science approaches. On the other hand, the approach helps clarifying the focal points, gaps and further opportunities for the scientific investigation of Open Science approaches.

The poster contribution addresses all persons who, as practitioners and researchers or responsible persons in stakeholder organizations, want to make empirically validated decisions in the field of Open Science by searching for good practices and experiences from other contexts. The openly accessible mapping of Open Science research makes it possible to gain general insights of Open Science research and to address specific questions to the existing Open Science research with the help of the open data set. Hence, the poster adds to the discussion in the conference's thematic focus on Open Science.

Preventing carbon lock-in before it happens: the case of the Philippines' proposed natural gas industry

John Charles Altomonte[1], Hannah Sofia Guinto[2,3,4]
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As the world seeks transition pathways towards sustainable energy systems to realize the ambitions of the Paris Agreement, developing nations in Southeast Asia continue to embed fossil fuels into their long-term energy plans. The Philippines in particular has set forth plans to develop large-scale natural gas infrastructure to combat dwindling indigenous reserves in the Malampaya gas field. The Philippine exhibits carbon lock-in primarily through its extant coalscape, and realization of the country's natural gas plans may constitute yet another significant source of carbon lock-in. Here we assess the prospective natural gas industry of the Philippines through the lens of socio-technical lock-in, utilizing Trencher et al. (2020)'s analytical framework to identify and understand the myriad factors that could contribute to further inertia. Given the present lack of built infrastructure and the absence of industrial markets, actors and institutions play a pivotal role in preventing or sustaining carbon lock-in. We argue that the role of discourse towards shifting carbon lock-in to a new trajectory of decarbonization cannot be understated and propose that further studies and efforts be done to investigate this interaction.

How do smart energy systems aggravate injustices against marginalised groups?

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Smart meters are currently being rolled out in the UK and the EU at a steady pace, with an estimated 47% of households in the UK and 37% in the EU having smart or advanced meters as of 2021 – yet several social justice concerns regarding their deployment remain to be addressed. Smart meters bring households into a seamless network of devices which communicate with each other to provide real-time data about energy consumption which can be used to enable demand-side management, construct efficient distribution networks, and support the integration of renewables into the energy mix. Thus, this rollout is being projected as an important milestone on the path to decarbonization by policy makers and industry alike. Due to this smartification push, other smart home technologies (SHTs) such as smart TVs, lighting and assistants that provide better comfort, convenience, and entertainment to households represent a rapidly growing market - their market value estimated at 2.7 billion EUR in 2020 is projected to double by 2024. However, several studies point out that the decarbonization capabilities of SHTs may be overestimated, and express concerns relating to

the security and privacy of their users, loss of their personal autonomy, and the technical reliability of these systems. Furthermore, using energy justice frameworks, some academic studies have pointed out that the smart meter rollout programs and the policy vision for smart grids lead to unequal access and opportunity. The studies also point out top-down decision making from industry players and unfair distribution of costs for consumers. Simultaneously, literature from global STS scholars is attempting to place SHTs in a broader social justice context – examining them as a classic tool for data extraction: wielding control and surveillance on consumers and creating a new hegemony for powerful big data companies. In this dystopian vision, smart algorithms designed by engineers unaware of their implicit biases learn constantly about their users, make them dependent, and share their data with entities which can use it against them. This is particularly aggravating for already marginalized groups striving for equality. For example, smart algorithms using facial recognition can predict the sexual orientation of users with an 81% accuracy – which can present severe threats to vulnerable users in certain contexts. While there is a growing work of literature on the injustices of SHTs, especially smart meters, there is a lack of overarching analysis connecting them with broader social justice theories such as feminist technoscience, postcolonial critiques of technology, and digital capitalism. In this study, this gap is addressed through a systematic literature review of smart meter rollouts in the UK and the EU, in which these two strands of literature analyzing justice are brought together and the most important social justice implications for women, ethnic minorities, and lower-income groups are identified using critical social justice theories. From these results, points of intervention in the sociotechnical system of the smart meter roll out are also highlighted so that exploitation and injustices can be prescribed and prevented, as more European households become smarter.

The Convenience of "Wastelands" for Solar Infrastructure: Legitimating the Worldeater for the Public Good of Indians

Shayan Shokrgozar
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An adequate response to anthropogenic climate change – caused by class, capital, and the consumption habits of a fraction of humanity – has been transformed into an existential struggle, occupying the horizons of the citizenry and much of public discourse. In this midst, the Ecomodernist tradition with its roots in the Our Common Future Report, 1987, advocates and believes in the decoupling of development from emissions. The degrowth tradition, on the other hand, with its roots in the Limits to Growth report, 1972, calls for a conscious minimization of energy and material throughout in socially just ways, rejecting the possibility of decoupling at rates necessary to avert 1.5 or even 2-degree targets. The global climate change mitigation agenda has overwhelmingly taken the former route, with little attention being paid to the latter. At the same time, it is widely known that without having to rely on negative emission technologies, limiting climate change demands 1) rapid decarbonization, and 2) a deep reduction in global energy use.

In my article, I explore the legitimation practices that have been carried out to legitimize an infrastructure that manifests itself as both a mitigation and development infrastructure in a financially constrained context to explore claims of climate change mitigation and notions of development through expanding energy access. More specifically, I closely analyze the legitimation practices in the state of Rajasthan, in Western India, and its effort in rolling out of solar energy infrastructure at various scales. The analysis includes practices of legitimation pertaining to discursive, financial, bureaucratic, and technocratic practices.

The article draws from discourse analysis and concludes that the legitimation practices are justifying infrastructures with significant energy and environmental justice concerns. The article thus seeks to offer counter expertise or delimitation. More specifically, offering a resistance strategy of counter-expert knowledge as a delegitimating effort. An effort that draws from the Pluriverse – a world of words. One that recognizes the limitation of the reality of socio-

political circumstances on the ground and thus does not call for the cessation of capitalism or state forms but seeks to displace the centrality of its discursive and social power by prioritizing the provision of Decent Living and satisfaction of needs over growth and so-called "development".

Dual character of embeddedness of individuals within the larger systems to support the cross sector sustainability transitions including energy sector

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Tokyo Institute of Technology, Japan

What is the role of individuals for transforming energy system as well as other systems closely related to energy system, such as system of food and these of health care? How are individuals exactly interacting with higher organizational level like community as well as beyond community? How may niche innovations of one sector at local level affect other sectors locally as well as central government levels? Through analyzing empirical cases of rural transition involving niche innovations across sectors of energy, forestry, food, elder and handicapped care in one local area, this paper explores these questions above. The key concept I present is individuals as multi-role agency in rural area, where individuals are required to practice two roles; one for preserving their community, the activities for *Gemeinshaft* in other words, the other for making money, the actions for *Gesellshaft*. Activities for *Gemeinshaft* embed individuals to their community, restraining their behaviors. However, this embeddedness also functions to connect niche innovations across sectors under certain conditions through the web of various *Gemeinshaft* activities. And cross sectors' innovations in local area sometimes influence central regimes through attracting attention to reform minded policymakers as well as journalists. Their reports constitute "vehicle" of change under certain circumstances. By examining micro foundations as well as macro foundations of multi-level perspective on transitions (MLP) from the Japanese angle, this paper explores the patterns and conditions as to how local initiatives of one sector may affect other sectors locally as well as central government levels.

Teaching Global Education in the Age of Digital Transformation

Ronald Tuschl
University of Graz, Austria

Digital media and virtual learning environments play a crucial role in the context of the digital transformation of our society and are increasingly changing didactic approaches, content and methods. For this purpose, it is necessary to discuss strategies for education in the digital world and in digital basic education and to make them usable. This raises the question of how globalization can be made tangible in social networks and how participatory educational processes can be developed in schools, universities, in extracurricular educational work and for lifelong learning. In addition, the question also arises as to how and to what extent digital reflection media can act as support in learning processes at schools, universities and in extracurricular educational work in global learning, education for sustainable development and Global Citizenship Education (GCE) and thus contribute to the democratic participation of society (Schwarz/Brendel/Schrüfer 2018). Global Learning should offer an educational answer to the present and future challenges in order to be able to react to globalization and world society. Thereby, the own position and interconnectedness should be reflected and an orientation for action should be offered, whereby educators receive suggestions and impulses for a contemporary teaching, which is based on a comprehensive theoretical and practical discussion (Schrüfer/Schwarz 2010).

This leads us to the central question of the extent to which digital technical tools are used in the implementation of Global Learning and Global Citizenship Education (GCE) to strengthen

democratic participation and digital sovereignty. For this purpose, the empirical results of a qualitative and quantitative survey that was conducted in the framework of the Pedagogical Education NEW (PädagogInnenbildung NEU) in the Development Association Southeast (Entwicklungsverbund Südost) will be presented.

Energy Transitions & Brazilian Electricity Sector: The Embeddedness of Actors

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Energy settings for developing countries typically present a significant expansion in energy use, and in particular electricity consumption (Fankhauser & Jotzo, 2017). The shift to a low carbon economy is the transition of our time (Smil, 2004; Smil, 2015; Ismaeel, 2019). Electricity consumption in Brazil is very representative and tends to grow.

Brazil, unlike other countries, has a multiplicity of energy resources at its disposal, needing to manage in the best way to promote energy efficiency. The allocation of resources depends on the moment in which the decision is being taken and on government public policies for energy, with a long-term vision. This calls for a governance challenge, as it is necessary to conform different interests to formulate solid public policies. The analysis of the sociopolitical interactions between the actors involved in the potential changes in the Brazilian electricity industry consents to better understand the role of these actors in the transition paths. It is possible to intuit by a trend of energy transition from an innovation niche or motivated by the exogenous pressures of the landscape from the analysis of the actors involved in the process. Different transition paths may coexist. The guiding question that arises is: Who would be the actors involved in the transition processes in the Brazilian electricity sector? This paper aims to identify and categorize the actors involved in the process of energy transition in the Brazilian electricity sector in a multilevel perspective (MLP). A literature review was carried out, then a documental case study.

Geels & Schot (2007) argue that the analyst should distinguish the empirical level object of analysis and, later, operationalize the MLP. Despite criticisms (Sayer, 1992; Genus & Cole, 2008), the model meets the explanations proposed in this paper. Brazil is going through a transition process, regarding its own trajectory (Pereira, 2016) and the involvement of actors in normative issues operating in terms of structuring new relationships is important (Rip & Kemp, 1998; Smith et al., 2005).

Climate change is a global issue and the fact that Brazil has renewable sources does not exempt it from pursuing decarbonization, besides energy justice and efficiency. In Brazil, many governmental institutions, within their sphere of action, have the competence to formulate and implement policies, plans, programs, and projects that can impact the behavior of energy consumers, as the individual's choice involves several dimensions. There is a need to improve institutional governance for better coordination and communication among different actors.

Three major categories of actors emerged from the case study: institutional actors - among which government actors, civil society & financial agents, and technological & environmental actors. From the analysis of the Brazilian scenario, we sense that the groups coexist at the multiple levels of the MLP, exchanging views and influencing each other, while suffering pressure from the socio-technical landscape that represents aspects that are exogenous to the sector itself. Our standpoint is neither exhaustive nor exclusive. Adaptations to the MLP framework can be carried out based on the Brazilian experience.

Forecasting Demands: An Ethnomethodological Study of AI in Practice

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This contribution emerges out of a ‘hybrid’ (Garfinkel, 2002) study of work in the field of Artificial Intelligence (AI) and Machine Learning (ML) focused on producing and applying algorithms in work settings where such production is ordinary and mundane activity. More specifically, it will present findings from one aspect of that study: ethnomethodological fieldwork conducted in an AI product company in Manchester, UK. This study was methodologically hybrid in the sense that it takes its cue from the methods at work in this commercial setting through hands-on engagement with that work. While in the field, I contributed to the everyday work of producing demand forecasts for an e-commerce business. Demand forecasting in this context means predictive modelling of customer demand in order to optimise the supply chain of the e-commerce business. My aim here is to recover this production of prediction in its practitioner’s relevancies, i.e., to explore how the uncertainty of prediction becomes relevant in and through the practical action and practical reason of doing such work amid conflicting interpretations by different members of the worksite. While on the one hand the data science team routinely worked on providing different measures of control over uncertainties, the management team on the other hand worked closely with them to derive metrics from such measures to make the performance of the forecasting model accountable to the e-commerce business. The methodical character of this collaborative production process is witnessable in its coherent details from within ordinary practical situations that are technically mediated and/or conversationally articulated (Sormani et al., 2017). Recent scholarship in STS has identified that to untangle complex sociotechnical systems like AI, we need to situate them within the practices they emerge from (Hoffman, 2015; Mackenzie, 2015, 2017; Jaton, 2017, 2020; Joyce et al., 2021 etc.). However, we should not relate AI to the “external factors like social, economic, cultural or political from the outset,” instead we should study how these factors become relevant in their concerted production (Benninghoff and Sormani, 2008). The current study aims to provide an account of the production of prediction that attempts to situate it within locally relevant methods of doing prediction.

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

A.1: Promise, Pitfalls, and full of Potential: Evaluating Open Science as an Expression of Science in and for Society

Session Chair: Thomas König, IHS, Austria
Session Chair: Jonathan Edward LoTempio Jr, George Washington University, Austria

Not a counter-culture: Scientific open source software as epistemic infrastructure

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The presented research aims at understanding open scientific software repositories as epistemic infrastructures and comparing them to the journal publication system. It is argued from the case of R/CRAN (a statistical programming language and its main controlled repository), that Open Science neither always is a heroic endeavour of counter-culture, nor can it escape from social mechanisms which are common in science.

It is to date widely acknowledged, that decisions on data collection and computational implementation of methods can influence the outcome of research projects, while at the same time researchers might not necessarily have enough flight altitude to be aware of their own biases. Thus, data sharing and tool transparency as part of a larger Open Science strategy are argued to have a positive influence towards validity, credibility and trust within science and humanities. Whereas the discourse on data sharing has reached some stability with, for example, the National Research Data Infrastructure in Germany, the discourse on software tool sharing has not converged yet; – but script-based analyses are frequently recommended to be made transparent and special merit lies in providing modularized software which can be repurposed by others and applied to different data or problems. Therefore, published software packages become interlinked epistemic resources, altogether forming an epistemic infrastructure which can be perceived as a scientific publication and reception system.

What will be in the focus of the presentation is the scientometric analysis of R/CRAN: the structure of the dependency network, the authorship declarations and the references to scientific literature - based on metadata for 110,000 R packages. The subsequently derived comparison of R/CRAN with the journal publication system goes along several dimensions which have been discussed as characteristic for science: the normative structure, the system

of quality control, the credit and reward system and disciplinary differences. Of interest is also the general movement towards making published software citeable and countable as research output in the context of a larger system of research evaluation.
Results show that social phenomena common in science are found in scientific software, too: gatekeeping quality control, authorship negotiations, broad disciplinary embeddings through outgoing references to scientific literature, and familiar patterns of quantitative distribution of peer recognition.

Crowdfunding for Scientific Research and the 'Democratization' of Science

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Politecnico di Milano, Italy

Recent decades have seen the rise of various Open Science initiatives, such as open peer review and crowdfunding, which are claimed to make science more democratic, transparent, and accountable. This development is often seen as both necessitated as well as facilitated by the rise of digital platforms, which have not only led to a so-called 'information revolution' but have also enhanced communication with the public and increased participation by non-scientists in the production of scientific knowledge and the allocation of resources. The impact of such digital technologies has been hailed as leading to more diverse, inclusive, and publicly accountable forms of scientific knowledge production. However, critics have also argued that Open Science remains an ambiguous and contradictory endeavour that can serve as a means to reconfigure academic institutions, and even the production of knowledge itself, along the lines of neoliberal market imperatives.
This paper focuses one specific instantiation of Open Science, namely crowdfunding platforms for scientific research. On such platforms, campaigns seeking funding for research are evaluated, and potentially funded, by members of the general public, thus publicly legitimizing such projects. Crowdfunding has been hailed as an important development for three mains reasons. First, it offers additional support for early-career researchers of diverse backgrounds who lack a strong publication track record and who frequently struggle to secure resources from funding institutions. Second, crowdfunding provides relatively fast and flexible funding for small-scale, pilot, or high-risk research projects that tend not to be supported by conventional granting institutions, which are relatively slow, inflexible, and adverse to risk. Third, crowdfunding provides a new means of engaging with diverse publics, who are not only exposed to insightful information about the process of doing research, but who can also financially contribute to projects that they deem important, and sometimes even propose projects themselves.

However, a critical examination – based on qualitative interviews with scientists who have sought crowdfunding as well as content analysis of campaigns on Experiment.com, the largest science-specific crowdfunding platform – raises several issues that cast considerable doubts on the potential for crowdfunding to democratize scientific research. My analysis highlights that crowdfunding 'success' is heavily dependent on scientists' existing social networks and their ability to contribute financially, and that crowdfunding requires skills in popular writing and digital media for which scientists are ill-equipped, thus increasing the burden of labour on already disadvantaged researchers. In short, crowdfunding campaigns are born out of necessity and desperation caused by structural inequality, and signal a shift in responsibility away from institutions and their failure towards that of individuals. Moreover, one of the main purported benefits of crowdfunding, namely its potential for engagement with and participation by non-scientists, is undercut by a lack of evidence of dialogue or interaction with the public let alone a shift towards more socially-informed science. These findings underscore that an analytical focus on the actual practices of crowdfunding is a useful means for problematizing this particular Open Science initiative and thus evaluating its 'democratic' potential in a broader social context.

"Open Science" Pitfalls Seen through a Bio-hacking Lenses

Daphne Esquivel-Sada
University of Ottawa, Canada

As one of the ubiquitous and polyvocal ideas of contemporaneity, "open science" is often cast as a novel way of "doing science" extirpated from its "flaws." Amongst the number of underdetermined terms revolving around open-science one can count "openness," "science," "participation," "flaws." In this presentation, I seek to contribute to the debate by foregrounding how "open science" can be understood within North American hacker and biohacker cultures. Drawing on interdisciplinary science studies scholarship, it reports on the results of a discourse analysis of documentary sources and of interviews with members (most based in Canada) of the Do-it-yourself bio (DIYbio) network. The latter can be framed as one of the most active and achieved embodiments of "open science," particularly in the form of open-source biotech. In this case, open-science means democratizing biotechnosciences by putting their tools in the hands of the public for individual autonomous use while cherishing craftiness (hands-on) faculties as the prime medium of knowledge appropriation.

The analysis I report is enlightened by the scholarship on North American computer hacker culture. It explores the pitfalls of the "science" and "research" model of DIYbio by focusing on its tendency to minimalize a number of social mediations. On a first moment, I sketch the

convoluted relationship that DIYbio phenomenon nourishes with knowledge, which ranges from instrumentality to positivism, to agnotology. On the one hand, knowledge is cherished as long as it entails operational value for the exploitation of biotechnological possibilities or enables legitimation of genetic engineered products. On the other hand, the same phenomenon that develops narratives and fosters practices of “open science” and “knowledge sharing” can leverage on ignorance as a faculty of its own. On a second moment, I bring to the fore how the DIYbio quest for normative minimalism impacts its research grammar: while self-judgment tends to be established as the gauge for research valuation, the instantaneous publishing model becomes the ultimate model for publicizing knowledge, and biomedical research ethics evaluation are put into question by self-produced knowledge/information along the lines of personal genomics exploration.

The skein of values grounded on individual autonomy, instrumentality, rapidity, self-determination, and immediateness crossing all these issues, I suggest, point to the emergence of an ideal research model rooted in self-referentiality and normative self-determination. A bio-experimental laissez-faire process gains traction at the expense of social mediations (such as abstract knowledge, peer judgment, academic education, ethical review of biomedical research) that ground the practice of science as a collective activity.

Open Science and Technological Sovereignty

Thomas König
IHS, Austria

Against the backdrop of emerging trade wars between China and the US (and Europe being sandwitched in between), and increasing dependence on a global oligopoly of providers in the digital "platform economy", talk about technological sovereignty has become prevalent among EU political leaders. It is easy to dismiss it merely as a buzzword, but this would not do justice to the ambitions that this concept actually contains - nor is it justified to turn a blind eye on the potential implications that come along with it.

One way to take this normative concept seriously is to ask how, and to what extent, technologocal sovereignty actually shapes ongoing policy initatives. This presentation starts by the assumption that sovereignty of (or over) technology can be described as the ambition to regulate and control at once three important though increasingly evasive dimensions of any political entitiy: knowledge, values, and infrastructures. Technological sovereignty, then, is not only a normative claim by politicians but also a useful analytical framework which allows to assess policymaking in different policy fields - among which the field of Research & Development playing a central role. Specifically, this presentation argues that policies aimed

at establishing (or fostering) "open science" can be analysed under this framework: how does open science, as it is perceived and installed by European policymaking, contribute to the overarching ambition of technological sovereignty?

Prerequisite for success: open science as a medium for international collaboration and science diplomacy.

Jonathan Edward LoTempio Jr[1,2,3,4,5]

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This presentation will cover two case studies in data sharing in the wake of the Covid-19 pandemic. As is so often the case, a crisis was the opportunity to turbocharge infrastructure that was built in earlier years. In both cases, over a decade of development, consideration, and planning led organizations to be well prepared to meet the challenge of the global pandemic. Both cases represent successes of open science and of science diplomacy and evidence-based science policy. Here, we will examine what went well, what did not, and where the field needs to go to ensure that the needs of researchers and nations are met by their research resources.

The first case is of the efforts of the International Nucleotide Sequence Database Collaboration, specifically on the efforts spearheaded by the European centers and their Coivd-19 Data Portal. The second case is the Global Initiative on Sharing All Influenza Data, based in Munich, Germany and accessible globally, which has extended its capabilities to advance research during the COVID-19 pandemic.

Questions we seek to answer include:

1. Are the platforms seeing worldwide use?
2. Are the data included in the platform FAIR?
3. Are the right kinds of data included for rigorous and reproducible science?
4. What does the future ecosystem of platforms look like?

The answers to these questions will underpin what scientists need to ask of their governments and funders, and what governments and funders to ensure that the successes of data science in this pandemic are sustainable and the failures are addressed and not ossified.

A.2: Open Science: Perspectives for Policy-Making?

Session Chair: Bernhard Wieser, TU Graz, Austria

Creating a tool to supporting sustainability transitions for the water-energy-food nexus policies

Eva Marina Valencia Leñero, Michel Nader Sayún, Alejandro Jiménez Montes, Ricardo Gómez Zamudio, Brenda Zetune, Moisés Rebollar Guagnelli
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This initiative was developed to create a tool to support the sustainability transitions for the water-energy-food nexus policies. For this, there were three objectives: a) find a useful definition of sustainability transitions for policies, b) find a methodological tool for the sustainability transitions, c) test whether the methodological tool worked in practical settings: Mexico City's water-energy-food policies. For this reason, a literature review found that the "Doughnut Economics perspective" served as a sustainability definition that could be contextualized to different places. Moreover, it was found that an evaluation of policy that analyzed the policies' theory of change could understand the gaps in the policies required for transitions. Finally, it was found that to test the methodological tools, a stakeholder feasibility test had to be done. For this reason, we are now currently making a project to create Mexico City's Doughnut Economics Coalition. This is done to assess whether this tool can serve to integrate sectors and agents, by using a governance and nexus approach. If so, this tool would serve to understand the challenges and opportunities for the feasibility of sustainable transitions found with the methodological tools as well as find responsible agents that will make the change required for these. With this last stage in our initiative, we are testing if this integrated understanding will create a collaborative platform that nurtures creativity and creates the support required for the sustainability transitions transformative change that Mexico City requires for the water-energy-food nexus policies.

RE-PLACE PAPER LABBOOK – Innovative Character of Digital Research Documentation

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OBJECTIVES: Electronic laboratory notebooks (ELN) transparently document research processes and support information exchange by facilitating co-working in ELN-based research projects. As transparency and cooperation are supposed to strengthen knowledge transfer, academic research institutions recently support the use of ELN. One example is the Berlin Institute of Health (BIH) as the translational research area at Charité – Universitätsmedizin Berlin that has been running a large-scale ELN implementation programme since Nov. 2017.
The work's objective was to evaluate the extent to which scientists at BIH/Charité have already adopted ELN in accordance with the intended programme goals.
METHOD: Employing a mixed-methods approach, quantitative and qualitative research strategies were combined to obtain a depth understanding of the evaluation subject (Teddli and Tashakkori, 2003, Sage). Empirical findings derive from qualitative interviews (n=9) and two online surveys, conducted in Feb. 2020 (n=518 institutional research staff members) and May 2021 (n=172 ELN users).
RESULTS: Taking a closer look at the institutional ELN implementation process, evaluation results show a considerable diffusion of the ELN programme. However, researchers' digital documentation practices in ELN do not always comply with the intended programme outcomes. Thus, findings reveal a discrepancy between individual ELN use and institutional vision of ELN use, suggesting that different stakeholders of the ELN programme might perceive the purpose of digital research documentation differently. Based on the necessity that researchers at BIH/Charité need to adopt novel laboratory routines, such as integrating ELN in FAIR data management concepts, to use ELN in line with institutional goals, the work highlights ELN stakeholders' interrelation at various organisational levels. It emphasises the importance of creating an institutional awareness for social innovations through empowering team science and co-production of knowledge in ELN based research projects as a social practice.
CONCLUSION: Research institutions need to pay attention to the creation of acceptance for the technical innovation ELN, above all to the creation of acceptance for intended 'novel' social practices, such as digital research documentation, to strengthen Open Science and Responsible Research. This includes carefully analysing researchers' motivations for action, also those that underlay previous social practices, such as analogous research documentation in paper lab books.

Municipal open data: risks, illusions and opportunities in a growing field

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Vrije Universiteit Brussel, Belgium

In the last years, many municipalities started to embrace the potential of open data, who envision open data as a mean to substantially enhance transparency and accountability towards citizens, restore trust in public services and increase citizens' participation and engagement. However, the flip side of open data rarely surfaces when municipalities report on their open data successes. This paper attends to the dark side of open data by examining open data extracted using the FixMyStreet (FMS) API, a mobile-city application used in the Brussels region (Belgium) to report incidents of urban disorder, nuisance and minor crimes in the streets, by visualizing the aggregated data through a dashboard and making it searchable to gain in-depth knowledge on specific areas. Our approach illustrates that the open data has a highly malleable character and breaks with several of the eight 'Sebastopol principles' of open data: (1) Only a fragment (45%) of reported data is available as open data; (2) The data is not primary, since information on the handling of incidents is sometimes added by third parties; (3) Interventions are not always added in a timely fashion, with standard responses provided automatically, with little to no information on the handling of the incident. This results in inaccurate data; (4) Reasonable privacy restrictions are lacking. The open data pose a risk to citizens' and municipal employees' privacy, and on occasion non-compliant with GDPR regulations. Given these limitations, we argue that there are serious risks of misinterpreting or misusing this fragmented and – at times – inaccurate data, leading to misinformed citizens and policymakers. These risks underpin what we argue is the need for a clear and transparent data policy that allow open data initiatives to deliver on their promises, and enable citizens to meaningfully engage with the urban environment and its complexities.

Tackling Moral Overload in the Lab: Complex Equality as a Heuristic for Responsible Innovation

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Stakeholders in the governance of science increasingly push for the inclusion of societal values in the innovation process. But societal values can conflict with one another (e.g., individual freedom vs. common good; justice vs. mercy) and they can also conflict with the scientific values already pursued in the lab (e.g., scientific novelty vs. societal utility). Save for clear-cut cases of irresponsibility or immorality, being a responsible innovator means distributing the projected gain obtained through innovation among many incompatible value requirements. This is sometimes referred to as 'moral overload'. To date, little has been

developed in the field of responsible innovation to aid the innovator with her moral overload. As a proposal to fill this gap, we propose the notion of complex equality (Michael Walzer) as a heuristic principle for responsible decision-making in the context of moral overload. We illustrate how the principle of complex equality can be used both at a micro-level in the lab and at a macro-level of science governance. As a case in point, we take recent innovation work in electrochemistry towards creating artificial photosynthesis.

A.3: Inclusion and Exclusion in Citizen Science

Session Chair: Michael Strähle, Wissenschaftsladen Wien - Science Shop Vienna, Austria
Session Chair: Christine Urban, Science Shop Vienna, Austria

The publics of personalized medicine

Lea Larsen Skovgaard
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Citizen science holds promises of broad inclusion of different members of the public. Inclusion of the public often relies on unarticulated assumptions about who constitutes ‘the public’. In recent years scholars within STS has sought to reconfigure the notion of ‘the public’ by revisiting theories of American pragmatists. These scholars argue that multiple publics exist and that publics emerge and dissolve around issues. It has also been pointed out how technological mediation affects the formation of publics. In this talk I present the work of a project in which I have empirically explored public legitimacy of data sourcing for personalized medicine in Denmark, a country which is renowned for its extensive infrastructures enabling reuse of health data. In the project I have used different methods to engage the ‘issue publics’ of personalized medicine. I have explored the publics which arise through mediation of social media and newspaper, where people actively express their opinions towards data sourcing for personalized medicine. Additionally, I have used more traditional methods for public engagement, i.e. interviews and a survey, to try to engage the publics who do not actively express their opinion about data sourcing for personalized medicine, but who are affected by the issue in the sense that they deliver health data used to carry out research in personalized medicine and might benefit from future medical development the research brings. In the talk, I discuss who become engaged in the issue of personalized medicine and contemplate over the difficulty in making questions about the data economy, in which health data used for personalized medicine feature, relevant for people who are not professionally involved in

personalized medicine. Additionally, I contemplate over the role researchers play in assembling different publics and how this affects the opportunity for engagement of different publics in science.

Exploring citizen science in art-practice methodologies as forms of community practice in biodiversity monitoring

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A growing number of people are getting involved in collecting and reporting scientific observations about their surroundings through citizen science initiatives (c.f. Wehn et al 2021). Many of these projects are producing valuable data about environmental phenomena (c.f. Steffen et al 2019), especially when our everyday lives recount observations that range from aesthetic, multi-sensorial, associative, affective, spatial and, visual modes of ‘knowledge.

This paper introduces the project "Our Planetary Garden" (11.2021-), awarded with the Austrian Citizen Science Award 2022, making use of increasing data quality and scientific evidence on the one hand, on the other of the direct interest at stake, e.g. the better insight in the quality of the local environments (c.f. EC 2016), pushing forward social innovation via social inclusion, social citizenship as well as sustainability as framed in the ECSA Policy Brief #3 2018. This way, we frame the act of Biodiversity Monitoring as a community garden that can be experienced by different multitudes (Clément 2015; Egli et al 2016). In this case how farmers from different regions in Austria share new angles for climate narratives, and the sensory aspects that have the opportunity to involve a broader public such as the youth as stewards of the land in order to grow liveable worlds. The project builds on the results of the biodiversity monitoring (https://www.biodiversitaetsmonitoring.at/). It is developed in the context of the WG Synergies and Innovation of the Austrian Citizen Science community “Österreich forscht” (https://www.citizen-science.at/netzwerk/arbeitsgruppen/ag-synergien), anchored in the context of the European project PROVIDEDH (https://providedh.eu/). Moreover, the project parallels biodiversity observation as a continuous, site-based practice of cultivation of care that extends to community practices in sites of education, such as schools.

In this presentation we provide a synthesis of our art-practice based approach to flesh out the role of co-creators of the environment that youngsters have as citizen scientists rather than only distant observants in biodiversity monitoring (Pateman et al 2021; When et al 2021).

1.Students own the role of co-creators through speculative design activities and storytelling that captures complex processes and problems as well as its ability to reimagine and visualize current climate challenges.
2. Structured methodology of public art-based workshops as part of the process to explore different approaches of “A community as a garden” and ways of transforming social-environmental relationships.
3. Brief overview of knowledge on the motivations of the data collected, and how there are multi sensorial narratives within social-ecological modes of engagement.
4. Collation of interviews with actors involved in art-practice activities, in order to more fully understand how to repurpose from an inventory perspective to a dialogue on biodiversity, the city, and personal experience.
Ultimately, as an output, the project develops tangible art-practice engagements that foster knowledge and raise awareness through new ways of knowing the ever-changing biodiversity of Austria. This collaboration critically explores, analyzes, and reflects on the role of datafication of biodiversity. We open opportunities and pathways for collaborative mechanisms and public deliberation on data collection while engaging with real-life regional challenges and local communities.

Citizen Social Science: exploring roles and ownership with participatory evaluation

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Centre for Social Innovation, Austria

Citizen science, and more generally participatory forms of science, have gained much traction over the last years. While such participation of non-professional scientists in authentic scientific endeavors is growing in popularity across disciplines, it is still mostly associated with certain disciplines and certain characteristics. The dominating disciplines of citizen science are thus the natural sciences, such as environmental studies and biodiversity, which embrace a wide number of participatory and collaborative practices for citizens, such as nature observations, environmental data collections, data classifications and analysis, or biohacking activities. In many of these projects the participatory activities are designed by professional researchers who offer a portfolio of participation to the wider public. Roles and responsibilities tend to be assigned by the project owners, i.e., the scientists.
Participatory research practices, however, also have strong roots in the social sciences, where long before the latest hype of citizen science people were involved in co-researching their own challenges within their socio-political contexts and contributing to changes in public policies. Approaches such as community-based participatory research or participatory action research

have paved the way for our contemporary understanding of participation in citizen science. Building on these practices, citizen social science has emerged as a growing and often inter- and transdisciplinary field of practice. Citizen social science concerns itself with challenges from the lifeworlds of the affected individuals or groups, often underrepresented in “classic” citizen science projects. In citizen social science there is thus the additional challenge of a “double hermeneutic” to be addressed in a participative and inclusive way, as participants are experts of the social phenomena under study.

In CoAct, a collaborative research project funded by the European research programme Horizon 2020, we aim to advance citizen social science as a transdisciplinary research approach and enhance its methodological repertoire, based on experiences in three concrete case actions. The project addresses global social concerns, such as youth employment, mental healthcare and environmental justice, via participatory research practices. In each case actions, which are situated in Austria, Spain and Argentina, local citizen social science research teams consisting of affected citizens, thematic and political stakeholders, and multidisciplinary academic researchers have been established to address the concerns and to implement concrete actions and strategies to tackle each specific social concern.

This contribution is based on the experiences collected during the first two years implementing the three citizen social science case actions in CoAct, where we include affected citizens not only in the research process but also in the evaluation process, which leads us to the challenge of a “triple hermeneutic” as we add another layer of complexity to the analysis. What we have experienced so far is that there is great potential to work with people from all strata of society, including those underrepresented in other citizen science activities, as the topics of concern are related to their own lived experiences. What we learned so far is the importance of changing and emerging roles, different interests - such as problem solving vs scientific publication output - and different expectations.

Citizen science and intensive parenting. Can families prove to be an essential factor in building and analyzing engagement in citizen science?

Katarzyna Tamborska, Michał Wróblewski
Nicolaus Copernicus University, Poland

The range of initiatives defined as citizen science is vast and diverse. That makes it challenging to precisely identify groups with a particular inclination to actively participate in research projects alongside professional scientists. Various studies point to middle-aged men with a high level of education as the collective undertaking such activities (e.g., Curtis 2018; Wróblewski et al. 2021). An interesting finding from the quantitative studies is that household

residence by children may induce participation in a project based on citizen science (Füchslin et al. 2019). Referring to family contexts related to participation in such research initiatives could contribute to greater diversity in the profile of participants (in terms of gender, age, education, or occupation). Family and friendship relationships transferred to a collaborative research initiative could be a factor influencing the durability of involvement in the project, which is also important for the continuity of the research conducted.

Based on qualitative data obtained from twenty interviews conducted with participants in the air quality monitoring project (completed in December 2020), we want to identify to what extent it is common to refer to family contexts in motivations and values. On the other hand, based on the literature review, we want to present key dimensions of parenting trends that indicate to what extent rationale can be found in them for building larger and more diverse groups of participants in citizen science projects. We want to determine to what extent the increase in interest in non-formal education initiatives, the investment of time and money developing of children's cognitive competencies, or the sense of responsibility for designing a good professional situation for the younger generation remains visible in current research. Moreover, we want to present which needs of households inhabited by children can be addressed by citizen science.

It seems worth testing the hypothesis that seemingly distant trends such as the development of open science through citizen participation and the changes in approaches to parenting can resonate with each other. Establishing mutual relations and areas of most remarkable coherence between these two phenomena could prove valuable for building relations between science and society.

Inclusion and Exclusion in Citizen Science: A Matter of Contexts

Michael Strähle, Christine Urban
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The Wikipedia article “Citizen Science” presents it as a kind of original scientific practice that is inclusive and democratic because since centuries citizens contribute to science by collecting data and developing theories, be it as amateur scientists or reporters of empirical data. Under such a perspective also Isaac Newton and Charles Darwin were citizen scientists. However, just because “citizen science” is an umbrella term, that does not mean that citizen science is inclusive by definition. Perhaps “citizen science” is another manifestation of the “participatory turn” (Jasanoff, 2003), the turn away from initiatives to promote public understanding of science that aimed at putting down public controversies on GMO and other controversial topics by informing publics, policymakers imagined as uninformed and reacting emotionally only.

Since about 2015 citizen science moves up on the totem pole of policymakers. It appears to be an answer to failing campaigns to promote public understanding of science and to the limitations of public engagement with sciences and the overpromising of those who pushed for it. We may witness a similar overpromising and deficit model here. Why do citizen science advocates stress the educational value of citizen science so much?
For obvious reasons, citizen science is not inclusive simply because non-specialists, sometimes imagined as being in need of science education, are invited to contribute to scientific projects. For instance, “participatory” agenda-setting in science or more time-consuming contributions can advantage even further those who are already cumulatively advantaged. On the other hand, as long as citizens have no more control over a project than volunteers in charity contexts, inclusion might not play such a crucial role.
The example of citizen science shows that the requirements for democratic participation of citizens in scientific research and research-relevant decision-making processes are many times more complex than presented by some citizen science advocates. Among other things, the question arises who is targeted. Probably citizen science advocates do not intend to provide a platform for anti-vaccination activists.
Within the framework of the Horizon 2020 project CS Track, the authors attempted to identify, classify and characterise the different activities that fall under citizen science along several dimensions, based on the European Commission's broad use of the term “citizen science”. Depending on the activity, exclusion and inclusion have different weight. The presentation will discuss which forms of inclusion and exclusion citizen science can produce and how much these depend on the respective activities and different dimensions; and under which conditions inclusion should be a goal and under which it is debatable.
The operationalization of this systematic assessment of citizen science activities and a set of different dimensions provides a basis for discussing how to evaluate the inclusivity of a number of citizen science activities systematically as well as the desirability of this inclusion.

A.4: Using Indigenous Knowledge to Promote Sustainable Development in Africa: Towards Decolonizing Development Science and Education

Session Chair: Eveline Wandl-Vogt, Austrian Academy of Sciences, Ars Electronica Research Institute knowledge for humanity, Austria

Local maker spaces as digital innovation hubs leveraging local knowledge

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Digital innovation hubs (DIHs) are, broadly speaking, entities with a non-profit objective to support others, mostly small and emerging businesses, in their digital transformation. Often, digitalisation and digital technologies in these hubs focus on software. In the European funded project mAkE we broaden this understanding by adding a hardware perspective to it. We define makerspaces as DIHs that drive local, digital innovation, learning, skill building and collaboration beyond software. In makerspaces digital prototyping, design and fabrication as well as smart manufacturing takes place. Makerspaces enable communities to actively shape social computing and innovation, especially marginalized groups in the so-called Global South, youth, and women. As digital manufacturing technology becomes cheaper and more ubiquitous, they are offering possibilities to quickly switch from concept to prototype, then to unit and/or serial development. This opens up commercial opportunities for makers, in particular in countries lacking traditional industrial production facilities. Further, makerspaces provide young people and students access to digital prototyping and fabrication tools, and thereby the possibility to actively contribute to digital innovation.

The mAkE consortium, composed of an interdisciplinary team from Africa and Europe, focuses on makerspaces as key players of local digital innovation ecosystems and global collaboration networks, which are complementary to the current efforts in digitisation in Europe and central for localized production in Africa. mAkE builds on existing networks of makerspaces as key drivers for local digital innovation in Africa and establishes mutual relationships and sustainable networks with European DIHs. Via capacity building activities mAkE aims to equip African makerspaces and their attached local SMEs and digital start-ups with entrepreneurial and digital skills, and offer concrete incubation, mentoring and matching activities to drive digital transformation. mAkE's matching and networking activities link local digital innovators in makerspaces with ICT professionals, investors, entrepreneurs, researchers and policy makers, fostering investments in African digital innovations and creating a sustainable and strengthened EU-Africa start-up ecosystem. Particularly in Africa manufacturing has been identified as a critical growth area to bring more jobs to the African economy and leverage on the local knowledge. Building novel smart products provides more ways to combine physical and digital interfaces, which form part of the digital age, as a path to sustainable digital economic development.

An example of the importance of local knowledge and production facilities has been the COVID-19 outbreak, where the maker community offered a rapid response to the lack of medical hardware supplies, personal protection and sanitary equipment. Many local makerspaces in Africa made use of globally shared design of e.g. face shields and delivered them to hospitals in their area. Others, such as the Mboalab in Cameroon, engaged the local population, especially young women, in producing hand sanitisers from locally available components.

With this contribution we want to raise awareness for the innovation potentials of makerspaces and their potential for contributing to local, and global, sustainable development. In mAkE we stress critical and sustainable making, committing to Open Source, Open Science, Open Data, address policy issues and frugal Innovation.

Indigenous knowledge, healthcare and healing: challenges and chances. A case study on African Diaspora Communities to cope with COVID19 in China

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Health humanities is an interdisciplinary area of study that investigates how the different components of humanities contribute to a better understanding of public health in relation to disease diagnosis and treatment for members of the society, as well as their general care.(Bodomo 2020 - 2021). Key research outputs on health humanities include the following: Crowford et al 2015, 2020; Jones, Wear and Friedman 2014; Klugman and Lamb 2019; and Squier 2007. One important aspect of health humanities is to focus on understanding issues of health and access to health in minority or marginalized populations. Migrant and diaspora communities often find themselves among such minority and marginalized populations.

We focus on a case study carried out with an African Diaspora Community in China of about 100 000 persons living in the area of Guangzhou mainly for trade purposes. Various studies are highlighting its roles in trade but also the political, economic, and social problems the group as a minority population in China especially highlighting health and wellbeing issues (Bodomo 2020, Bodomo et al 2020, Hall et al 2014, Lin et al 2016, Lin and Brown et al 2015, Lin and Bodomo et al 2015). In this papers it is argued, that health care specialists and policy makers ought to pay attention to the barriers that migrant and minority groups face in regards to access to health care if they want to bring effective control to the outbreak of infectious diseases like

SARS and EBOLA. The authors are reflecting these knowledge unter the circumstances of the given pandemic.

The work is carried out in interdisciplinary teams of scholars (trained doctors, humanities/social science scholars, practitioners and civil society knowledge carriers) to socially engage and interact with the community (hybrid access). Based on a systemic interdisciplinary and challenge oriented literature review (c.f. Rodrighiero et al 2021, Taslakian et al 2021), qualitative interviews are set up as well as focus group consultations. A series of systemic questionnaires offers the data basis for a large scale quantitative study to gain a comprehensive understanding of systemic gaps.

The COVID-19 pandemic demands ingenious solutions. The authors in their presentation propose an art driven innovation approach, to set up interdisciplinary teams (experts in health care, humanities, social sciences artists and designers, creatives, practitioners and knowledge carriers of the given knowledge communities in the home countries) to find the best solutions for a certain community.

Next steps include to embed this research into the international project “Design for Emergency” (https://designforemergency.com/, reflect on the qualitative approach (interviews with actors within the African Diaspora Community in China) and the quantitative analysis (questionnaire of the design.for.emergency project) as well as offer design sprints to overcome certain challenges which are related to a lack of knowledge of the African Diaspora Community. The design sprints shall be designed in a way that the Diaspora Community is linked on the one hand with the home land and on the other with the global African Diaspora. To do so, Data Science shall be applied (NamSor NamSor https://namsor.app/).

A.5: Digital contestations of openness: dynamics and frictions in digitized science communication

Session Chair: Clemens Bluemel, German Centre for Higher Education Research and Science Studies (DZHW), Germany

Conceptualizing digital science communication: values, affordances, and value based contestations

Clemens Bluemel
German Centre for Higher Education Research and Science Studies (DZHW), Germany

The goal of this contribution is to present a preliminary typology of scholarly communication channels in the digital realm based on value attributions. We contend that communication in the digital realm is channel specific in that digital communication channels have not only specific technical affordances, but also specific values attached to them. We are drawing from theoretical work from the sociology of evaluation (Lamont 2012; Kjellberg et al. 2013). Based on these accounts, we argue that values attached to a specific communication channels emerge from both the use (e.g. in preparing an entry) and consumption (e.g. reading a post) of elements from digital communication. Values concerning novel communication channels may also emerge from public or field specific debates. Such values are relevant for scholarly communication, and may not always be explicated. Rather, they may be perceived as enacted every time a specific item is produced or consumed. We have called these action 'acts as valuation' whereby we classified various activities in digital scholarly services and social media.

The typology is based on survey data (with researchers as participants) as well as document analyses aiming at classifying various activities in digital scholarly services and social media. Data were generated in the context of a European Open Science project. Since the different sources of valuation (public and policy debates, perceptions of researchers) also provide competing attributions, results may also spur debates about contestations of digital dissemination channels

#FuckCancer. Instagram practices of women who share their lives with incurable cancer

Afke Wieke Betten, Jill van der Kamp, Lotte Krabbenborg, Radboud University, The Netherlands

In the 21st century, science communication has been shaped by the advancement of online media. Whereas formerly one-way communication prevailed (from science communicators to the public), with the introduction of interactive social networking sites, such as Twitter and Instagram, publics can easily discuss science-related topics by themselves. As such, online media provide new digital spaces for interaction that enable bottom-up, spontaneous and even transnational debate between citizens on scientific topics.

For this paper, we studied the practices of women who narrate their lives with incurable cancer on the social media platform Instagram. Instagram enables people to share images in relation to digital affordances: text, emojis, tags, hashtags and the overall grid. For long, illness was a personal affair experienced in private, perhaps only discussed with family, friends or healthcare professionals. Hence, illness narratives, i.e. an autobiographical genre wherein an

illness and its effect on patients' lives are described, occurred in face-to-face conversations or written down in biographies or diaries. With the introduction of the Internet, online illness communities emerged, via blogs, forums or social media. As such, creating illness narratives became a public activity: people share their personal cancer experiences online, allowing others to react regardless of time or distance.

We aim to answer the research questions: (1) How do women narrate medical knowledge regarding their diagnosis, therapies and prognosis on Instagram? (2) How do Instagram's specific affordances such as hashtags, visuals and the grid, play a role in women's narrative practices? We used a digital ethnographic approach to examine 60 firsthand accounts of women, with various types of cancer, from March 2019 until October 2021.

We found that women used their daily life experiences, experiential knowledge and self-education as the interpretative framework from which they assess medical science. We found that one of the functions Instagram seems to provide is the tooling to weave living with cancer, including dealing with medical science and technology development, into everyday life and the other way around. To illustrate some of our results, we found that women use scientific jargon from biomedical research in posts and hashtags, for example the use of #CA125, which is a tumor marker for ovarian cancer, to become part of a subcommunity on Instagram. We saw how women use #LivingWithCancer when they post about everyday life, thereby weaving casual and serious moments together. We also found that women inform each other about medical trials that are set up or which therapies were most beneficial in their own experience.

Our research showed that social media platforms like Instagram provide insight into the ways people discuss topics that are important to them, in this case living with illness. This insight increases our understanding of the variety of public perspectives, interpretations and attitudes towards scientific knowledge and can reveal discrepancies in perceptions between scientists, medical professionals and the public. Science communicators can mediate discussions by utilizing both scientific and lay knowledge found on social media platforms and by indicating what is at stake for the relevant stakeholder groups.

Clickbait or conspiracy? How Twitter users address the epistemic uncertainty of a controversial preprint

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Many scientists share preprints on social media platforms to gain attention from academic peers, policy-makers, and journalists. In this study we shed light on an unintended but highly

consequential effect of sharing preprints: their contribution to conspiracy theories. Although the scientific community can quickly judge whether a particular preprint is flawed, its uncertain epistemic status simultaneously allows conspiracy theorists to exploit the text as scientific support for their own narratives. To better understand the epistemic politics of preprints on social media platforms, we studied the case of a highly controversial biomedical preprint, which was shared widely on Twitter in the wake of the Covid 19 pandemic. Using a combination of social network analysis and qualitative content analysis, we compared the structures of engagement with the preprint and the discursive practices of scientists and conspiracy theorists. We found that despite substantial engagement, scientists were unable to dampen the conspiracy theorists' enthusiasm for the preprint. We further found that both scientist and conspiracy theorists not only tried to reduce the preprint's epistemic uncertainty, but sometimes deliberately maintained it. This maintenance of epistemic uncertainty helped conspiracy theorists to reinforce their group's identity as skeptics and allowed scientists to express concerns with the state of their profession. Our study contributes to research on the intricate relations between scientific knowledge and conspiracy theories online, as well as to the role of social media platforms for new genres of scholarly communication.

A theoretical perspective on openness and digital science communication

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In this contribution, I would like to present a sketch of a theory of openness whose value can be well illustrated by the example of science communication and digitization. The conception is based on a figuration-theoretical and dialogical approach to science communication. Starting point of my line of reasoning is (1) that openness is an epistemic condition for any meaningful interaction, (2) that openness has at least three dimensions, and (3) that established configurations of openness in these three dimensions become irritated through digitization.

Reg. 1 & 2: I assume that there are three dimensions of openness to which most open science practices can be more or less distinctively assigned / relate to. These are an infrustructural dimension (dealing with questions of norms and standards), a social dimension (dealing with questions of social agency and inclusion), and an epistemic dimension (dealing with questions of regarding the access and types of knowledge). My assumption is that these three dimensions are interdependent and that different configurations of openness in the three dimensions are necessary to produce meaning.

Reg. 3: I assume a broad understanding of science communication that covers the entire research process, thus also 'scholarly communication', since open practices render formerly intra-scientific processes accessible to non-scientific actors. If we take the classic phase model of research as a basis, irritations of established configurations of openness in each of these phases can be observed in the context of digitization. These may have both advantages and disadvantages for the scientific value creation.

An example to illustrate this line of thought is the role of preprints during the pandemic; typically, while they are infrastructurally open (they are equipped with open licenses and freely available on servers), they are socially and epistemically only semi-open (social: they are primarily used by scientists to set a timestamp on a finding or to receive feedback from other scientists; epistemic: they deal mostly with intra-scientific problems as opposed to, say, a policy paper). During the pandemic, however, preprints (such as the one by Christian Drosten on the infectiousness of children) suddenly became the subject of public debate; they became socially open. While preprints are an increasingly important social practice for science, the extent to which untested results should be part of the public discourse is questionable. This being said, I think that openness is the precondition for trust in science; however, this depends on the 'right configuration of openness'.

In this still rough theoretical underpinning, I see several advantages: (1) Such a framework would allow operationalizing openness for different phases of a research process; it can be empirically examined and gives a basis for a non-normative discussion about the 'right kind of openness' (2) It broadens the scientific perspective on science communication for issues of standardization and norming. (3) It furthermore allows for different disciplinary approaches to science communication, beyond communication science and psychology.

I would be happy to contribute my own research on the topic to the discussion and to get feedback on these still preliminary thoughts.

Deterritorialization of Digital Science Communication – The Case of Altmetrics

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Increasingly, scientists use digital communication channels to disseminate, discuss and catch up on scholarly work. In fact, the reasons for such communication exceed far beyond the aforementioned list. Digital science communication (DSC) is often held to enhance Open Science (OS) practices and science-society relations more general. This link between OS and DSC has been a major argument in the advance of Altmetrics, quantifications of science-related online behavior. Altmetrics have turned out to be a profitable business, collected from

largely commercial online platforms, aggregated mainly by for-profit companies, purchased and implemented by almost all large publishers. Yet, from the view point of science studies it is more than unclear what Altmetrics can actually be used for. Analytical utilization of Altmetrics is hindered by the infrastructurally induced opacity of the data. Research on Altmetrics is driven in a large part by the question what do they mean? Nonetheless, these quantifications of DSC are reflected back on scientists, their articles being scored by Altmetrics alongside citation and download numbers. This contribution scrutinizes the discrepancies between the meaningfully situated online behavior of scientists on the one hand and its re(e-)valuation in aggregated form (Altmetrics) on the other. First, 24 interviews with scientists from two disciplines, genetics and psychology, are analyzed with regard to respondents' participation in DSC. Second, 15 expert interviews with diverse actors from the field of Altmetrics are interpreted with respect to how Altmetrics are invested with relevance and meaning. In synopsis, this enables an introspection into the production of reactive potentials in science (e-) valuation.

Open Science as an Engine of Anxiety

Martin Reinhart
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Science, as a professional field, produces extreme forms of inequality. Most young and aspiring scientists who sucessfully complete their tertiary education and go on to train as a PhD or doctoral student, never make it to becoming a 'working scientist'. Most of those who do become postdocs, never make it to becoming a tenured professor. And most of those who become professors, never make it to becoming famous in their field, receiving prestigeous prices or even being highly cited. Careers in science are a trial of attrition, where only the best (or the luckiest?) prevail in the competition for careers. Scientists themselves tend to believe, generally, that science is a meritocracy, with the most productive being selected along these career junctures. While there is no logical contradiction between meritocracy and competitivity and while many scientists believe that the meritocratic ideal explains and justifies the high competitivity sufficiently, there is at least some ambivalence. Robert K. Merton (1973) noted the general ambivalence that results from the interplay between the normative structure and the reward system in science. Since then it is not just the increased competitivity and the rising inequalities, that have changed; more importantely, it is the way visibility regimes have been changing over the last 20 years, mainly due to digital communication, that has forced scientists to acknowledge the ambivalence inherent in the meritocratic narrative. This talk is an attempt to explore this ambivalence, which, as of yet, has no ready-made description.

My argument will ,first, describe the ambivalence in a current understanding of science both as competitive and meritocratic, by relating it to changes in scientific visibility regimes. Second, I will briefly discuss the theoretical concepts that emerge from such a description, mainly 'visibility', 'background emotions', and 'digital selves'. Third, I will lay out one strategy that highly visible individual scientists seem to employ, to deal with the ambivalence of these new visibility regimes. Finally, forth, I will discuss what the ensuing politics in science might be, that result collectively from such individual strategies. The argument will result in a paradox: The current visibility regime in science, resulting from digital communication and online platforms, leads to excitement among scientists over the possibilities for attaining hypervisibility. Increasingly, however, the excitement of fashioning digital selves is taken over by anxiety over being exposed to the possibility of negative, reputation threatening attention. Pardoxically, anticipating and preventing such a possibility leads to even more vigorous fashioning of digital selves, for which the open science movement provides the most suitable policy narrative. In short: to protect themselves from the possible negative effects of visibility, scientists push for more visibility; while becoming fatalistic about their careers and about science policy.

A.6: Understanding barriers and drivers to facilitate responsible research and innovation (RRI) in organization contexts

Session Chair: Sandra Karner, IFZ, Austria

Responsible Innovation: Perceptions from within Australia's national science agency.

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Responsible innovation (RI) is a relatively new concept in the Australian research and scientific innovation landscape, contrasting against the embeddedness of the related concept of responsible research and innovation (RRI) in Europe. While historically, comparable theory and research practices have existed under cognate conceptual frameworks in Australia, distinct responsible innovation practices are still emerging and growing in popularity. With an aim to contribute to this growing scholarship, we present empirical findings from qualitative semi-structured interviews with 31 research scientists and managers from the Commonwealth Scientific and Industrial Research Organisation (CSIRO) in 2020/21 on their RI perceptions and practices.

In presenting these findings, we explore the diversity in participants' understandings of RI, and how sense-making relevant to specific research contexts unfolds through enacting RI. We also discuss how participants identify opportunities for embracing and enhancing RI-informed research practices, and how challenges emerge and are managed.

More specifically, our findings are presented around three main areas. First, participants' understandings and sense-making of RI and how this relates to their organisational role. Second, participants perceptions of established principles of RI (i.e., the AIRR principles of anticipation, inclusive deliberation, reflexivity and responsiveness) relate to their perceptions of more practice-based RI management approaches such as managing risks, building public trust in science organisations, and being socially responsible, all in the context of effective research organisations. Third, opportunities and challenges in enacting responsible innovation within science organisations.

We discuss how enacting RI practices around risk management, trust and social responsibility can facilitate and aid in the recognition of opportunities and management of challenges. Implementing RI in an organisational context requires not only RI principles, but also practice-informed and context-specific approaches to allow successful uptake and optimal outcomes. We suggest organisations need to develop RI approaches and policies by applying a data-driven sense-making approach to embedding RI principles in more practice-based RI management approaches. Based on our findings, we discuss how RI principles can play out in more practice-based RI management approaches.

STIRRI: A conceptual model for embedding responsibility practices through gradual multi-stakeholder alignment

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To contribute to the debate on how to fill in the existing gap between theory and practice of responsible innovation we seek to explore the question of how to embed socially responsible practices in Research Performing and Research Funding Organisations and to transform them to lasting system-level challenges. This question involves also a viewpoint on 1) whether and to what degree individual researchers can be seen as accountable for the sustainability and desirability of innovation outcomes and 2) whether and to what degree responsible research and innovation (RRI) is a matter of individual or collective responsibility and what is the link between both. To address these complex issues, we combine several theoretical perspectives of experimental learning and propose a new conceptual model called "STIRRI". The STIRRI

model is based on the Socio-Technical Integration approach (STIR), which refers to “any activity whereby technical experts take into account the societal dimensions of their work as an integral part of that work” (Fisher, 2019).

Building on the idea that emerging research needs to be continuously aligned with the context into it emerges, we provide guidance to researchers, engineers and their organisations in cultivating a fruitful relationship between scientific creativity and social responsibility. To resolve this, we introduce a structured, but flexible collaboration between humanists/social scholars and innovators and seek to overcome the dilemma between socio-ethical and techno-economic aspects. Without passing judgement about social and ethical aspects we assist researchers in recognising that through modulations of their daily routines that they can deliver public value and greater social impact in their domains. Thus, by repeated micro-scale reflections and exploration of the relationship between the individual research and the context into it emerges we seek to gradually achieve a spiral effect in which the focus progressively shifts from particular research values towards universal values crucial for the well-being of the society as a whole. We argue that to bring these modulations to an (eco)system level it is required to build consecutive relationships of alignment between stakeholders and this should be performed in an iterative, multilevel process of coordinating of perspectives, values, and strategies.

The research is conducted within the ongoing EU funded Project “Co-Create Change in Research Funding and Performing Organisations”, which aims to stimulate system changes in the area of responsible innovation and involves three leading Research centres, two Universities as well as two Research Funding Organisations.

The dynamics of organizational institutionalization of university community engagement

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The present paper fits into an emerging stream of literature that focuses on the “organizational institutionalization” of responsible innovation (RI) (e.g. Randles 2017; Owen et al. 2021). RI covers a wide range of concepts and practices, which may differ in their potential to transform the reigning institutional settings. In the present paper we focus on university community engagement (UCE), which we conceptualize as a mutually beneficial cooperation between the university and various further actors alongside a social justice agenda (Benneworth et al. 2018). Although UCE and RI are distinct concepts; the practices they cover largely overlap. Most often UCE is a peripheral, “Cinderella-mission” of universities, which is hardly

institutionalized. Thus, the institutionalization of UCE requires significant organizational change and is likely to challenge the reigning logics and practices.

There is a wide-spread expectation that the change in the practices and norms of universities is necessary and also the possible way forward for the uptake of RI. However, our knowledge on the dynamics of organizational change towards the institutionalization of RI is rather scarce. This paper presents organizational change as a process of simultaneously de-constructing and constructing legitimacy. We build on three types of legitimacy listed by Suchman (1995) to understand how the (de)construction of pragmatic, moral and cognitive legitimacy may lead to / prevent institutionalization. Legitimacy challenges may open up spaces for change. However, change may not occur; or may occur but still fail to transform the reigning logics and practices.

We demonstrate and critically (self-)reflect on the social justice orientated UCE processes that we created (or contributed to) at the University of Szeged, Faculty of Economics Research Centre. We use these processes to examine the dynamics of organizational institutionalization of UCE. In line with former findings, we argue that institutional entrepreneurship (agency), leadership and organizational culture are vital factors to understand organizational change. We also argue that the co-existence of different framings of engagement (Hazelkorn 2016) and their interplay significantly affects the dynamics of organization change.

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The role of Serious Games in facilitating citizen and community engagement in the context of Responsible Research and Innovation

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This contribution focuses on the use of Serious Games to enable engagement between researchers and diverse actors from across different societal sectors. Serious Games are games that are played not for entertainment but for other purposes such as co-creation and collaboration, education and learning, or awareness-raising. Responsible Research and Innovation benefits from the opportunities for citizen and community engagement provided by the use of Serious Games. This is because Serious Games enable more equitable and non-threatening communication, which is a precondition for genuine engagement and co-creation. This effect is particularly important with respect to people who do not normally work together and have very different cultures of interaction and communication. Gamification also provides more accessible contact with the results of research, particularly when combined with multimedia outputs.

I present uses of gamification related to two different stages of the research process, namely co-creation at the point of planning research, and gamified multimedia publishing at the point of dissemination of research. The first is based on my empirical work with facilitation in highly diverse groups of researchers and community stakeholders through Serious Games, while the second is a design concept for gamifying publication.

When planning for research, the Serious Games I invented and used include games for brainstorming, timeline planning, team structure, prioritisation, and the like. I present examples from working on educational projects with diverse groups consisting of participants from different continents and language backgrounds, and academics as well as community members and practitioners. When engaged in Serious Games in such a context, people communicate more clearly and equitably, bond more readily as a group, and benefit from the visual outputs of the sessions.

Dissemination of research has already become multimodal, e.g. by using videos or exhibitions, but gamification adds another dimension. The aim here is to reduce the gap between research findings and their uptake in society. I present a design concept where multimedia materials are curated and arranged in a Serious Game process. Adding gamification means that people can engage actively with these materials in a non-threatening and inspiring way. This is particularly useful for research that results in potentially implementable prototypes, e.g. research in Living Labs, where real-world implementation and/or scaling is feasible but has not been part of the research itself.

On the part of researchers, becoming skilled in Serious Games requires training in facilitation as well as enhanced linguistic and cross-cultural awareness. While this may not be easy for many, it is rewarding when authentic connections emerge between the research community and citizens from other sectors or society. I argue that RRI depends heavily on the narrowing of gaps, both between researchers and stakeholder communities, and between research

findings and their uptake by societal actors. This can be facilitated by Serious Games under the right conditions.

Action learning as a potential tool for organisational change in higher education

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In this presentation we attempt to start a conversation about whether action learning (AL) as a participatory tool can be applied to instigate and support responsible research and innovation (RRI) initiatives in higher education. Since RRI's precepts are largely based on participation, engagement and action potential of participants to change existing social and organisational structures, we shall focus on these potentialities of the method. Nevertheless, we also aim to bring in the critical remarks about AL and offer some methodological insights how to remedy at least some of the constraints of this process.

Action Learning is a participatory process in which a small set of people (typically 4-7) look for solutions for wicked problems. In a typical round, one of the set members (called the problem-owner), brings a personal issue to the group and the others in the set pose questions to support the problem-owner in finding a solution. In order to reach a solution, the sequence involves understanding past emotional, cognitive and behavioural patterns (which might hinder the problem-owner), the evaluation of the present conditions, as well as forging action plans to change the situation.

Each set member sooner or later finds themselves in the role of the problem-owner. In this manner, members of the set not only learn as they answer others' questions, but they also learn when they formulate specific and intentional questions in relation to someone else's problem. Nevertheless, the highest potential of learning stems from actual actions set members take after the session. Action plans formulated at the end of each session are to be implemented and the experience and lessons learnt from attempts at changing the situation is an important element in the learning process. Consequently, AL typically consists of several rounds or cycles.

While AL is not a research tool per se, several scholars used it in research projects to produce knowledge in an interventionist, action-oriented manner. As far as RRI oriented projects are concerned, AL seems a very opportune participatory process since it not only aims to make people aware of their own action potential (that is their own agency space), but the sequence of a typical session also follows a sequence which moves from past patterns towards future possibilities.

Nevertheless, action learning is often criticised for being overly focusing on individual self-development aspects while not taking into account a wider perspective encompassing the organisational and social relations in which individuals are embedded. In this manner, instead of being actually beneficial, AL might be a tool to dampen social and organisational awareness, by hoodwinking participants and narrowing their perspectives to their own, individual problems. These individual issues, however, cannot be solved without taking into account issues of power and social conditions in which they find themselves. This can also be posed as a methodological conundrum of how to integrate systems perspective and systems thinking into action learning while maintaining the emphasis on the individuals' issues to preserve relevance and connection to the lived reality of those involved.

Addressing responsibility in sustainability-driven innovation processes: Management lessons for sustainable innovation from a systematic literature review

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Sustainable Innovation (SI) can be regarded as a search paradigm for innovation that has the potential to contribute to the creation of systems. This is supported by various mechanisms within the innovation process that influence search heuristics and assist in the creation of radical innovations. For instant, a clear directionality towards sustainability and the pursuit of competitiveness through sustainability. Thereby, SI addresses a significant agent of change, namely the business sector. However, SI often fails to strategically integrate aspects of responsibility such as social justice and equity into the innovation process. This study argues that without strategic integration, there is a risk of contributing to "irresponsible" system change as a result of business innovation activities. Therefore, an extended sustainability-driven innovation process model is recommended, which is enriched by the factor responsibility. For this purpose, the framework of Responsible Research and Innovation (RRI) is utilized. This study reports on findings from a systematic literature review of a representative sample of empirical studies from the SI- and RRI-literature. Even though the comparison of the two concepts has already revealed considerable synergies, there are only few studies to date that attempt to examine how the two concepts can complement each other in a joint framework. Results from the literature review reveal, that both frameworks have a different approach through which system change could be enacted. While SI places more emphasis on a goal-oriented approach, RRI takes an inclusive approach – in which change is fueled by societal consideration. The results further support the assumption that innovation processes in the SI-field often do not incorporate responsibility strategically, as profit often dominates innovation

practices in times of critical decision-making. In contrast, integrating responsibility into sustainability-driven innovation processes can create a moral compass that helps to set clear standards for decision-making, which can ultimately increase efficiency. Furthermore, the integration of responsibility can also be seen as a competitive advantage when businesses go “beyond standards" through responsibility. The study concludes with a management proposal for a (responsible)- innovation process model towards sustainability. The model outlines possibilities how RRI tools can be used to further strengthen the sustainability-driven innovation process. Thereby, it becomes clear that responsibility can become more than a process, but a design element for radical innovation.

Situating responsibility in drug discovery

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What does Responsible Research and Innovation (RRI) mean in the field of drug discovery and development? In this paper, I study notions of responsibility (as a practice, an academic discourse and a policy concept) among patients, scientists, industry and governmental stakeholders through interviews and policy documents. One value that policies about (RRI) seek to promote is the ongoing alignment and collaboration between multiple societal actors with the goal to maximize the impact of research and innovation in society. How can this be done in the field of drug discovery? By studying the politics of alignment as a means to responsibilize research, this paper will address the multitude of ways that responsibility matters to patients, publicly funded researchers from different disciplines working together to do drug discovery, industry and governmental stakeholders. I seek to understand if, when and how ‘alignment’ achieves value for the people involved. The point is to provide insights into how each societal actor is engaged in making notions of RRI relevant for themselves. In order for alignment to become more than an arbitrary ideal in the field of drug discovery, more attention needs to be given to these stakeholder perspectives.

Benevolent Social Bots – A participatory design approach to include civil society actors in their ethical design

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While there are some applications that are supposed to be helpful, bots in social media are usually associated with either spamming ads and nonsense or, even worse, spreading misinformation and propaganda. Within the four-year Bots Building Bridges (3B) project, algorithms are developed to detect uncivil discussions in online social networks, and benevolent bots are designed to intervene autonomously and promote a constructive and factual debate culture.

Debate in social media can have a significant effect on society (e.g., Allcott & Gentzkow, 2017). The development of bots that autonomously influence discussions in terms of tone and content obviously demands consideration of ethical, legal, and social aspects (ELSA). To meet these demands, our research follows a Responsible Research Innovation (RRI) approach right from the start (e.g., Owen & Pansera, 2019). Alongside the technical modules, a project-spanning module specifically concerning RRI and ELSA was already included in the project proposal.

In accordance with the RRI dimensions of "inclusive deliberation" and "responsiveness" (Owen & Pansera, 2019), ongoing exchange with civil society stakeholders who have expertise in organizing counter speech, improving debate culture, and education in online social networks is organized. Participatory design methods are used in the workshops to not only incorporate stakeholder expertise, but especially to support consideration of ELSA during the development process of our benevolent bots. Accordingly, our literature-based ethical guidelines are, such as prototypes, iteratively updated as we develop and test our bots in the course of the project. We will present our results of the first workshop, our general approach, the 4-year roadmap, and workshop design that will be implemented through our RRI module.

Road to Openness: Perspectives from a Small Local Research Funder

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WWTF - Vienna Science and Technology Fund, Austria

Research funders (RFO) play an important part as an actor of the research and innovation ecosystem: identifying gaps and needs of the scientific community, academic institutions, and local stakeholders. When it comes to bringing openness to the long-standing paradigms in science, dilemmas, pitfalls, and constraints arise in this triangulation. Therefore, the development of new funding criteria, guidelines, or policies might be perfect test-beds to reflect on this process. With this session contribution, we want to portray some of the most important observations regarding Vienna Science and Technology Fund (WWTF) has made during the convergence towards Open Science.

Background: WWTF holds a key role in shaping the local research community via thematic project calls and long-term basic funding for promising young researchers coming to Vienna. By experience, recent calls in new topics like Digital Humanism and Environmental Systems Research have inspired many non-university stakeholders to engage in project calls. Therefore, this development showed the need for reconsidering the WWTF funding guideline towards introducing new elements of openness.

Reflection: In this session, WWTF will reflect on its initial experience along the process, specifically describing the multi-dimensional aspects on a structural and organizational level. We will pinpoint to specific dilemmas by these guiding questions: “Who is actually responsible for capacity building for Open Science practices: RFOs or RPOs?”; “How does openness impact our own organization?“; “How can we keep administrative costs low and maintain compliance throughout funded projects?”, “How can we avoid that openness is yet another box to tick?”

Stream B: Digitalization of Society, Society and AI

B.1: Cultures of Prediction

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

A rich past of poor predictions about the future of artificial intelligence

Aristotle Tympas, Konstantinos Sakalis
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Predicting that in a near future computing artifacts would be intelligent enough to be able to carry out works that require intelligence has a long past. Our presentation will introduce to the most representative predictions regarding the most important computing artifacts, all the way from the mainframes of the first postwar decades to the home/personal computer of the more recent decades. As our argument goes, this history is overwhelmed by a pattern of failed predictions, which turned initial enthusiasts about the supposed artificial intelligence of a computing artifact into eventual discontents with it, due to its proven unintelligence. Histories of computing technology, just like histories of technology in general, tend to stay at the excitement during the initial introduction of new machines as intelligent. Our paper adds the history of the disappointment during the eventual withdrawal of the same machines as unintelligent. We rely on empirical research on the history of computing in Greece, a country belonging to the west, yet a non-anglophone one. This empirical research is focused on some of the most influential Greek home technology journals and newspaper technology columns.

Constructing the future of a scientific field – high-energy physics and the ATLAS upgrade

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Among the sciences, physics has been especially acknowledged by philosophers for producing theories whose novel predictions – novel both in the sense of “new” and in the sense of “unexpected” (Leplin 2004) – have been repeatedly confirmed by empirical evidence. The notion of prediction in physics has, however, most often been restricted to the inferential resources of the semantic content of its theories, rather than the aim to say something about the future, least to inform policy decisions. Here is an example: “While the masses of the

supersymmetric partner particles are not predicted a priori, naturalness requires that the supersymmetric partners of the top quark, the Higgs bosons and the gluino should have masses not much larger than a TeV – and therefore in the range accessible at the LHC." (ATLAS 2011, 95) While the first part of the sentence makes predictions about the apparently atemporal, universal realm of physics entities, the second part introduces a predicted feature of the actual apparatus - the Large Hadron Collider (LHC).

In this talk, I show how the high-energy physics community infrastructures the future of its field by creating conditions for generating and confirming predictions with the help of novel technologies. These technologies include model-independent, data-driven experimental searches largely dependent on machine learning. Future detectors and colliders are planned based on the envisaged physics goals, while the physics goals are constrained and steered by the feasibility and the predicted performance of the available and expected future technologies.

The talk details the physics-engineering work involved in the upgrade of a subsystem of the ATLAS detector at CERN's LHC. Based on qualitative interviews with researchers involved in the design, evaluation, and implementation of a detector upgrade, I bring forth the overlaps and intertwinements of the material, social, and theoretical ontologies of high-energy physics, drawing on concepts of genealogical change and unfolding of the object (Knorr Cetina 1995, 1999). While keeping the epistemic ends in sight, often portrayed as uncovering further bits of microphysical reality, the physicists need to "get the reality in" – in terms of what is, or will be, achievable. This comes down to the types of connectors, the length of optical fiber cables, or securing cooling, powering, and radiation hardness of the components. They will need to last for another twelve years, until the envisaged end of the High-Luminosity LHC operation in 2034. The high-energy physics community thus emerges as a community of not only inferential prediction, but a temporal one as well – a prediction of its predictive, experimental, material, computational, and technological capacities, and thereby of its possible future(s).

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"Rangers are big data pioneers, too": The rise of intelligence-led conservation

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During IUCN World Conservation Congress and International Congress for Conservation Biology in 2021, law enforcement monitoring (LEM) dominated the panels on conservation technology, rendering drones, camera traps and other remote devices as simply its supporting infrastructure. Examples of such technologies are integration platforms Spatial Monitoring and Reporting Tool (SMART) and its successor, EarthRanger. While the software itself is open-source and so-called “philanthropic”, the infrastructure - digital, physical and soft - to implement such “free” technology is estimated in millions of dollars. Those systems promote a particular techno-managerial approach for practices of the protected area personnel, consisting of implementation of adaptive management loop, near real-time visualisation of aggregated data and algorithm-driven decision-making. Yet, as a result, conservation efforts become framed in terms of anti-poaching prediction and deterrence. In about 10 years of LEM’s existence, those technologies quickly expanded throughout protected areas without any significant obstructions from the academic, activist and practice communities.

This paper investigates the design and techno-managerial practices of those tools through discourse analysis grounded in interpretive policy inquiry. To do so, I examined 98 texts, including grey literature, scientific research and media coverage, 3 conference presentations and 5 online workshops – all containing explanation or promotion of LEM use.

I demonstrate that LEM specialists mobilise the narrative strategy of the “angel shift” that operates on the logic of lack. It reinforces the position of poachers as villains and “smart” technology transfer as an ultimate solution. With their Silicon Valley-style promotion, LEM representatives frame the poaching crisis as a problem of the lack of sufficient data, which supposedly would be alleviated through intensification of data collection, the introduction of an experimental management model focused on uncertainty reduction and reliance on game theory-based AI tools. Urban technological solutions of the Global North, such as intelligence-led policing, get transferred directly onto socio-politically complex conditions of conservation areas of the Global South. The “optimisation” of patrolling, efficiency of area management and – from LEM’s perspective - the success of conservation efforts rely on the standardisation of collected data and emphasis on poaching metrics. Meanwhile, neither adaptive management nor intelligence-led conservation, which are deemed as more “scientific” approaches, have any evidence of their efficiency and translation into conservation outcomes as of yet.

This work contributes to larger research on the logics of the West-based technological sector reinforcing (neo-)colonial narratives, militarisation and technosolutionism, as well as intervening in the development of the digital infrastructuring of the Global South through

conservation practice. Algorithmic prediction founded on the assumptions of urban criminology and Global North infrastructures has the potential to further exacerbate the marginalisation of local communities and vilification of subsistence hunters.

Polls as rituals: On the history and culture of survey sampling

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How do we know what voters know? Should pre-election polls be 'trusted' as tools of prediction, or feared as mechanisms of distortion, making voters falsely certain of a probable win or loss. The presentation of the "latest polls" has become a media ritual, especially before high-profile elections. Election forecasting is always embedded in a particular scientific culture and can thus be situated within the framework of "cultures of prediction". This presentation explores how those cultures of prediction emerged and changed over time, developing new insights into the history of survey sampling and the way survey legitimacy has been negotiated throughout time.

The basis of most election forecasts is the survey sample, which history I describe as one of consensus and controversy: Whereas first sample surveys were conducted in the 17th and 18th century, the epistemic context of the 19th century was one that saw those early sample surveys as dubious speculation and emphasized the importance of full enumeration. Only by the end of the 19th century was sampling seriously suggested again, followed by a controversy over the right method of sampling. The academic controversy came to a halt after a survey sampling theory was developed in 1934, heralding a consensus about the superiority of random sampling over purposive sampling. The crucial aspect is that random sampling, despite being well understood and accepted among statisticians, has not found its way into the actual practice of election forecasting, at least not until the 1936 and 1948 miscalls associated with the US elections. Those failed predictions brought about a new culture of prediction that remained stable until recently. The last decade has seen an upsurge in headline-making mispredictions by pollsters when it comes to elections and referendums, most prominent among these are the US elections of 2016 and 2020, as well as the British House of Commons election of 2015 and the Brexit referendum of 2016. In many ways, these are reminiscent of the miscalls in 1936 and 1948, but they bring about a crucial new dimension: Whereas the 1948 election heralded the superiority of the principle of random sampling, current debates and applications entail a reexamination of this very principle.

Not only have the presentations of the latest polls become a ritual, the evaluation, as to how accurate the polls were, has equally become ritual in the public, the media and among survey

researchers and companies themselves, including evaluations of the used sampling methods. To explore this phenomenon in greater detail, this presentation aims to do accomplish three things: It will first introduce the topic of election forecasting and its relevance to the framework of “cultures of prediction”. In a second step, it will outline a genealogy of survey sampling and will explore the way the scientific cultures of predictions evolved over time. In a third step, it will propose an argument on the role the evaluation of election forecasts plays in shaping the culture and practice of forecasting itself.

Estimation – Measurement – Profit? Predicting Futures Between Feeling and Data in a Software Engineering Company

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Developing Software in a business company environment is a complex process during which all stakeholders maneuver through different uncertainties. To cope with these unknowns, techniques of prediction play a central role in software production itself as in its economic monitoring. A basic number of predictions rely on the actor’s feelings and work experiences. Though, there are rising attempts of datafied measurements of the present to anticipate the future. One example is the agile method Scrum, which is a popular tool for project management and social organization. Software developers use this agile framework and its rules to deconstruct and restructure big projects into smaller parts, which promise to be much easier to handle when it comes to predictability on duration or size of a project feature.
Based on ethnographic fieldwork, this contribution investigates the practices and effects of prediction in the process of software engineering in two spheres: (1) in agile estimation while planning a software task, (2) in controlling datafied business phenomena such as working time and the company’s earnings. Elaborated systems of measuring time, project progress and money throughout many business data channels allow all employees a company-wide monitoring of ‘the numbers’ and the self-assessment where the company is standing at. The actors see both ways as rationalized approaches dealing with the potentials of not-knowing future. Prediction through data is seen rather legitimate than through sheer experience. If it is not measurable, its less reliant. However, the gap between feeling and data in a self-called ‘agile’ environment is often not too big. Actors in the software development process have implemented various practices of creating, measuring, comparing, and benchmarking elements of labor to gain higher control over basically unhedged phenomena. Not only to avoid pitfalls in the project’s process, but also to maximize the company’s profit.

Consequences of these practices of prediction are not only subjectification processes, but an increasing effort in creating data on the cost of working time as the datafication is not fully automated in the company. This additional workload is justified by intentions of economic stability and implicit power of the finance and controlling department. Although resistances exist, the company manages to keep their employees in line through a narration of self-organization and the necessity of controlling the uncertain through knowledge – and by establishing a data-positive company culture.

A vision of future care? Public and stakeholders' perceptions of care robots in Ireland, France and Hong Kong SAR China

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For several decades, a growing body of literature in social sciences, most notably in STS, has analysed how healthcare policies and practices are framed by visions of the future, and has underlined the performative nature of these visions in a modernity marked by the coproduction of science, technology, and society. Different conceptualisation of these anticipations have been proposed: hope, expectations, promise or "sociotechnical imaginaries" (Jasanoff and Kim 2015).

When we look at the reality of the care sector, health and social care systems are under huge strain, and all countries are faced with demographic challenges as the number of older people, including those living with dementia, is expected to grow. To support ageing in place and tackle the workforce shortage, digitalisation and assistive technologies have been adopted as a policy instrument in industrially advanced economies.

From this standpoint, the worldwide COVID-19 pandemic was transformative, as technology became almost the only method of connecting people within local communities and across the globe. Telemedicine and telecare began to be embraced. It can be argued that the pandemic accelerated the change that was already envisioned and happening.

Robots are a case in point. They are now deployed in many care settings. Developers claim that care robots are designed to enable active ageing as well as ageing in place, with support for older persons. Among the stakeholders and potential users, there is a strong expectation

for such robotics-based solutions, while ethical concerns remain particularly in relation to decision-making, dignity, and the rights of older people and their carers. These critical issues are still there, and different views exist. Are there similarities and differences in the public discourse across difficult cultures? What about stakeholders' views regarding a vision of future care?

To address these questions, a multidisciplinary team in Ireland, France and Hong Kong SAR China carried out this study. The objectives were two-fold: (i) to understand how care robots have been portrayed in the newspaper media, and (ii) to explore the perceptions of stakeholders regarding the use and future of care robots.

The team selected one major newspaper from each jurisdiction, plus the UK, and conducted a keyword search (robot & ageing/older people/care/dementia/Alzheimer) in their three respective languages (English, Chinese and French). A total of 245 articles were collected from the period of January 2001 and September 2020, and analysed thematically.

We then conducted 34 semi-structured interviews in the three jurisdictions. The participants were care professionals, service providers, researchers, and advocacy group representatives and policymakers. The questions explored their knowledge of and perceptions regarding assistive technologies and a future vision of care provision.

The results show that the portrayals of care robots in newspapers indicate some cultural differences in the focus of the articles (e.g. potential impact of human-robot interactions, technological development and adoption of robots), while stakeholders' views are very much mixed.

The study was supported by the Toyota Foundation.

Jasanoff S and Kim S-H (Eds.) 2015. Dreamscapes of Modernity: Sociotechnical Imaginaries and the Fabrication of Power. Chicago: The University of Chicago Press.

Futures Tribes and their Territories: A co-citation analysis of recent publications, and some reflections on the global structures of futures studies

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Sociologists of science, STS scholars, and others have long researched the interlinkages of social structures and knowledge structures, and have proposed several conceptualizations to describe these relations. One of these concepts, academic tribes and territories, has been used to focus attention on the relations of descendance within scientific communities, arguing that during academic socialization, individuals incorporate not only explicit, but also large elements of tacit knowledge which then continues to inform their further research activities.

Whithin futures studies, there exist quite a few analyses trying to identify the existing tribes, although not specifically using this concept. Adding to this more self-reflecting line of work, the article uses a specific form of network analysis to question whether current futures studies is structured according to different lines of (intellectual) ancestry. It runs a co-citation analysis on a sample of futures studies publications from the last ten years (n = 500).Thereby, it identifies four clusters of references that are very commonly cited together. However, the larger network of which these clusters are a part of is not segregated, meaning that there are no structural holes between them. We can furthermore say that not only is there a considerable diversity of perspectives in futures studies; what is more, this diversity is widely received and acknowledged.

B.3: Trust (erosion) in AI regulation. Dimensions, Drivers, Contradictions?

Session Chair: Jascha Bareis, Karlsruhe Institute of Technology, Germany

Aligning Expectations in AI and Brain Technology: the Case of Deep Brain Stimulation for Parkinson Disease and Beyond

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The aim of the presentation is to analyze the technological promises, future visions, and expectations embodied in Deep Brain Stimulation (DBS) and AI technology, with a particular focus on trust. Understanding the formation and mobilization of expectations is crucial to analyze emerging technology concerning biomedicine (van Lente, 1993) where knowledge is coproduced by new socio-technical relations (Hedgecoe, Martin 2003). This qualitative case-study is part of the SYNCH project, funded by the Future Emerging Technology (Horizon 2020), whose objective is to combine DBS with AI to treat several diseases including Parkinson Disease (PD). In this scenario, promises are fundamental feature to examine the “horizons of hope” where expectations of technoscientific actors arise (Robinson, Audétat et al 2021) and where trust can be rooted. To do so, interviews were conducted with the aim of understanding how the expectations of different stakeholders, i.e. neuroscientists, engineers, clinicians, entrepreneurs and patients can shape the future application of AI to DBS, but also the promises solicitated by patients and the potential for clinical applications. So, the aims to examine 1) the role of expectations about DBS and AI in the alignment of heterogeneous

elements that shape technology and 2) the emerging “sociotechnical hopes” related to promising futures. Deep brain stimulation (DBS), however, is a technology with a high potential for biomedical innovation in several fields: as a treatment for Parkinson disease, to control eating disorders or – potentially – to manage kids with ADHD. The study of the brain is a powerful activity in providing new ways for understanding ourselves and societies, producing ‘neurologic subjectivity’ (Pickersgill and Cunningham-Burley et al 2011). The brain, in fact, is an object often distant from everyday experience, but it is also the location of the `modern self' (Vidal 2009) and the engine of what is conceived as human rationality. The lack of trust in AI, moreover, becomes an even more controversial problem if we consider that today AI and neuroscience drive each other forwards. The combination of DBS and AI elicits fears and doubt by stakeholders, based in the idea that intelligent systems will replace the role of neurologists, of physicians or, more in general, of an idealized form of “natural intelligence”. Although the AI enables a more personalized treatments by tracing and recording patients’ cerebral activity, however, it has been characterized by challenges and tensions among clinical teams and patients due to its “technical opacity” (Burrell 2016). Several studies (Agid et al., 2006; Gilbert, 2018) have noted that, despite the positive effects on the motor symptoms of Parkinson’s, some patients have not experienced the improvement in the quality of life that would be expected. Thus, exploring expectations allows to examine the conflicts that shaped DBS over time; but also the promises on which future scenarios are based for both the treatment of PD patients and for biomedical applications, and finally to investigate the problem of trust in AI.

Re-configuring aquaculture sustainability assurance in the digital age

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This paper explores the emergence of digital sustainability assurance in the aquaculture sector. Over the past decades, third-party certifications have emerged as the dominant mechanism to assure the sustainability of aquaculture products. Certifications are designed to rely on ‘analog’ means of assurance including in-person audit visits to production locations. Digital technologies provide new opportunities to collect and verify data, assess sustainability and identify areas of improvement. Satellite imagery, drones and sensors enable remote monitoring. Blockchain technology allows for temper-proof information sharing in value chains. Using digital applications, distant actors can communicate in real time. Together, they promise to make sustainability assurance more transparent, effective, efficient, accurate, accessible and scalable. We explore how digitalization enables shifts in - and novels forms of - assurance.

Based on interviews with key experts and organizations in the aquaculture sector, we investigate how digital technologies are put to use to (re)organize the rules, procedures and practices of sustainability assurance. Building on the sociology of trust, we then identify shifts in the ways in which trust in sustainable production is institutionalized in the aquaculture sector. Preliminary analysis reveals a shift towards both increased surveillance as well as a stronger focus on enabling improvement as logics of trust.

Engineering Trust in AI: the impact of debates on AI regulation on the work of software developers

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Trust ranks high in the debates on artificial intelligence (AI). It has become a key term for regulatory proposals such as “The Ethics Guidelines for Trustworthy AI” of the EU High-Level Expert Group on AI (2019) or the European Commission’s proposals for a Digital Services Act (2020) and a Digital Market Act (2020) and there is barely an article on AI not mentioning the issue in one or another way. Important discussions focus on interpretability, privacy, transparency, fairness, and reliability as criteria defining trust(worthiness) and increasingly also on tools to contribute to these. However, there has seemingly been less interest in actors and mechanisms aiming to achieve trustworthy AI.

We would like to contribute to this ensuing debate, especially regarding the complex interactions and linkages between the operational and regulatory levels during the development of AI applications by data scientists and developers. In other words: How is the question of trustworthiness dealt with at the level of software development? How do engineers perceive hard and soft regulations such as the GDPR or ethics guidelines? How do the technicians navigate through a differentiated environment structured by clients, funding agencies, professional societies, peer groups, regulators, management, media, and the broad public?

The material for our analysis comes from the work of the Austrian Institute of Technology Machine Learning Lab (AIT ML Lab) funded i.a. by the H2020 project Co-Change, where social and data scientists discuss key issues of AI ethics such as bias, privacy, data protection and transparency. The ML Lab work is structured around interactions between participants from technical, humanities and social science backgrounds in the form of focus groups, Socio-Technical Integration Research (STIR) inspired question and answer sessions, and short presentations followed by discussions. Invitations have also been extended to AIT innovation

ecosystem partners such as researchers from other organisations and civil servants working on AI-related issues.
In the paper, we would like to take a closer look at the work of engineers and the way in which they deal with the issue of trust as a key term of AI ethics. Important elements are the roles of soft and hard regulations as well as the internal discourses at the group, organisational, technological (sub)field and societal levels. In terms of actors, we are looking at the innovation ecosystem, which the engineers are navigating, i.e. at researchers, managers, companies, funding agencies and civil society. Our analysis will elaborate which of these elements and actors reinforce and hinder each other and what we can learn from these insights for the key issue of trust in AI (regulation).

B.4: Privacy and Digital Sovereignty during a Lifetime

Session Chair: Lea Watzinger, University of Tübingen: International Center for Ethics in the Sciences and Humanities (IZEW), Germany

Processes of Vulnerabilisation in e-ID: Lessons From India's Electronic Public Distribution System and the UK's EU Settlement Scheme

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This paper compares two related digitisation projects: the Electronic Public Distribution System (e-PDS) in India and the EU Settlement Scheme (EUSS) in the UK. These are two of the world's most ambitious attempts to regulate populations' access to public goods through digital infrastructure. As such, the types of inequities and harms they (re)produce have wide-ranging effects which differ across lines of race, class, caste, gender, age, and disability. A growing body of literature has emerged charting out how people can be differentially vulnerable to negative impacts from these systems (Lahuerta and Iusmen 2019; Jablonowski and Pinkowska 2021; Rao and Nair, 2019; Gangadharan 2017). However, especially in policy arenas, such ideas of vulnerability are often static and do not account for how vulnerability varies across time. Additionally, further work remains to theorise how processes of vulnerabilisation which are 'internal' to a system interact with 'external' sources; for instance if changes to a system's design extends or exacerbates other forms of social inequality. We therefore offer a dynamic account of how vulnerabilities are created through changing

technological systems and infrastructures, developed through empirical case studies of the EUSS and e-PDS.

In the EUSS case, EU citizens have experienced fundamental (and often abstruse) changes to their legal statuses and have become newly obliged to engage with government websites and smartphone applications to access public services. Based on our research, such new obligations, combined with changing life circumstances, can create vulnerability to being denied access to such services. We have found evidence that illness, disability, social isolation, stress from changing professional or family circumstances, poverty, and certain life milestones (entering education, marriage, retirement, etc.) can all cause particular harm to people when filtered through their changing legal statuses and obligations to use online services.

Similarly, in the e-PDS case, increased obligations to engage with technology to access subsidised grains have caused harm for people at certain life milestones. Two crucial components of the system are having a seeded Aadhaar card and a mobile phone. However, it is not guaranteed that this is the case for every individual in a household (Kamath, 2018). In some cases, school-going girls have had to miss class in order to procure grains for their family, which can be particularly harmful for their academic, professional and social development (Menon, 2017). Thus, existing forms of vulnerabilisation across lines of age and gender become extended and reproduced by the e-PDS system.

By creating composite profiles of EUSS and e-PDS users based on a combination of primary and secondary data, we suggest that vulnerability is not something which is fixed prior to the use of digital public services, but created through them. Developing a dynamic view of vulnerability in e-ID systems highlights how vulnerability to poor outcomes with the EUSS and e-PDS varies over time (especially as peoples' lives, and the services they interact with, change) and is not something which is necessary for certain groups but rather a product of design choices.

Privacy Smart Home Meta Assistant

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With adding IoT devices, one's home can become more and more a 'smart home'. As data collection is central to smart devices and the own home is a specially protected place, it is worth taking a closer look. Since there are several problems regarding users' privacy:

1) The smart devices are integrated into their environment rather naturally and the data collection is unobtrusive but ubiquitous. The benefit of smart home devices arises precisely from the fact that their users normally have not to think about the presence of the sensors, because everything happens automatically. Thereby it is not obvious to users when data is recorded by smart devices.
2) Additionally, the users do not know which data is collected (about them) and what is happening with their data. Even from data that does not appear to be personal data at first glance, important information about individuals can be derived through inferences (Kröger 2019).
3) Users are sometimes deliberately misled when their consent is requested.
These aspects become particularly relevant when considering specific applications of the smart home. For example, devices that detect whether an elderly person has fallen or offer remote monitoring of children. In other words, contexts in which privacy plays an even greater role. But you often don't have to go that far; the presence of visitors is often not taken into account when considering privacy in the smart home (Marky et al. 2020).
In my talk I want to introduce a matrix to distinguish between different types of data. It distinguishes according to the extent to which data is collected under consideration of the informed choice of the data subjects. Through this matrix it becomes clear that informed self-determination cannot be exercised, and sovereignty is not given. Therefore, there is an urgent need for action. The current legal situation, in particular the GDPR, provides a good initial basis, but still has gaps to sufficiently protect personal data (Wachter 2017). Since many smart devices target groups worth protecting, an ad hoc solution is needed.
Based on a contextual understanding of privacy we want to introduce our idea of a Privacy Smart Home Meta Assistant (PriSMA). This is not intended to replace regulation, but rather to highlight the need for it and provide a temporary solution until the gaps in regulation are closed. PriSMA is intended to be an uncomplicated solution to inform users about the shared data and to give back control. Due to the complexity of the data collection contexts, the assistant should be able to automatically adjust the IoT devices, like disabling certain sensors or shutting down devices in full, in order to relieve users. These changes are oriented to the respective situations. One challenge is to recognise situations in such a way that the privacy of the persons present is not invaded.

The growing vulnerability paradigm. Use of telepresence robots for assisting people with moderate dementia

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Dementia has been recognised by the World Health Organisation as a public health priority. Contemporary societies struggle to find sustainable ways to provide care for people living with dementia. Telepresence robots, also known as virtual presence or remote presence robots, have been tested in different settings for their potential to support social relationships and independent living for the elderly, and have shown a capacity to sustain users' health status particularly by reducing isolation and supporting social interactions In addition, when family members use telepresence robots alongside elderly users, this can lead to physical and mental health benefits as the users' feelings of family presence and security increase. The mental health of the family members can also improve as they feel less anxious about their loved ones.

At the same time however, these technologies raise challenges relating to ethics, data protection and human rights protection. Telepresence robots are equipped with a videoconferencing system (video camera, LCD screen, speaker and microphone) so they can be used in a "surveillance mode" violating the privacy and even dignity of elderly people, their families and carers. From a personal data protection perspective, the data collected by a telepresence robot in the context of tele assistance are special categories of personal data as they reveal information about that person's health status. Ethical and privacy concerns are raised regarding the capacity for elderly people with mild and moderate dementia to give their explicit consent for their profiling and surveillance and how this will change as their health status worsens over time. There are also security risks of illegal access and use for unauthorised or malicious purposes.

Given these challenges, it is necessary to consider mechanisms which may serve to protect users of telepresence robots and uphold their rights. These may include for instance, reminders from the robot that monitoring is in place and rolling consent processes that adapt to users' changing capacity over time.

B.5: Ethics and/in Intelligent connectivity: principles, practices and governance

Session Chair: Ana Tomicic, Catholic University of Croatia, Croatia

Setting agenda for ethical AI through understanding practice in a more than human world: Accountability issue and its future ethnographic perspective

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In this presentation, we will try to nurture a new approach in social science by providing argumentation for the study of algorithms and accountability issues by further expanding the usability of the concept of niche construction and environmental perspective in ethnographic studies. Namely, the humanistic perspective on the research of ethics has been recently challenged and complemented by the posthumanist approach which brings into assemblage different agency — human and non-human — objects and environment. From design perspective, this means expanding the quest of ethical matter by intensifying the inquiry perspective in a design that includes not just the design process but also a more comprehensive environment. Inspired by current positioning in evolutionary science (mainly through evolutionary and biological anthropology) and digital anthropology, this presentation is in line with those approaches who reaffirm ethical issues from standpoint theory in the current scientific debate about trust in science. The motive for this approach was found in the tendency of the ethical matter that goes beyond the framework of designer practice and find its sources in a much more comprehensive environment, which is not only consisted of a programmer perspective but from a much broader environment that include entanglements, situatedness embodiment of different elements — human and non-human — within the process of knowledge production and ethical becoming. This attempt will tend to foster a more comprehensive approach that investigates the life of an algorithm not as a mere human or even technical product (technological determinism) but as a product created within a process of coevolving into a broader environment. Thus, we hope that we will open widely a field saturated with standards that are closed within rigid institutional frameworks in the field of Artificial Intelligence.

Examining the social representations of AI ethics in PR China

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Artificial intelligence (AI) technology is rapidly developing and is increasingly being applied across disciplines, posing significant ethical and societal challenges. Various such challenges have been raised: from concerns with privacy and confidentiality, to the implications of encoding structural biases within AI technologies and the moral status of the machines themselves. The complexity is multiplied by the variety of socio-political and legislative perspectives on AI. At the same time however, as the use of AI increases so does the need for a global governance framework. Cultural differences present a unique set of challenges when it comes to aligning core ethical principles. We currently lack a culturally-specific understanding of how the ethics around AI technologies are anchored in specific socio-political

context, and how they are objectified in the respective scientific, political and social environments. This paper aims to research the social representations on AI ethics in PR China. It is interested in examining the historical and philosophical anchors which inform the current objectifications of AI in PR China. For this purpose, it maps out the key hubs of institutional knowledge production on AI in PR China. Secondly, it maps out the scholars (internationally and in China) who are examining the issue of AI ethics in PR China. Thirdly, it maps out their knowledge production (diffused through scientific and popular articles) on AI ethics in China, and locates the key themes and concerns.

Conflicting expectations and unexpected perspectives: Unpacking views on the future of clinical decision support systems in health care.

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The added value of clinical decision support systems (CDSSs) in health care is often enthusiastically described in terms of productivity and efficiency: systems that are fast and thorough. CDSSs are expected to support decision-making by organizing, analyzing and presenting data in ways beneficial to medical professionals, for example by selecting and presenting information from various guidelines that applies specifically to an individual patient. CDSSs differ in use and complexity, some systems are relatively simple predictive programs based on a straightforward algorithm, other CDSSs use extensive data mining and complex AI. Despite high expectations the success of CDSSs is not straightforward: many evaluative studies show that when implemented in a practice achieving a particular CDSSs' potential remains difficult. The majority of these studies assess the quality of a CDSS primarily from a technical perspective (e.g. how often the system gives sound advice, how fast or well images are analyzed), the actual daily work practice remains under-examined.
Our article takes as its starting point the importance of insights from actual practice: we studied two concrete examples of CDSSs in which we were specifically interested in perspectives from physicians and developers in order to gain insight into the issues, dilemmas and tensions surrounding the development and use of CDSSs. To this end we held 28 interviews with physicians and developers that were related to one of the example CDSSs. We used sociological literature diving into themes of work practices such as boundary work and professional identity (e.g Burri et al. 2008) and more specific literature on issues related to machine learning and AI such as the notion of bias (e.g Pot et al. 2018) or the reorganization of work (e.g Bergey et al. 2019) to guide our analysis.

One issue that we found revolves around the incorporation of guidelines and new evidence into the CDSSs and the potential issues of trust and feelings of responsibility that may arise when integration is not clear and up-to-date. Our results on this topic show that liability is a complex and sensitive topic, for both clinicians and developers. We emphasize that asking that question in particular when it comes to AI-based decisions can be problematic: it implies that "normal" decisions are exempt from issues of liability. From our results it becomes clear that some people tend to trust human-made decisions more, other people tend to trust computer-processed decisions more, which automatically shapes perspectives on issues of trust and liability and how to deal with those.

The elaboration above is one example of a set of results in which we explore various problems and areas of tension based on the interviews with physicians and developers. We think that our results are valuable as empirical input for a joint ethical reflection on themes that will be addressed during the panel.

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The missing P(iece) in ELSI research – moving past speculative ethics and reaffirming the political dimensions of digital health

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Catholic University of Croatia, Croatia

Artificial intelligence (AI) systems in healthcare aim to be predictive, preventive and personalized by leveraging an unprecedented amount of available data. Pressing ethical concerns over the impact of AI on our societies emerge with the growing use of algorithms for health-related data analysis, coupled with the reduction of human supervision over automated processes. ELSI research (Ethical, Legal, and Social Issues) has long been key in investigating the challenges of the digital transition and principles for the ethical governance of AI. But recent criticisms of the ELSI approach hold that its significant focus on the ethical issues associated with technological applications comes at the expense of concern with the politics of technological and scientific practice, thus producing a kind of speculative ethics concerned primarily with hypothetical futures. In the framework of a post-ELSI agenda, we draw on a case study of the digital transition of healthcare in Croatia and propose a conceptual framework to guide public action and policy implementation in the field of digital health and equity.

To apprehend the positioning and the expectations of key stakeholders, and to assess their experiences and future needs, we developed a qualitative research design. We draw from Stakeholder theory (Wright and Schultz, 2018) and the Shiffman framework (Shiffman and Smith, 2007) to suggest strategies for further digitalization. We explore the issue of digitalization of healthcare from a more political and organizational perspective of the health system. By inquiring about the existing uses of digitalization on the ground and by co-designing a prototype of a future AI-based healthcare service with the concerned stakeholders, the aim is to describe and better understand the challenges identified by key stakeholders in the Croatian health system and to explore perceived political priorities amid the digital transition.

We conducted this research from June to December 2021 through semi-structured face-to-face interviews, complemented with two scenarios based on anticipatory ethics (York et al, 2019). Participants (n=75) were identified stakeholders in the healthcare context: patients, physicians, IT engineers, lawyers, hospital managers and public policymakers. Our results show unclear institutional leadership and paint a picture of a complex healthcare architecture enabled by the dynamics of political patronage. We propose a plausible amalgamated solution to the perceived challenges of digitalization by considering the priority and interest of all stakeholders. These insights hold key implications not only for Croatia, but at the international level to help set a scope of investigation on the health agenda and direct the attention of policymakers to overlooked aspects of the digital transition.

Non-users also matter: inquiry into the non-users of digital self-monitoring apps for multiple sclerosis

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Research on the adoption of new biomedical technologies mostly focuses on how users adopt these technologies in their daily life, for instance studying the creative and innovative ways in which technologies are integrated in users' world (Oudshoorn & Pinch, 2003). Several Science and Technology Studies (STS) scholars, such as Wyatt (2003) and Oudshoorn (2011) have criticized this exclusive focus on users. With a strong emphasis on users "we run the risk of accepting a worldview in which adoption of new technologies is the norm" (Wyatt, 2003, p. 77). In the field of STS it is acknowledged that non-users are also an important stakeholder group in shaping the development of new technologies and their (de)stabilization in society (Hyysalo, Elgaard Jensen & Oudshoorn, 2016). In our study we focused on non-users of smartphone apps for digital self-monitoring of chronic diseases. Digital self-monitoring refers

to the use of digital tools such as smartphones and activity trackers for the collection of health data to stimulate self-management of health and disease. Whereas self-monitoring apps for chronic diseases are increasingly being developed and implemented by companies and public institutions, it is known that digital health technologies often fail to become implemented or are used differently than envisioned by the technology developers (Dam Nielsen, 2015). Therefore it is timely to investigate why patients with chronic diseases are not using self-monitoring apps and how they are managing their disease without these apps. We filled this gap by conducting interviews with 21 patients suffering from the chronic neurological disease multiple sclerosis (MS). These patients were not willing to use self-monitoring apps at the time of the interview. For the interviewed non-users the perceived value of self-monitoring apps did not outweigh the expected burden of such apps. These apps were seen as time and energy consuming and were thought to bring undesired focus to the MS. Non-users appeared to have other ways to manage their MS, based on the experiential knowledge that they have gained through living with their disease. Therefore many non-users believed that they do not need self-monitoring apps for their disease management. Interestingly, non-use turned out to be a dynamic process. Multiple non-users could imagine using self-monitoring apps in the future, particularly when such apps are recommended by their healthcare providers and used as part of the therapy.

Our findings emphasize the notion of non-use being a reflective and rational act (Oudshoorn, 2011). Instead of persuading non-users to become users, more space should be given to the considerations of non-users in the discourse on digital self-monitoring. While the value of objective numerical data is dominant in this discourse, our findings stress that non-users foreground their experiential knowledge as the main source to engage in self-management. It is unrealistic to assume that every chronic disease patient will become a user of self-monitoring apps. Therefore attention should be devoted to how to prevent exclusion from healthcare of those who are unwilling or unable to engage in digital self-monitoring when these apps become an integral part of chronic disease therapies.

B.6: Empowering employees in dealing with digitalisation, artificial intelligence, and privacy in the workplace

Session Chair: Julian Anslinger, Interdisziplinäres Forschungszentrum für Technik, Arbeit und Kultur, Austria

Actively Shape Digital Transformation Processes! Empowering Social Workers in Dealing with Digitalization

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Against the backdrop of societal changes that are gradually leading to a “digital society” (Lindgren 2017), also the field of social work is undergoing fundamental transformations. Digitalization processes are changing the working conditions for and tools of social workers as much as organizational cultures. For example, digital technologies open up new possibilities to support clients or document working hours in the mobile service (Klinger, Mayr, Sackl-Sharif 2019).

Compared to other sectors, the field of social work in Austria faced many challenges related to digitalization processes before the COVID19-pandemic (Klinger, Rauter, Sackl-Sharif 2022). Social workers complained about poor technical equipment and inadequate software that does not correspond to the logic of working practices. Social workers often had a skeptical attitude towards digitalization. For example, they feared dehumanization or total surveillance through the use of digital tools. And most important for the context of this paper: There were hardly any opportunities for employees to actively participate in the introduction of new digital tools or to report technical problems. The project digi@socialwork[i] has therefore set itself the task of exploring participation possibilities for employees in the field of social work and to support their wish to actively shape digitalization processes.

Based on the results of a broad online survey among social workers in Austria (N=1.246) and nine group discussions, we developed together with social workers solutions and dealing strategies for the identified desiderata. In so-called idea labs, we presented the most important results of our surveys and introduced the current main challenges related to digitalization in the field of social work. First, the participating social workers identified further challenges they face in their work practice. Second, we invited them to develop recommendations for action based on their professional experiences. Finally, we compiled these recommendations in a toolbox, in which active participation opportunities for employees are listed for all discussed topics.

In this paper, we will discuss our participatory research design more closely and explore the advantages and challenges of developing recommendations for action directly from the researched field. Furthermore, we will present recommendations for action from selected topics such as participatory models for the introduction of new digital tools or the development of a working environment in which the use of digital tools can be learned in the best possible way.

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[i] The digi@socialwork project is funded by the Digitalisierungsfonds 4.0 of Arbeiterkammer Steiermark. It is carried out from 2020 to 2022 at the Institute of Educational Sciences (University of Graz).

Fostering technological competences to enable the responsible integration of AI assistance systems in the workplace

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“We lack knowledge and time to really ensure that the AI systems implemented in our company are beneficial to our workforce.” This is how a works council of a large company described the situation for employees' representatives in Austria during a workshop. And indeed, the set of technologies behind AI systems is evolving with a rapid speed, is barely conceivable without prior knowledge and can nevertheless have a considerable influence on all personnel. Particularly, aspects of ethics and privacy ought to be explored thoroughly. Employees and their representatives need a tool that provides them with the necessary knowledge to understand and co-shape the AI systems they must deal with. Co-creating such a tool in form of a broadly accessible online-handbook is the main goal of the VEKIAA project, funded by the Vienna Chamber of Labour (Arbeiterkammer Wien).
The interdisciplinary VEKIAA project team, i.e. social scientists from IFZ – Interdisciplinary Research Centre for Technology, Work and Culture and AI-experts from Pro2Future, pursued a participatory research approach. This means that relevant stakeholders (works councils, union representatives, etc.) were actively involved in the research process and played a significant role in determining the content of the handbook. Advisors’ perspectives with gender-, RRI and adult education as well as technology design were also considered. This participatory approach of co-creating relevant AI-knowledge ensured that the actual circumstances surrounding the integration of AI assistance systems in workplaces were taken into account and that the derived recommendations are practical and useful for employees’ representatives.

What positive and negative consequences can emerge from the specific technologies? What knowledge do employees' representatives need to become active participants in the process of the implementation of new technologies and how can they legally protect the workforce? These questions are addressed in the handbook, which will be published mid-2022. With this presentation we want to give a sneak-peek into the answers, developed in the VEKIAA project.

'To get them all on-board' – The roles of employees for technology providers in interorganizational AI projects

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Johannes Kepler University Linz, Austria

Not all organizations are big enough to have technology departments of their own that allow them to develop the tools that they need for themselves. In fact, there are a lot of companies that are providing other organizations with technological tools that they offer. This is no different for solutions based on Artificial Intelligence (AI). I want to provide a perspective on the topic of employees dealing with digital technologies by looking at AI providers and the different ways they construct their clients' employees. What roles are the employees pushed into? How do AI providers include/exclude their client's employees into implementation processes? What role does AI play in the interrelation between AI providers and their client organization's workplace?

In this talk I will look upon interorganizational implementation processes of AI solutions from an intersection of practice theory and organizations studies[1,2]. This perspective allows us to recognize that the experiences of employees with AI technologies are not only internally shaped by different organizational departments, their interests and practices with and appropriations of those technologies but also externally by the roles and activities that AI providers deem relevant and promote in regards to their own AI solution[3]. The arguments presented in this talk are based on preliminary results of the author's own empirical research which is designed to include both the perspectives of AI providers and the organizations in which AI is to be implemented. For this talk specifically, the insights are based on qualitative interviews with AI providers in Austria about how they deal with the implementation of AI into external companies.

AI providers construct roles for their client's employees such as relevant subjects of knowledge, testers in trial periods and sources of data and feedback, and ultimately as actors that AI providers 'need to get all on-board' for – in their point of view – a successful implementation. These roles and activities not only influence the implementation of technologies and their translation into prior or new organizational routines but – as I claim –

have implications for how employees deal with AI in their workplace and their perception of these technologies to be empowering, restricting, useful or a nuisance[4].

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B.8: Standardisation for (the Digital) Society

Session Chair: Kai Jakobs, RWTH Aachen University, Germany

DIGITAL INFORMATION STANDARDS AS SYMBOLIC GROUNDING OF INSTITUTIONAL LOGICS: IMPLICATIONS FOR GRAND CHALLENGE SENSEMAKING

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Information standards have an implicit role in many of today's grand challenges, a role illuminated by an institutional perspective (Fuenfschilling & Truffer 2014; Hinings, Gegenhuber & Greenwood 2018). This paper leverages Friedland and Alford's (1991) work on institutional logics to unpack a critical difference in how digital information standards enable and constrain the social sensemaking process needed to address grand challenges. According to Friedland and Alford (1991: 248), institutional logics are comprised of material practices and symbolic constructions. Material practices entail recurrent behaviors and activities including use of artifacts, while symbolic constructions entail shared ideas and schematic structures that frame material practices and social relations. The material practices and symbolic constructions are linked together through transrational referents (1991: 249) and symbolic systems:

"…the behaviors make sense to those who enact the behavior only in relation to those transrational symbolic systems and those symbolic systems only make sense in terms of the behavior". (1991: 250)

Friedland and Alford do not define “transrational”, but make clear that transrational referents and symbolic constructions are highly abstract concepts or typifications with profound social meanings (e.g. private property, love, democracy), that are concretized through social behaviors and relations. Other institutional theorists consider typifications directly as categories (Douglas 1986; DiMaggio 1997) and as classifications (Berger & Luckmann 1966; Douglas 1986), but do not clarify distinctions between them. According to information science however, distinctions between categories and classifications can be characterized in logically formal terms (Jacob 2004; Mann & Brooks 2011), with differing implications for usefulness: category definitions are equivocal while classification definitions are precise and unambiguous.

Information standards are a form of typification; through the material practices and social relations associated with their use, along with the material persistence of artifacts in which they are inscribed, information standards are symbolically grounded in artifacts (1991: 248-49). This stabilizes relations between typifications and their constituent elements.

In the digital domain, information standards are a common form of typification at a higher level of abstraction than data structures and programming language constructs, inscribed in artifacts that enable and constrain information processing according to principles of formal logic (Boolean, AND/OR, NOT). At their base, then, digital information standards are intrinsically classifications, not categories (Mann & Brooks 2011; Brooks & Rawls 2012). Institutional logics associated with digital information standards then are symbolically grounded in formal logic, and operate more deterministically (Leonardi & Barley 2008) than the more fungible capabilities of non-digital institutional logics.

Implications for grand challenge sensemaking are significant. Whereas digital information standards are valued for precision and efficiency, they obfuscate the equivocality that invites sensemaking around a broader context (Weick 1979; Brooks & Rawls 2012). I illustrate this perspective with empirical cases highlighting efforts to establish information standards for measuring climate change mitigation.

Theoretical contributions of this work include characterization of distinctions between institutional logics in formal mathematical terms. Practical implications include recognition that unreflective reliance on digital technologies intensifies unanticipated risk in a world where equivocal challenges comprise the new normal.

Theorizing on the effects of digitization on urban heritage preservation monitoring practice. Towards new norms and standards for balanced resolution of the preservation-development paradox

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In this work we reflect on scholarly insights obtained from the project aimed at introduction of AI-based innovation to the practice of urban heritage protection and risk monitoring (UHP). The insights obtained from the project cater for standards- and standardization related discourses in two important ways. First, on the 'technical level', introduction of novel sophisticated technologies in previously 'manual' practices introduces a challenge for the system developers to choose from a plethora of (available alternatives of) technology standards. What we learn, is that this choice is likely to be based on soft measures, such as the availability of support community, rather than on purely technical excellence of the standard or technology. Complementary to the popular knowledge on the importance of interoperability of two standards, we find a much more complex understanding on the interoperability of technologies-and-practices-in-the-workflow has to be considered, including the costs (and knowledge requirements) for establishing and maintaining (archiving, auditing, renewing) the workflow. Second, the project illuminated several important directions for future research on how novel technologies can be breaking/extending the traditional boundaries of work practices. For example, the project revealed several conflicts in the regulatory norms in UHP. The international regulation for heritage recognizes the need for participatory practices, whereas Lithuanian national legislation does not. Introduction of novel technologies in UHP opens the door for pluralistic consensus-based decision making. There are different groups of stakeholders whose material interests are affected by urban heritage (e.g., real estate owners of heritage buildings, city infrastructure developers), or whose contemporary identity and life is entangled with the meaning of urban heritage (e.g., members of town or town quarters communities). In other cases (e.g., tour operators who work with urban tourism, or publishers), people are related to urban heritage because their work draws on its conduct and outcomes. Introduction of novel technologies can establish new standards for what is understood as "risk monitoring" or "preservation". For example, digitization of UHP risk monitoring tools and processes has a potential to enable advanced sensitivity analysis (and establish the need for defining standards for minimum quality requirements), where different risk criteria can be compared based on interests of different stakeholder groups. Technologies also have a potential to completely redefine the understanding of what establishes the practice of UHP by enabling not only the strict retrospective monitoring of heritage objects, but also introducing the possibility of creating

projections of what the city (views/ sites/ objects) can become by putting more weight on preservation or development side of the scales. These novel possibilities reflect the invitations to theorize venues where AI-powers can elevate the powers of human reflective judgement, and where standards setting process can contribute to broader, non-technical (e.g. societal, environmental, legal and ethical) expertise development.

B.10: A cosmolocal approach to the digitalization of work

Session Chair: Lucas Lemos, Tallinn University of Technology, Estonia

DAOs for the creative industries: post-precarity models

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The blockchain and cryptocurrency economy, spurred by the coming of the Distributed Autonomous Organization (DAO), has been widely used by the 'digital wealthy' and hidden sectors of the economy. It has been argued that, in both cases, the ethical, moral and legal uses of these new technologies are, at the very least, questionable. However, there is an undeniable potential for blockchain and DAO in other sectors of activity. Connected mainly to financial and legal aspects of the digital economy, the organisational capacities of the DAO can foster novel financial and productive capabilities on sectors of activity passing through a period of adaptation to the global conditions of digital(ized) work.

In creative industries, individual creative skills generate intellectual property (Cunningham, 2002). Due to platform capitalism, working conditions in the creative industries have worsened considerably: precarious freelance jobs, intermittent pay, and intermittent health insurance coverage have encroached on the life of creative workers. However, the digitalisation of work has also brought the emergence of platform co-ops, providing a new framework for collaborative work and encouraging the stabilisation of work conditions while promoting new forms of intellectual property. On the other hand, the DAO, a blockchain-based system regulated by smart contracts (Hassan & De Filippi, 2021), enables people to coordinate financial transactions globally in a decentralised, horizontal, transparent and secure manner. Although DAOs have been primarily applied in the area of cryptocurrencies, they are showing promise in other areas like open participation, democratic governance and freedom from centralised forms of power and control. However, their legal status is uncertain: only in Wyoming are DAOs legally recognised as limited liability companies.

Since creative industries work primarily online, individual workers can associate themselves in ad hoc projects through blockchain. Such connections between creative workers will eventually lead to more standardised modes of collaboration and more stable organisational models that could become DAOs. Thus, DAOs would make it possible to transparently assign different tasks through standardised criteria, with remuneration calculated according to objective scales, and without workers necessarily being located in a particular country, or having to deal with legal intricacies individually. The mutual influence between DAOs and other organisational models as platform co-ops (Nabben et al., 2021) could play a relevant role in the future of the creative industries. Using DAO as a technology governance part of platform co-ops for creative industries would also provide the application of DAOs for the general interest, creation of wealth, and a post-precarity frame for digital labour, increasing its chances of being regulated in more states.

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Nabben, K., Puspasari, N., Kelleher, M., & Sanjay, S. (2021). Grounding decentralised technologies in cooperative principles: What can “Decentralised Autonomous Organisations”(DAOs) and platform cooperatives learn from each other?

Digital work meet the Estonian e-residency program: redistributive algorithms in co-op DAOs

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The Estonian e-Residency program supplies government-backed digital identity providing access to Estonia’s digital services. The program aimed to increase the country's attractiveness as a business environment. However, from the targeted ten million e-residents by 2025 eight years ago, there were less than 100,000 e-residents at the beginning of 2022. It can be argued that the political-economy ideas underpinning the e-Residency program are built upon unquestioned economic principles resonating with the neoliberal phase of capitalist expansion of financial markets. However, the e-Residency program provides valuable digital services that could be used under a different political-economy framework.

Platform co-ops are providing an alternative organisational model for digital workers. A platform co-op could be officially based in or in direct communication with a digital country,

like Estonia, providing a common national legislative system for digital workers that are part of the platform co-op located everywhere globally. Having the platform co-op members registered under the same digital legislative framework, the collective management of resources produced by the platform co-op members located globally should be significantly simplified. Specifically, in Estonia, nearly all services and the legislation delivered by the state are digitised, opening a path for algorithms to operate in that e-Estonia digital environment. Moreover, a Decentralized Autonomous Organization (DAO) could encode as software the legislation and procedures about workers' rights, occupational categories, taxation and insurance and payment systems, among other parameters. The code would be available for every platform co-op member to be reviewed, as DAO promotes open and transparent governance. Hence, the DAO would function as an automatised interface between the Estonian administration, the e-Residency program, and platform co-ops.

Redistributive algorithms encoded in a DAO would redistribute resources between the platform co-op members and automatise administrative processes. For example, after completing a job, the algorithm would identify how many resources have been produced (payment) and allocate them between the platform co-op members, the e-Tax office in Estonia, and other institutions. The complementary features of Platform co-ops, DAO and the e-Residency program, would relieve platform co-op members from burdensome administrative procedures while using a state-of-the-art administrative system and digital technologies, playing a potential role in the future development of digital work.

Acknowledging the complexity and technicality of the theoretical arguments exposed here, the authors aim to spur a debate on the possible complementary uses of technological approaches to producing and distributing resources in globally distributed networks. We propose a patchwork vision between the realms of market innovation state policies, crypto utopias of individual freedom, and sustainable community mutualisation practices. Alternative futures may lay ahead in the crossroads of combining different technical and organisational solutions that emerged from competing world visions.

Invisible Labor During the Digitization of the University of Thessaly's (Volos, Greece) Graduate Theses and Dissertations

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In the effort to better understand the ways in which Information and Communication Technologies (ICTs) relate to human labor, my research is focused on the study of digitization projects in the recent past in Greece. Using theoretical perspectives and methodological tools from History of Technology and Science and Technology Studies (STS), mainly the

‘technology-in-use’ approach, and keeping as a starting point the idea that technology embodies social meanings in a way that allows us to describe the technology-society relationship in terms of mutual ‘co-production’, it aims to reveal the features of labor needed to render an analog archive into digital. Digitization projects are generally considered as the expression of the virtues of digitality and of the quality-of-life improvement, though hegemonic discourse about these virtues tends to hide social processes that take place during the implementation of these projects. People who work in these projects remain invisible to the final user as much as to the projects’ call for tenders’ and detailed designs’ books. Methodologically, my research follows the historical schemes of Greg Downey about labor in information systems and digital technologies that render it invisible and of Aristotle Tympas about the historical and social construction of the concepts of “analog” and “digital” for the computer, where invisible computation labor is perceived as a prerequisite for establishing “digital”.

In my proposal I highlight the creative and skillful work (digitization and documentation/metadata labor) that took place during the digitization of graduate theses and dissertations of the University of Thessaly, carried out in 2015. Throughout the process the digitization team faced unexpected problems that caused delays to the project’s successful completion. The problems didn’t involve neither the workers’ education or skills nor the material’s condition, but had to do with difficulties the operator of the scanner faced with its use. In order to overcome the problems, the staff had to adjust the scanning process in a way that their creativity and inspiration would offer the solutions needed for the project to advance. In this way, the crucial role of human agency emerged and modified the initial predefined normative script of the tasks needed. The idiosyncratic way of solving problems comes in full contrast with the system’s highly emphasized technical virtues and the staff’s underestimated labor.

This case study is one of totally three I studied for my dissertation (Supervisor: Professor Aristotle Tympas) that I am about to defense on February and where I pose my main research questions: “How much labor is after all required in order to render an automated system to seem laborless? To seem as fully free of human intervention? How much labor is required in order to transform an archive from its analog-printed to the digital form?” The research is based on semi-structured interviews with the people who worked to the projects and on material that occurred during the projects’ implementation (technical studies’ books, implementation designs, deliverables etc.)

A cosmolocal approach to the Digitalisation of Work to support “the Future of Workers”

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Ouishare, Austria

The current context of the digitalisation of work, especially in the on-demand drivers and food delivery couriers, puts pressure mostly on the platform workers that are subjugated to the information asymmetry and power of the platforms (Renau-Cano et al. 2021). Several organisations have emerged in different geographical areas or by sector, that support platform workers. These organisations provide platform workers with skills development (learning), collective-representation, collective negotiation, information on rights and obligations, risk mutualisation, employment rights, connection to other professionals in similar situations (emotional layer), among others (Cañigueral, 2021). Therefore, it can be argued that these organisations play a similar role as the "guild" in the middle ages as fraternities and solidarity systems. In a commons-centric economy, such efficiency and solidarity could be achieved through open participatory systems that would connect producers and consumer/user communities, as community-supported agriculture does now (Kostakis & Bauwens, 2019).

In the context of digitalisation of work, these organisations are sometimes refered to as neo-guilds. In practitioner's literature, these organisations take many forms: from communities like Ouishare or Enspiral that experiment with new forms of organizational and governance practices to worker's associations like Freelancers Union (EEUU) o Independants.co (France) or profession-based organizations like AsoRiders in Spain, Independent Riders Guild or SMart. Each of them have different organisational and legal structures, although some argue that these neo-guilds take the form of open coops. Most of the above-mentioned organisations are acting independently of each other, focusing on their own sector or geographical area (in the case of SMart, it is a network with chapters in several countries), which creates a lack of cross-organizational knowledge sharing with negative consequences for generating a legacy of practices. Some of those collectives that organise themselves as co-ops might be supported (exchange of information, movement building) by the platform coo-p movement, but many others aren't. I argue that a further cosmolocal approach —beyond the organisation type being co-ops or not— could help supporting the flourishing and maintenance of such collectives by providing more resources, information and power as a global movement.

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Stream C: Towards Low-Carbon Energy Systems

C.1: Towards just transitions: Ambitious climate policies and social fairness

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

Sustainability transition and low-income groups in Norway: The interrelation between policy measures and actual needs

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The policy discourse on sustainability has shown an increased recognition of the adverse distributional effects that can be caused by polices aimed toward emission reductions. As an example, when the European Commission launched its new growth strategy “The European green deal” in 2019, one of its main areas of focus was on supporting a just transition towards a greener economy that would “leave no one behind”. However, while justice is increasingly recognized as an important dimension when addressing sustainability issues, this also introduces a new important question: how well do policy articulations of justice and the policy instruments aimed to initiate sustainable and just transitions resonate with the actual needs of vulnerable groups in society?

Based on an analysis of policies on three different political scales (European, National: Norway, Municipal: Trondheim, Stavanger, and Bergen) and qualitative interviews with people from low-income groups in Norway, this paper explores frictions between policy discourses on justice and sustainability, and the real-life experiences of people in economical need. While the policy discourse on justice has been largely based on ideas of compensating regions and vulnerable groups that suffer economically because of climate policies, our study also shows the need to move beyond this framing of economic sheltering. We find that low-income groups are not only vulnerable in terms of being exposed to increased expenses, but they also express a personal desire to live sustainable lives. Nevertheless, because of their economic capacities and material situation they are excluded from participating in transition initiatives. As an example, in Norway, the wealthy middle-class benefits most from climate policies, e.g., through support for the purchase of new electric vehicles or for energy retrofits of privately owned homes that are beyond the reach of low-income groups. To create real processes and dynamics of participation in the ongoing transition, our findings show a need to not only develop financial strategies that can counterbalance the adverse distributional effects of

climate policies, but also to develop strategies that aim to value and award the sustainability work that is already conducted within low-income groups.

Exploring potential injustices arising from a 'just transition' policy

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As the European Union committed itself to a clean energy transition, it set binding climate and energy targets for member states. Each country has been required to present a 10-year National Energy and Climate Plan, from 2021 to 2030, setting out how to reduce greenhouse gas emissions and increase energy efficiency and the share of renewable energies, while also tackling energy poverty and enhancing the quality of life of citizens. This presentation examines the Energy and Climate Plan of Portugal, one of the member states most vulnerable to energy poverty. From a fairness and social justice perspective two areas of action seem particularly challenging: reducing CO_2 emissions and increasing energy efficiency in the residential and in the transport sector. Based on rationalist and 'information deficit' model assumptions, measures planned for the residential sector include promoting the renovation of buildings and adoption of efficient equipment, whereas for the transport sector actions planned include promoting electric mobility, public transport, and active and shared mobility, while also increasing the carbon tax. In a country with very high levels of both energy poverty and car dependence, among other issues, these measures seem to underestimate the complexities of the everyday life contexts. Based on an energy justice approach, this presentation explores the understandings conveyed in the Plan by contrasting them with results from own research on energy poverty and car dependence, surveys on citizens perceptions and judgements, statistics and extant literature. The presentation contends that some of the measures in the Plan may have potentially adverse consequences for vulnerable socio-economic groups, such as those with low income and education and living on rural and peripheral communities, as well as exacerbate inequality between those who will benefit from incentives and subsidies and those who will be unable to do it, remaining forgotten and neglected. It is suggested that such adverse consequences may contribute to higher levels of lack of trust in political institutions and erode public support to energy transition policies.

Policy instruments to balance burdens from the expansion of wind and solar energy in Germany

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In response to a decision of the German Federal Constitutional Court (Bundesverfassungsgericht 2021) Germany has determined by law to achieve climate neutrality by 2045 and to reduce greenhouse gases by 65 percent by 2030 (Deutscher Bundestag 2021, 3907). In addition, the new German federal government is committed to the Paris climate agreement in its coalition agreement and aims to "put Germany on the 1.5 degree path", to drastically accelerate the energy transition and to remove hurdles and obstacles to the expansion of renewable energies (Bundesregierung 2021-2025, 5, 54, 56). In their coalition agreement, the traffic light coalition of SPD, FDP and Greens defines ambitious climate protection goals. To achieve these goals, the massive expansion of wind and solar power is necessary.

Policy change usually entails a redistribution of costs and benefits. This is rarely perceived as an improvement by everyone (Trebilcock 2014, 1–2). Against the background of the conflict over scarce space (Reitz, Goshen, and Ohlhorst 2022, 30) and already existing spatial conflicts of interest (Nieber et al. 2020), the plans of the German government hold great potential for conflict, the implementation of which cut "deep into social reality“ (Geinitz and Wehner 2022). In social reality, we are increasingly observing a "logic of compensation", namely the expectation of being compensated for economic losses from natural disasters, pandemics, for example, but also from transformations. However, the design of such compensation programs or mechanisms is very difficult, as can currently be observed in relation to the economic aid packages provided to service providers, small or large companies in the context of the COVID pandemic. Distribution conflicts, however, lead to resistance from groups or actors who have the most to lose when choosing a specific policy instrument (Böcher 2012, 17). Research shows that people are more open to new technologies when they use policy instruments with the aim of “maximizing” distributive justice (El Hachem and Giovanni 2019, 84). Against this background, it is essential to understand how policy instruments work with regard to justice. The aim of our study is the analysis of policy instruments and their impact on distributive justice, as one dimension of the 'Energy Justice' concept of Mundaca et al. (2018, 294). In this qualitative, comparative case study, we identify the stakeholders involved and affected in the approval and implementation of wind and solar parks, such as project developers and operators, social stakeholders, planning and approval authorities, and analyze their burdens and related interests as well as which instruments were applied to balance disadvantages they experienced. In doing so, we address the question of how informative, cooperative, economic or regulatory policy instruments can balance for the (perceived) disadvantages of actors that arise from the expansion of wind and solar energy in

Germany and aim to contribute to the energy transition literature as well as the literature on policy instruments and Energy Justice.

Addressing the Carbon Complex for a more just transition

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Despite decades-long scientific consensus on the social and environmental harms of climate change, high-emitting sectors that use petrochemical inputs have yet to decarbonize at a global scale. This is due in large part to extensive strategic investment in climate policy lobbying and obstruction by industrial leaders in these sectors with the aim of consolidating and reinforcing corporate wealth and power. In this paper, we explicitly connect the activities obstructing ambitious climate policy implementation led by corporate actors collaborating across three major sectors that form a “Carbon Complex”, the petrochemical energy sector and petrochemical applications in the agricultural and consumer plastics sectors, with the human health, environmental justice, and political dynamics of what we term “embodied petrochemical injustices”. This term references Healy et al.’s “embodied energy injustices”, policy decisions relevant to extraction, processing, transportation, and disposal of energy resources that do not account for transboundary socio-environmental impacts, with additional application to the socio-environmental effects of the tripartite Carbon Complex. As petrochemical production and application continues to thrive, particularly in agriculture and consumer plastics, it remains critical to examine the injustices that underlie and are perpetuated by the continued demand for fossil fuel-based plastics and agricultural inputs even as decarbonization begins to occur at a large scale in the energy sector. This paper examines the extent of climate injustice resulting from the Carbon Complex’s obstructive activities in the US, discusses the implications for just climate policymaking, and identifies essential policy strategies for a just transition to a low-carbon and low-pollution society in light of the policy impacts of the Carbon Complex.

Representations and proposed measures of the political parties on climate change in the Vienna provincial and municipal elections in October 2020

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This work addresses the representation of climate change by political parties in the election campaign of the Viennese provincial and municipal elections in October 2020. The aim of the paper is to record climate change related measures and representations of climate change. The first part of the work consists of a presentation of the current state of the literature on the role of cities in climate change, on dealing with climate change in the city of Vienna, and on environmental and climate policy party politics. Starting from this basis, a content and framework analysis was carried out on the basis of election programmes, contributions in the social media, TV debates of the leading candidates and a written enquiry to the parties. Numerous climate protection measures were identified and assigned to the five topics "mobility and transport", "energy and buildings", "economic policy", "tasks of the city of Vienna" and "adaptation, nature and environment". Measures from the areas of "energy and buildings" and "mobility and transport" were of particular importance in the election campaign studied. Through the framework analysis, nine rhetorical frames could be identified: "Climate change as a real challenge", "Negative impacts due to climate change", "Climate protection between responsibility and justice", "Criteria and requirements for climate protection measures", "Vienna between pioneer and laggard status in climate change", "Climate protection as the highest goal", "Climate change means change", "Climate protection as a political phenomenon" and "Climate protection as part of sustainability". Particularly striking were the strong interweaving of social and climate policy aspects, the attempts by right-wing parties to delegitimise and distract from effective climate policy, and the multitude of criteria and requirements associated with climate protection measures. The dominance of the Greens on climate issues described in the literature as well as the relatively low salience among right-wing parties could be confirmed. The appearance of the centre parties SPÖ and ÖVP also corresponded to the literature in many aspects. A local special case is the NEOS, which differs from other liberal parties in the salience of climate policy and the measures represented.

Shifting the Power Balance: how community-led resistance shapes local understandings of place

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Past energy transitions have been characterised by strategic geopolitical and socio-economic drivers that rarely considered issues of social justice or community cohesion that emerged from the profound systemic reconfigurations that took place. Until recently, the current

transition to low-carbon energy has seen a departure of sorts, particularly in terms of the complexity of intersecting drivers involved. Consequently, there has been a widening of the roles citizens are expected to take, particularly in terms of participation and engaging with the energy system. However, differing interpretations of how these roles are to be expressed and the degree of power assigned to them has resulted in the rollout of what on the surface appear to be broadly popular renewable energy technologies meeting resistances at the local level. Place attachment – especially in terms of belonging, identity, relationships, and acceptance – has come to define localised responses to recent (inter)national energy and climate-related governance and policy frameworks. Understanding how place attachment affects the (re)negotiating of local understandings of place, and its role in sustaining narratives of resistance to locally-unpopular strategic energy projects. This paper will present on findings from the SEAI-funded project, EnergyPOLITIES and cognate projects, which explored how governance structures intersect with socio-economic and key socio-cultural factors to influence the social acceptability or otherwise of the energy transition. It will also examine recent responses from powerful actors challenged by emerging citizen participation and engagement roles, and discusses the tactics used to limit the diversity of voices and perspectives in the energy transition.

Finding the 'collective' in Sociotechnical Imaginaries – towards understanding scale, collectives and the individual in future energy imaginaries on Gotland

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The concept of sociotechnical imaginaries (STIs) has been increasingly implemented in social science energy research to scrutinize collectively held visions of desirable energy futures. So far, this burgeoning literature has predominantly dealt with collectives on the national scale, examining and comparing imaginaries between and within different nations. Less attention has been placed on identifying and exploring imaginaries of collectives situated on other scales and with consideration to other actors and institutions. Moreover, the notion of 'collective' in the STIs scholarship has been underdeveloped and thus poorly understood, especially regarding potential implications for the individual. The overall purpose of this article is twofold. First, we perform the STIs literature review to discern how the 'collective' has been, so far, understood in relation to various scales (e.g., national). Our attention is placed particularly on studying peer-reviewed articles with a focus on sustainable energy transitions. We analyze these papers to identify how researchers have, so far, addressed the notion of 'collectively' held visions and what scale such 'collective' entails. Second, following the results

of the literature revision, we problematize how scaling-up or -down the 'collective' may have implications for discursive struggles surrounding collective interpretations of ambitious climate policy. Such could be the exclusion of or disregard for other (alternative) imaginaries, as well as how collectively held visions may affect the individual based on various factors, such as gender, age, ability, etc. We do so by taking a closer look at Gotland, an island appointed forerunner in Sweden's renewable energy transition and hence largely affected by imaginaries ranging from national to parish and household levels. With Gotland's ambitious target of reaching a 100% renewable energy system by 2040, studying campaigns, networking, politics and policy implementation in the region creates a great case for understanding how imaginaries of energy transition works at various scales and between different actors. Our study draws on experiences from research on imagined publics, layperson experience, local users, gendered household roles and reproductive health to exemplify how a notion of 'collective' may obfuscate the potential of individuals to imagine futures, but also how imaginaries are sometimes heavily reliant on individuals performing the visualized transition. Our paper thus offers both theoretical and methodological contributions to the STIs scholarship focused on sustainable energy transitions.

Contest and conflagration in energy transformation in South Africa; justice for whom and at what cost?

David Richard Walwyn
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South Africa's energy transition exposes in clear terms the challenge of a just transition. At a national level, the country faces a large decarbonation capital cost within a context of a bankrupt public sector, record unemployment and a contracting economy (Walwyn, 2020). The prospects of a transition in which the livelihoods of coal miners and others whose income links to the coal sector, remains unaffected seems remote. This presentation will consider the arguments presented by the Mineral Resources and Energy Minister, Gwede Mantashe, and his officials, for ongoing investment in coal-based energy generation vs. the policy documents and members of civil society, particularly environmental and community activists. In the contest between local livelihoods and public goods, it is unclear as to whether social justice can be achieved simultaneous to the Nationally Determined Contributions and policy goals for decarbonisation. Structural issues in the economy, and in society more widely, weigh up heavily against the need for retraining workers and shaping regional economies. Fully aware of the government's prior failure to manage transition in a just manner, vulnerable groups have already set in place well-organised resistance to any coal disinvestment. The presentation will

conclude with several comments on if and how this deadlock may be broken, informed by an analysis based on the multi-level perspective and historical institutionalism.

Walwyn, D. R. 2020. Turning points for sustainability transitions: Institutional destabilization, public finance and the techno-economic dynamics of decarbonization in South Africa. Energy Research & Social Science, 70, pp 101784. doi: https://doi.org/10.1016/j.erss.2020.101784

C.2: Understanding the embeddedness of individuals within the larger system to support the energy transition - prosumer and community issues

Session Chair: Katharina Biely, Delft Technical University, Netherlands, The

Identifying behavioural change interventions that activate individuals to drive the energy transition process

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The speed of energy transition in the Netherlands is low, in contrast to the ambitious 2050 net-zero emissions climate change target. The transition requires the action of 7.5 million households that are still depending on gas supply for heating their homes. The main challenge is not technical, many viable options are already available, but social: people will need to be supported to decide and act.

Based on social contagion theory, when a decision is complex, uncertain, and involves large investments, it only makes sense for someone to act if several others have already acted and experienced positive results. This theory explains the present impasse where everyone is waiting for others to adopt sustainable energy sources, and consequently, nothing happens. The theory consists of three phases (1) identify change-makers (2) activate change (3) accelerate the energy transition. In this paper, we identify interventions that could activate change within energy communities.

The research context is the Austerlitz neighborhood, municipality of Zeist, in the Netherlands. Austerlitz is a mixed neighborhood of around 800 households where about 90% of the houses are privately owned. The homeowners are predominantly older (above 45 years), and most households have children. We conducted 21 interviews on the 4 - 19 March 2021. The interviewees were selected from different house types (bungalows, flats, and two-under-one roof), with varied years of construction. Interview questions were guided by the Capability,

Opportunity, Motivation, and Behavioural (COM-B) change model. The COM-B change model explains how people get influenced to change their behavior, and how they influence others, which weaves into the second phase of the social contagion theory (activation).

Results indicate that homeowners in Austerlitz are highly motivated to renovate their homes to improve comfort, aesthetics, safety, and convenience. Still, many households have not initiated energy transition actions. Current interventions are piecemeal, they focus on opportunities (energy efficiency, alternative energy sources, and financial support), and barely address psychological capabilities and motivation factors (aesthetics, convenience, and comfort).

To boost psychological capabilities and motivation, interviewees recommend more interventions that connect people with their neighborhoods. These may include having 'show' or 'display' houses, installing an energy neighborhood exchange network, and highlighting inspirational stories of residents that have transitioned on the municipality website. To make the energy transition more systemic, interviewees suggested integrating energy transition aspects into existing or future homeowner's renovation plans. We recommend a co-creation process where designers and technical experts help homeowners find innovative solutions for developing and financing home renovation plans that incorporate insulation, ventilation, and the progressive adoption of new energy sources.

We conclude that interventions should enhance homeowners' belief that energy transition is an intrinsic part of their long-term home renovation plans, to motivate them to drive the energy transition process. The suggested approach will enhance homeowners' long-term engagement in energy transition, as the main drivers of change. However, more research needs to be done to understand how social contagion can play a role exactly. What these individual changes can mean for the diffusion of change among a network.

„OUR energy transitions"– experimenting with balcony pv modules for increasing inclusiveness and diversity

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KIT, Germany

Urban energy transitions need space for learning and experimentation. Such spaces can be created in form of real-world laboratories fostering sustainable development, local co-creation and experimentation. The inclusiveness of these spaces and diversity of people taking part are an important element of these labs, but also a challenging task. Same for the energy transition in Germany which lacks inclusiveness, thus intensifying inherent issues of social justice. Being a task for the society as a whole, it requires the active participation of many, as

well as reflection on the question of who can get involved and participate under what conditions.

The real-world experiment “Your balcony network – Energy creates community“ takes up this challenge. It is part of the real-world lab Quartier Zukunft in Karlsruhe, a mid-sized town in the South of Germany, and conducted by the projects “Energy transformation in Dialogue” and and “Seeds for SEETS” (for more information see: https://www.itas.kit.edu/projekte_boeg20_debane.php). The real-world experiment tries to attract and integrate low threshold groups by using a technology, which enables inclusive citizen engagement and a design that attracts so far under-represented citizen groups in energy transitions. As the aim was to make solar panels available for more citizens, we focused on the technology of so-called photovoltaic balcony modules, which can be installed in rented spaces and don’t require an own property. “Your balcony network” tries to get the topic of energy transition out of the „Tec-Zone” by focusing on the promotion of community and by linking energy to other urban sustainability topics like urban gardening. A specific focus of the project lies on the integration of women and tenants or co-owners of apartment buildings.

In the real-world experiment participants try out the technology of mini-PV in their everyday life with support from the project team (e.g. workshops on the installation of the modules and registration formalities; as well as exchange possibilities for support between participants, e.g. an online forum). The real-world experiment is constantly monitored based on an interdisciplinary framework combining spatial and socio-psychological approaches (Bögel et al. 2022) using qualitative and quantitative methods (mixed methods approach).

The socio-spatial framework integrates the understanding of socio-psychological and spatial structures to create a better understanding of transformation processes. It does so by analyzing the four dimensions in which spatial transformation can take place (physical dimension; cultural dimension; dimension of actors and agency; institutional-regulative dimension) and linking them with the socio-psychological perspective on actors’ perceptions and behavior (three levels: individual level, community level and societal level). The combination of spatial and psychological concepts allows us in this experiment to study how individuals are influenced by the embedding system but also how they themselves influence the embedding system (e.g. regulations). A focus of the study is on the mutual interplay of actors and institutions.

The presentation outlines the design of this real-world experiment and its scientific approach. It gives insights in first findings with a focus on actors and institutions.

Adapting the SES Framework for Understanding Individuals' Role in Collective Actions in the Energy Transition

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Societies are faced with a pressing challenge of addressing climate change as the greatest threat to human health. Tackling this global issue requires a unified global approach, driven by strong political leadership, bold technological investments, and changing consumer habits. Embedded within this wicked problem is the negative environmental effect of the energy industry which in turn demands a fundamental shift in how resources are used, supplied, and consumed.

Within this energy transition, individuals and private consumers are expected to play a greater part in the larger energy system. Instead of having a passive role as in the current, vertically organized energy system composed by producers, suppliers, and consumers, individuals are increasingly becoming active participants (prosumers), being able to influence the energy system from an individual or from a coordinated, community position. Supported by the uptake of cleaner energy technologies, the existence of these communities shifts the focus from the technical aspects of the energy transition to the social elements and engagements rooted in the functions of every society. These community coordination activities are novel forms of engagement in the context of the energy transition and considering their role and function to achieve a common objective, they can be classified as collective actions.

To further support the emergence of energy communities as one form of individuals' active participation in the energy transition, different drivers and barriers of collective actions need to be identified. For this reason, Ostrom's socio-ecological systems (SES) framework is adapted and adopted for analyzing past collective actions, as the utilization of this interdisciplinary framework enables the comparison of various forms of actions and social movements across different contexts and historical periods. The analysis also shows the role of the individual in the collective action, and more specifically, the role that leadership has in reaching the common objective of the community or the society.

Understanding the social-psychological aspects of collective neighbourhood initiatives in the energy transition.

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Behavior is an important topic to study if we want to accelerate the energy transition. Research on behaviour in the energy transition often focuses on the individual levelor the societal level. Less scientific attention goes to the group level (de Vries et al., 2021). Because of the lack of scientific attention to the impact of group behaviour in the energy transition, it is for instance unknown how bottom-up energy initiatives ‘’function and sustain’’ (Steg et al., 2021, p.5). This white spot is unfortunate because groups can significantly impact the energy transition, for instance by producing and using local renewable energy, raising environmental awareness (Lupi et al., 2021), or founding a social norm that could eventually lead to a social tipping point (Stadelmann-Steffen et al., 2021).

The scope of this research is on bottom-up neighbourhood initiatives that center around sustainable energy and/or mobility technology. To understand the relevance of neighbourhood groups on the energy transition and effectively use this knowledge to develop technology and policy, we need to investigate the underlying social-psychological processes. Insight into the dynamics of neighbourhood initiatives could illustrate interaction patterns within the group and the social-psychological influences that spur individuals’ acceptance and use of sustainable technology. Social-psychological processes relate to group dynamics, but also to individual factors, such as personal motivation for participation in a community project (Sloot et al., 2019).

Our research investigates how neighborhood initiatives impact the energy transition by collectively using sustainable energy and mobility technology, and which underlying social-psycholigical processes determine social group dynamics. We will first present a typology of interactions collective neighbourhood initiatives have with (different) sustainable energy and mobility technologies. Second, we will present a conceptual model illustrating the most influential social-psycholigical factors determining social group dynamics.

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CITIZENS' WILLINGNESS TO PARTICIPATE AND INVEST IN ENERGY COMMUNITY INITIATIVES: THE CASE OF GREECE

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The transition of societies to sustainable models of production and consumption is a major challenge of our times. In addition to changing behavior at the individual level, systemic transformation through collective action is required to address the challenges of existing energy systems, as collective action has historically been a successful driving force for social transformation. In this context, energy communities can contribute to the efficient production and distribution of energy and contribute to achieving climate goals, by assigning new roles to citizens and local communities, placing them at the center of the energy system. In this direction, through Law 4513/2018, energy communities were recently established in Greece.
The present research, through the examination of energy communities in Greece, suggests the following research questions:

- What is the level of public awareness about energy communities? What are the factors that affect the level of information?
- What is the level of citizens' intention to participate in the energy communities? In what ways do they prefer to participate? What are the factors that influence these decisions?
- What is the intention of the citizens to invest in the energy communities? Which financial instruments do they prefer? What are the factors that influence these decisions?
- In what kind of activities do citizens prefer to participate in within the energy communities? What are the factors that influence their preferences?
- Do citizens intend to participate and invest in energy communities where public and private entities and local authorities also participate? Which factors affect their specific preferences?
- Is there a relation between participation intention, investment intention, and preferences regarding financial instruments, concerning the level of information, the type of activity, and the composition of the energy communities?

- What are the obstacles that can slow down the participation of citizens in the energy communities?
- What are the appropriate strategies and actions to stimulate citizens' participation in the energy communities?

Through the investigation of these questions, both the provision of new empirical data in a field that has not been researched extensively so far and the research of innovative issues on energy community initiatives are achieved. In this context, this work presents:

- The current situation regarding Energy Communities in Greece: Relevant legal framework, market, existing financial incentives, technologies, and stakeholders.
- Literature review of the factors influencing the information on, and participation and investment in Energy Communities, as well as the relevant dissemination barriers and support measures.
- Results of the performed questionnaire survey focusing on citizens' attitudes regarding the information on, and participation and investment in Energy Communities, as well as the related issues (motives, barriers, incentives, structures).

The results of this research can assist the policy and decision-makers to plan effective supportive policies adapted to different conditions, to encourage active participation and investment at the community level, and for the stakeholders responsible for developing an energy community initiative to design strategies tailored to the goals and benefits of each project.

From top-down to bottom-up: the notion of Energy citizenship

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Clean energy transition is a pressing global challenge. For a solution we do not only need technological advancement, but a societal change from a neoliberal, consumer-oriented regime towards an alternative citizen-focused regime, from a centralized model of the energy market to a decentralized one. Individuals are at the core of the energy transition. Over 50% of final energy consumption in the EU is accounted for by private households and by (passenger) transport (Eurostat, 2019). This means it is crucial to question, discuss, and understand the role of people in the energy transition. The attributed role of individuals can have a broad range from passive consumers being part of a top-down transition to more active concepts of individuals. A term that has been coined in this context is 'energy citizenship'.

Active citizenship in the context of the energy transition might present creative solutions and new pathways to a sustainable energy system and a necessary shift of prevalent energy models.

In order to gain knowledge on how the energy citizenship approach and with that citizens' embeddedness in energy markets can be organised and unfold its potential, the European H2020 project "EC^2" studies the complex relationships between the legal frameworks, the economic structures, and the psychological set-ups of energy communities, energy citizens and their surrounding societies. What does energy citizenship entail and where are the boundaries of the notion? Who is an energy citizen and who is not? Which dimensions need to be considered to understand the different forms and degrees of energy citizenship? What are the trajectories of energy citizenship and which facilitators and barriers support or stand in the way to energy citizenship? These questions are tackled in the project EC^2 based on an inter- and transdisciplinary co-creation processes. This contribution will give insights into the results of our process as well as the disciplinary, intersdisciplinary and transdisciplinary steps along the way.

Firstly, the notion of energy citizenship has been defined disciplinarily from a psychological, economic, and legal perspective. In a second step, disciplinary teams came together to conceptualise the interdisciplinary definition of energy citizenship with the aim to make it understandable outside of disciplinary boundaries, without scientific knowledge in the field. Other criteria to be fulfilled were conciseness, absence of negative connotations, and reduction of complexity in the definition. In the last step, for further refinement, the conceptualisation process consisted of transdisciplinary co-creation workshops with multi-stakeholder groups: representatives from energy communities, citizens, policy makers, and businesses. These workshops took place in three different countries: Poland, Austria and Germany. They followed the same workshop structure, from collecting associations with energy citizenship, to prototyping energy citizens with hands-on material, to further refining the definition.

The conceptualisation of energy citizenship and energy citizen in EC^2 shows not only the complexity of notions in interdisciplinary and transdisciplinary collaborations but also its importance to open up the process of defining terms and notions, from a top-down conceptualisation to a bottom-up definition.

Exploratory study on the role of change agents in governance learning.

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Systemic change has been discussed extensively in various strands of research concerned with the transition to sustainability. A more recent strand of literature has emphasized policy experimentation as a means to accelerate change processes. Central to these practices is the idea of learning at the governance level. Given the new ways of setting up governance systems, change agents have been discussed as a driving force for transformation processes. A clear concept of who these change agents are and what influence we can attribute to them is still missing today. Nevertheless, the call for change agents often seems to be an overly optimistic attribution of change processes on an individual level. I explore the concept of change agents through an exploratory case study of 27 international regulatory experiments that focus on sustainability-oriented innovations (14 on energy regulation). Using a pragmatist perspective, I analyze how individual agents influence governance learning, what challenges can be expected, and what changes in governance systems can be observed through regulatory experiments. My findings contribute to the discussion of how the design of regulatory experiments can support change.

The challenger – an activist-orientated manifestation of the energy citizen

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The energy system is an integral part of modern society, with energy itself intimately intertwined with the way people live, albeit invisible to most, save through its absence. The (long) promised transition away from carbon intensive fuels will result in substantial change to the energy system, but moreover change also to our societies. Decarbonising energy is not just a matter of exchanging one energy source for another, it both requires and will result in significant change in people's everyday lives. Accordingly there is an increasing realization that the perceived legitimacy and social acceptability of this required societal transformations will largely determine the success of the energy transition. Increased citizen participation is seen as an essential element of the transition to a decarbonized energy future, although the nature and scale of the desired participation remains contested.

Citizens of course are only able to play roles in the energy system that they are permitted to play by factors such as the policy and regulatory context, socio-economic circumstances, and not least by the influence of energy incumbents. Concepts such as energy sovereignty, energy democracy, and energy citizenship are finding currency, but they are still quite underdefined. Moreover, the discourse around them tends to revert towards neoliberal ideals of the role

citizens should play e.g., active consumer, good citizen, energy producer. These are relatively non-threatening to the status quo or at least can be made so by friendly socio-political structures. There is little is any appreciation of the positive role than citizen agitation within and against the energy system can play in realizing the energy transition.

This paper considers a little celebrated manifestation of the energy citizen, that of the challenger – a politics based role which directly challenges the status quo. While many see the challenger as an impediment to social and economic development, many other value their role in dissenting from, and testing perceived wisdom. This paper examines this energy citizenship role, drawing on qualitative studies on social mobilisation around energy projects and on emergent modes of energy citizenship. It examines how the challenger is influenced by socio-economic and key socio-cultural factors, how they act on (and interact with) multiple levels of governance. Finally, it posits that the 'vehicle' of change in this mode of energy citizenship is awareness raising and knowledge sharing. The paper concludes by discussing how ad hoc networks are used by Challengers to share knowledge and experience and propagate a sometime useful agitation.

Sustainability transitions in the cookstove energy sector

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To the WHO, around 3 billion people still cook using solid fuels (such as wood, crop wastes, charcoal, coal, and dung) and kerosene in open fires and inefficient stoves. Most of these people are poor and live in low-and middle-income countries. These cooking practices are ineffective and use fuels and technologies that produce high levels of household air pollution with many health-damaging pollutants, including small soot particles that penetrate deep into the lungs. Exposure is exceptionally high among women and young children, who spend the most time near the domestic hearth. Sustainability transitions are necessary to promote changes in communities localized poor regions to become more sustainable and healthier, especially in this cookstove energy industry that promotes transitions towards a low carbon future and involves multiple actors. When analyzing the conditions for and processes of transitions, the arenas of the development (AOD) approach provide an alternative framework in the context of sustainability transitions in the cookstove energy sector. Though the problem has been investigated, how can actors and locations engaged promote sustainability transitions in the cookstove energy sector? It aims to characterize how actors' and locations engagement promotes sustainability transitions in the cookstove energy sector. Based on the proposition for transformative social innovation of Pel et al. (2020), this research will bring

social innovation to the involved communities to create more sustainable and healthier conditions to the prior situation.

Understanding PV adoption in organisations as a social practice

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The transition of electricity systems in Europe has to increase in speed to achieve EU goals on renewable energy and GHG emissions. This transition requires that a substantial amount of new energy infrastructure will have to be installed to cover expected future electricity demand. Here photovoltaics (PV) has potentially a large role to play. There are many studies on PV and the residential sector. There is however also a large potential for property owners of non-residential buildings as they have a lot of existing roof space. This study focuses on property owners of non-residential buildings in Sweden as change agents.

This study aims to analyse PV adoption from a social practice theory perspective, to understand how a PV adoption practice is performed and how different elements come together to form this practice. The adoption of PV is not only a technical but rather a socio-technical question. For a socio-technical transition to a low carbon society to mitigate climate change we need social and technological innovations. Usually, change is seen to be taking place from the top-down (e.g. policymakers) or the “bottom-up” (e.g. citizens), but change can also take place by e.g. different professionals as middle actors from the middle-out. Middle actors e.g. property owners lie between e.g. the government and citizens. For achieving a real transformation we also need to change their professional practice. This study focuses on property owners of non-residential buildings in Sweden studying their PV adoption practice.

As a method, twenty-five semi-structured interviews with property owners in South Sweden were conducted for this study. The property owners’ buildings can be summarised in three categories, namely only owning (1) non-residential buildings (e.g. workshops, stores, offices, warehouses shopping centres, hotels, restaurants, storage facilities or car showrooms), (2) community service properties (e.g. schools and hospitals) and (3) non-residential buildings and apartments combined. Additionally, the interviewees were private and public property owners.

Some property owners had PVs installed for a long time, have already many systems in place and have developed a PV adoption practice. Results show these property owners have established routines within the company, have aggregated knowledge, a trusted relationship with suppliers, strong environmental goals and find information as well as rules and regulations

easy to navigate. This is different for first-time installers or non-adopters. The study is a first step towards gaining a fuller picture of practices of non-residential property owners for PV adoption. We want to contribute to an enhanced understanding of how property owners decide on PV adoption, what kind of patterns can be seen and how different property owners could be targeted with different policy instruments. This study contributes to understanding the conditions for an increase of PV installations of non-residential property owners and their willingness to become prosumers.

What shapes regional businesses' attitude toward solar photovoltaics? A case study in Iran

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Retail investors in renewable energy technologies as a section of the market when it comes to social acceptance, are a significant group in the existing literature in the field of environmental sociology. Regional businesses, given their close contact with the citizens, as the public society are referred to as a group of "developers" for renewable energy infrastructures and in a zoomed-out illustration, in accelerating the energy transition. Although the existing theoretical and empirical literature has missed considerably the global south, as the majority of studies are conducted in the western/ English-language countries, having totally diverse social contexts. Contributing to closing the existing gap, we focused on the solar PV regional businesses in Iran to investigate what shapes their attitudes towards this technology. Moreover, given the very infant stage of energy transition in Iran, as an energy-rich (renewable and conventional) country and listed as one of the top CO2 emitters worldwide, we asked the active businesses about their motivations and the existing barriers towards solar PV development. To do so, we conducted qualitative research based on 10 semi-structured in-depth interviews in Golestan Province, Iran. Taking an inductive approach to analyse the gathered data we used the acceptance, adoption and diffusion theories as sensitive concepts in our mind to investigate common and specific issues in terms of attitudes in Iran.

We understand that the (low) level of awareness among the public society in parallel with the external factors, mainly the economic sanctions by the US on Iran banning businesses, do shape regional businesses attitudes negatively towards solar PV development. Moreover, the absence of mature policy and regulatory design by the national authorities in a top-down energy transition context country is perceived as a barrier by the regional businesses. Our

findings imply that the solar PV regional businesses perceive themselves as the leaders and developers for solar PV in Iran but regarding the existing barriers, the adoption trend would not necessarily lead to the majority of adopters. We conclude that the previous literature has considerably overlooked the geography-based nature of market acceptance specifically (and social acceptance generally) and its determinants. This calls for a better serious investigation into the social aspect of energy transition in fossil fuel-rich developing countries like Iran.

To what extent can green energy prosumption in local fruit value chains support the energy transition?

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The principle of using the sun for the growth of a farm was for a long time limited only to the cultivation of crops. Due to recent changes (technological progress, favorable political conditions, increasing energy prices), it is becoming more and more interesting for farmers to make use of the sun for solar energy production as well. So far, however, we have noticed a rather hesitant investment in solar energy. For this case study, we developed the model of two prototypical fruit farms to assess the potential for reducing carbon emissions from energy production. One farm specializes in production for the local market, where apples are produced, sorted, and then stored for up to six months. The other type of farm specializes in production for overseas markets, where apples are produced, sorted, and shipped to consumers. We also included the impact of different consumer choices on fruit value chain developments in order to clarify how consumer expectations can be drivers of change. We calculated the primary energy requirements of both apple value chains and the carbon footprint for different green power options at the farm level and along the value chain to determine the extent to which the use of green power would help decarbonize the fruit value chain under the given energy demands. In our study, we compared the size of the carbon footprint for three scenarios: using grid power, green power, and own solar power. The main challenge in the consideration of solar energy prosumption is that energy is needed on the fruit farm primarily when the yield from solar energy is lowest, and a high yield from solar energy is obtained when the energy demand on the farm is comparatively low. This applies not only to fruit farms but is also representative of large parts of the horticultural sector, which in turn is one of the most energy-intensive forms of agricultural production. We argue that while the use of alternative energy sources compared to the normal power grid has a positive effect on reducing carbon emissions, the temporary gaps in solar energy production and demand contribute significantly to farmer uncertainty and delay the widespread installation of

PV systems. At the same time, the additional financial burden on farms to convert to green power is a major barrier. At this point, tools need to be developed to, on the one hand, make the investment in PV energy more attractive and, on the other hand, make the conversion to more sustainable energy supply financially feasible.

EXAMINING CONSUMERS' BEHAVIOUR TOWARDS THE ADOPTION OF HYBRID THERMAL ENERGY SYSTEMS

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The residential building sector is responsible for a large proportion of the energy consumption worldwide, mainly due to heating, cooling and Domestic Hot Water (DHW) needs. The TESSe2b system is the outcome of a Horizon 2020 funded project intending to deal with the above issue, through the enhancement of energy efficiency in buildings. The target of TESSe2b was to design, develop, and demonstrate a thermal storage technology based on solar collectors and highly efficient heat pumps for heating, cooling, and DHW production.
A key issue regarding the success of the technology's diffusion is consumers' behavior. The present study aims to examine the factors that affect hybrid thermal energy systems' adoption through consumers' self-reported behavior. On this basis, a behavioral survey was performed in five EU Member States (Austria, Germany, Greece, Spain, and Portugal). Issues under investigation involved the a) outcome expectations, b) perceived adoption behavior, c) willingness to pay (WTP) (in €) and d) acceptable payback period to be willing to pay for TESSe2b solution.
An online questionnaire survey was conducted between June 2016 and February 2017, targeting both dwelling owners and tenants. The questionnaire included four sections of questions: a) personal interests about environmental and energy issues, b) TESSe2b solution: intention to use, c) housing/household characterization and d) sociodemographic information.
A database of 583 responses was created. Initial statistical analysis included descriptive statistics, while procedures such as chi-square tests, non-parametric tests, and ordinal logistic regressions were conducted to examine the influence of demographic/socioeconomic and residence characteristics on outcome expectations, adoption intention, WTP and acceptable payback period of the TESSe2b.
The main conclusions, according to the descriptive statistics, are the following:

- The majority of the respondents in the five EU countries have a positive view of the outcome expectations of the TESSe2b solution, as well as the possibility to adopt the innovative system.

- Concerning the amount that they are willing to pay for the TESSe2b solution in the future, most respondents chose 0-3,000€ in Greece and Portugal, while in Austria, Germany, and Spain, the most common amount is between 3,000 and 6,000€.
- Regarding the acceptable payback period that would lead respondents to be willing to pay for the TESSe2b solution in the future, the most acceptable period was 3-5 years in Greece, Portugal, and Spain. In Germany, the payback period was 5-8 years, while in Austria 8-10 years.

Through ordinal regression analyses, the factors that can affect the perceptions and the WTP issues regarding the TESSe2b solution were examined. The main characteristics positively affecting the perceptions and the WTP issues regarding the TESSe2b solution were income, percentage of income spent for energy, educational level, previous investments in related technologies, profession, or interests related to energy/environment and household size. Year of construction, the energy source for space heating, and area of residence are additional factors with an impact on the examined subjects.

To conclude, the findings of the study contribute to the understanding of the behavioral patterns of consumers regarding the selection and installation of residential thermal energy systems.

System change via lifestyle change (and vice versa): a multi-stakeholder approach to (policy) intervention design

Kevin Broecks, Geerte Paradies, Laurie Hermans
TNO

The clothing and textiles industries contribute significantly to global greenhouse gas emissions, with substantial energy use going towards the production of textiles. Some studies estimate that a 30% reduction in greenhouse gases emitted by these industries can be achieved through behavior change. As a result, many (policy) interventions have been developed that aim to reduce the consumption of clothing by directly targeting the purchasing, recycling or re-use of clothing by individual consumers.

Studies conducted at a systems level of analysis (e.g. system dynamics, innovation systems or the multi-level perspective) show that the behavior of individuals is often constrained or stimulated by their environment. Yet, approaches to designing (policy) interventions rarely take such interactions into account. The question remains whether targeting individual consumer behavior is the most effective leverage point to effectuate change at a systems level. New approaches should be developed that examine systems and behavior change simultaneously. Yet, few studies analyze the clothing industry from such a perspective and

even fewer use their insights to develop interventions that policy makers, NGOs or companies can use to help this industry become more sustainable.
To tackle this literature gap, we have conducted 15 interviews with stakeholders in the clothing and textiles industries (e.g. policy makers, researchers, NGOs, companies), followed by a group model building workshop. These activities are used to (1) develop a shared understanding of the system dynamics in the clothing industry, (2) select the most relevant leverage points for intervention and (3) foster support for change in the participants.
Together with the participants, we aim to further develop an intervention pilot and evaluate its effects on behavior and system change towards sustainable production and consumption of clothing.

Iranian governmental organisations' attitudes towards adoption of solar PV

Leila Aghlimoghadam, Hans-Liudger Dienel
Technische Universität Berlin

Attitudes towards renewable energy technologies have been increasingly recognised to play an important role in the success of the transition from conventional to renewable energy. Although most of the empirical studies have focused first, on the Global North and second, they considered mainly the public society as the households. In the current research, we selected Iran, as a fossil fuel-rich developing country from the Global South, and we aim to identify determinants shaping attitudes of governmental institutions towards the adoption of solar PV. We asked: What are the attitudes of governmental organisations towards solar PV? What main issues shape these attitudes? and How did the adoption of solar PV in governmental organisations change the attitudes of these organisations? In order to do so, we conducted 12 semi-structured in-depth interviews with high authority executive levels in governmental organisations that have already adopted and did not adopt solar PV yet, in Golestan and Guilan (Northern Provinces in Iran). We took an inductive approach to analyse the gathered data and we used the Technology Acceptance Model and Diffusion of Innovation Theories as sensitive concepts in our mind to investigate common and specific issues in terms of attitudes in Iran. We find that the attitudes for Solar PV among the governmental institutions are positively shaped by institutional capacities, and the existing infrastructures, while perceived usefulness and economic costs of solar PV as the main items affecting attitudes negatively and leading to resistance towards acceptance for solar PV. Moreover, the governmental institutions that have adopted solar PV emphasised higher influence and awareness creation among the households via visibility of the results of an innovation. We understand that the previous literature has overlooked first the top-down energy transition in

FFRDCs and the effective consumer role of governmental organisations in these systems. The findings imply that better designed upstream policies can result in shaping attitudes positively at the governmental organisations' adoption level.

C.3: The transition to low-carbon energy systems and new regimes of ownership

Session Chair: Marco Sonnberger, Friedrich-Schiller-University Jena, Germany
Session Chair: Matthias Gross, Helmholtz Centre for Environmental Research - UFZ, Germany

Reclaiming the Windy Commons: Landownership, wind rights and the assetization of renewable resources

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The ‘second phase’ of the energy transition involves large scale rollout of renewables, raising wider questions about the management of such resources, and how costs and benefits distributed. Ideas and practices like ‘community energy’ and ‘prosumption’ capture the potential for more decentralised systems of ownership and control inherent in renewable energy technologies. However, until now, ownership and control of the key biophysical resources (e.g. wind, wave, solar, geothermal) underpinning the transition has received far less attention in academia and wider society. In the case of wind energy, numerous social actors have rights or claims to use and benefit from wind resources. Key among these are landowners who are silently enclosing the ‘windy commons’. Through monopoly property rights, landowners can extract ‘wind rents’, with profound (but undertheorized) distributive and structural ramifications for the energy transition. Despite this, and with some recent notable exceptions, much social science and humanities energy transition research portrays landowners as taken-for-granted, apolitical and sometimes, marginal(ised) stakeholders. Combining a Marxist, class-based approach to landownership and wind rent with Ostromian institutional analysis, this paper reviews and expands the (predominantly legal) literature on wind rights. This facilitates an unpacking of the concept of ‘wind rights’, to show that in many instances wind resources are de facto privatised/enclosed via ‘proxy wind rights’ for landowners. We also indicate some alternative wind rights configurations including nationally and commonly managed wind resources. This analysis leads to a consideration of the

potential benefits of alternative social property right arrangements, such as community wind rights or nationalisation of the wind resource.

Owning what, owning for what? Citizen financing of renewable energy projects in France

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Ownership ties together one or several owners and an object to be owned. It bundles different types of rights and may concern the pool of resource (wind, sun), the production infrastructure (turbine, PV panel) or the units of outcome (electricity). Rights can also be bundled so to articulate in various ways these ownerships.
(Martinez, 2017)In most Western countries, legal doctrines have left ownership patterns for RE resources (wind, sun) unspecified ((Fontaine, 2020; Le Baut-Ferrarèse, 2012) RE policies have been targeted at production artefacts – RE projects –granting the rights to use and valorise the resource to the actors owning facilities. Such a framing fails to convey the collective dimension of entities engaged in harnessing these resources (landscapes, local solidarities) (Nadaï and Labussière, 2017). It raises tensions around RE projects and conflicts with political ideals – e.g. commons - that have been associated with RE development, especially in the citizen movement (Byrne et al., 2009; Martinez, 2017; Scheer, 2007).
We will consider citizen financing of renewable energies (CIFRE)[1] in France in order to explore: i/ how tensions around ownership are addressed by actors in the development of RE projects, ii/ what definitions and practices of ownership are brought forth, iii/ which assemblages of ownership result from this, in order to do what.
In France, CIFRE has taken two forms over the past decade, defending contrasting practices and visions of the the development of RE projects. Specialized crowdlending platforms (e.g. Lendosphere, Enerfip) are inviting people to lend money with interest via loans - and not shareholdings – to selected RE projects, which leaves the decision-making for professional developers. Citizen collectives advocating political alternative and wanting RE facilities to be owned by citizen shareholders granted with decision-making power, have experimented investing into and developing RE projects. They structured into a nation-wide Shared Energy Movement (le movement Energie Partagée) equipped with a charter of values, a fundraising infrastructure and networking tools. Tensions and rivalries, notably in seeking for state support, have grown over the past decade between these strands of CIFRE. Yet, they did not hamper experiences of co-development of RE projects between private developers and citizen

groups, experimenting in the field new possibilities of sharing the financing, the ownership and the control of the projects in order to satisfy specific political ends.
In our presentation, based on a recent collaborative research project with CIFRE actors and fieldwork, we will explore the question addressed in the above by analyzing three arenas in which definitions and practices of ownership are confronted or devised : the current working of the Energy Partagée 'movement', a recent working of a Ministerial (DGEC) working group about the 'local governance' of RE projects, and the co-development of two local wind power projects.

[1] We use this term in this paper, to keep the possibility to distinguish between two occurrences of it in France 'participative financing' and 'citizen investment'.

Are ecologists fighting against green energies? Assessing the off-shore wind energy controversy in France in regard to policies evolutions

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Like other European countries, France decided to foster the renewable sources of Energy by setting ambitious targets. It relies mostly on large infrastructure aiming to both produce a massive quantity of energy and foster the construction industry (Goumri 2014). The renewable energy policy made a major turn in the early 2010's in France. After a first period in which French State fostered the development of localized small-scale projects, calls for larger projects, offshore in particular, changed the ways this policy was performed, and the artefacts being built (Nadai 2018, Chiapello et al. 2020).
I want to illustrate this turn in presenting the particular case of offshore wind turbine project of Saint-Brieuc, Bretagne (West of France). The project of Saint-Brieuc is a real massive industrial project, very powerful (500 MWe, a half nuclear reactor), both funded and operated by a nuclear industrial actor: Iberdrola. Despite the renewable energy it aims to produce, the project is facing a large opposition coming from many different actors (fishermen, citizens etc.) but also, and probably more surprizing, from environmental activists. Because of the uncertainties such projects produce, they invoke the "precautionary principle" for postponing or cancelling the works. Local biologists showed that the project would jeopardize the exceptional biodiversity of Saint-Brieuc's bay and potentially lead to rare species extinctions (such as Balearic Shearwater as far as half of its population is located in the area).
In presenting together the Saint-Brieuc's project and the evolution of French energy policy, I will emphasize the consequences of the "industrial turn" on the controversies and the type of

projects proposed. In providing a large-scale industrial project, the call made the project integration difficult in a sensitive area regarding biodiversity at junction of 6 Natura 2000 zones. I will show, confronting the various impacts' studies, that this large-scale project brings uncertainties that are more produced by the specific type of project, rather than a lack of data. My presentation relies on a French national archive analyses regarding the renewable strategy and an extensive field work in Saint-Brieuc started in 2013 which consists in observations of public debates, interviews of protagonists and documentation monitoring (ie. Newspapers).

Power to the People? Ownership and Energy Justice in Energy Cooperatives

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In order to achieve the goals of the Paris Climate Agreement, large-scale systemic transformations are needed in Germany and elsewhere, especially regarding the CO_2-intensive energy sector. Since nuclear energy is to be phased out in Germany by the end of this year, decentralised power generation through renewable energies gains more and more importance. Energy cooperatives are outstanding players of this transformation: since 2006, they have invested around 3.2 billion euros in the expansion of renewable energies in Germany. Crucially, renewable energy cooperatives do not only reform the technological mode of energy production, but also engage in different forms of ownership and participation. This study investigates the ownership processes and claims of energy cooperatives from an energy justice perspective, based on eight narrative interviews with members of two German energy cooperatives (conducted between 2020-2021) and an analysis of their respective homepages and media reports. The first energy cooperative mainly operates local photovoltaic systems on open spaces and house roofs in southern Germany but also holds stakes in wind farms. The main focus of the second energy cooperative is the remunicipalisation of the electricity grid in a large German city.
We show in a first step how both energy cooperatives fight externally for more distributive and participatory justice in the energy sector. In a second step, we examine how the energy cooperatives internally try to foster more democratic forms of ownership and participation.
Our research highlights how energy cooperatives actively critique large profit-oriented energy corporations as well as state-based forms of energy production and grid operation. Unequal ownership of the means of production and the lack of opportunities for participation in the existing energy system are rendered visible by their claims. Internally, on the other hand, the

cooperatives try to create opportunities for co-ownership and co-determination of infrastructure as well as feelings of responsibility for energy transition and climate protection. Yet, their inclusive claims stand in tension with internal participation hurdles regarding financial or time requirements as well as professional competences and existing social inequalities. This reveals internal negotiations over notions of democracy and ownership that are entangled with the socio-technological opportunities offered by renewable energy generation. Overall, our research shows that energy cooperatives enact an alternative to common modes of energy production and could play an important role for the transformation towards an energy-just society.

Introducing an Obligation of Sustainability into Property Law? Towards a Re-Conceptualisation of Property Rights to include the Commons

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EUROPA-UNIVERSITÄT VIADRINA FRANKFURT (ODER), Germany

Thesis: An obligation of sustainability can be introduced into property law as an extension of the social function of property, assuming that pursuant to the power of the legislator to determine the content and limits of property rights, a distinction must be made between different forms of property (e.g., property of corporations, commons, etc.).

Arguments: In order to balance the conflicting interests of the parties involved, the legislator must take into account both the constitutionally guaranteed legal rights of the owner and the mandate regarding a socially just property system in accord with constitutional principles including those of intergenerational justice and the tenets of transitional justice. Based on the case law of the German Federal Constitutional Court and the Court of Justice of the European Union, I further, argue on behalf of a general principle asserting that

- the legislative power to define contents and restrictions of property rights increases apace with the social relevance of the property owned,
- while the intensity of conflict decreases as the relationship between the owner and the object owned becomes more depersonalized and abstract.

A vital issue in the present discussion is the question of whether, and if so, to what extent, the benefit owners of productive property derive through depleting natural resources from reduced production costs (externalisation) assigns them the corresponding duty of preserving and restoring these natural foundations of life to compensate for their exploitation (internalisation). The obligation of sustainability under property law comes into play to balance interests in recognition of property's social function. This obligation would compensate for the ever-weaker link between formal owners unable to exercise either their legal property rights or their

corresponding social obligations, on one hand, and the corporate property administered by management, on the other. In other words, an obligation of sustainability can help to ensure a minimum of sustainability by restraining market forces thereby mitigating the principal-agent problem and re-establishing the lost equilibrium.

This necessary corrective is based on the idea of self-conservation ("conservatio sui") which both Descartes and Spinoza considered one of the basic human instincts. Compared to the other legal functions of property, sustainability has an inherent self-preserving function. This principle prevents the depletion of resources thus preserving the property which private property rights defend. It is a prerequisite to the constitutional guarantee of the very substance of property. In short: Without a legally defined sustainability principle in property law, private property in the form of productive property would gradually eliminate itself by using up the resources on which production depends. The self-preserving function of property is closely related to a fourth form of property, one often excluded from the system of property rights because it is taken for granted, namely the commons.

Against this background, I assess on the one hand, the legal rationale and potential obstacles for introducing an obligation of sustainability into European and EU Member States' property law (A, FR, IT, PL, SE), and on the other for a re-conceptualisation of property rights in general.

Revisiting energy transitions: the case of Greece's pathway to low carbon energy systems

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Over the last several years and in response to the current environmental and climate crisis there is a shift of attention towards sociotechnical transitions to low-carbon energy transitions in particular and sustainability in general. In this framework, the key role of Renewable Energy (RE) in climate change mitigation and a cleaner way of producing energy is predicated on the dominant imaginary of renewability, formed by older visions of low-carbon technologies and newer visions of net zero emissions. Mass industries, state energy politics and international organisations' policies are all in a phase of adoption of, and transformation to a low carbon fuelled present and future. This process entails restructuring of both energy regime and environment-society relations as mediated by technology.

Contrary to a traditional and public-discoursed argument, which assumes that the transitions are a linear process involving only firms, consumers, and the diffusion to the markets of new technologies, the historical and STS literature invites attention to new uncertainties, side

effects, possible social conflicts, and inequalities by bringing to light key players' practices, cultural beliefs and political struggles. Therefore, it researches what is new, what is transformed and what is missed within a technological transition. Inevitably, questions of property and access rights as well as energy democracy in general are raised.

This paper aims to critically examine and reframe low-carbon energy transition by focusing on mega RE projects that were proposed and/or implemented in Greece in the post-2008 economic crisis period. Our main research questions are: Can we assume that mega projects of wind or solar energy contribute to a transition to renewability and sustainability? Do such projects, advanced in time of economic crises, usher in such transition? Furthermore, do ownership regimes change in the context of such transitions? In what ways and how are the emerging regimes challenged?

To explore these questions, we will follow a twofold research and analysis: a) we will critically research the Greek state's current policies towards low-carbon transitions such as the National Energy and Climate Plan (NECP) for 2030 and the Long Term Strategy (LTS) for 2050, b) we will map the current mega RE projects in the country and their noisy promotion as a recipe for quickening the exit from suffocating austerity policies and c) we will present and analyse the emerging energy regimes (mainly private) in the country and the counteractions towards them.

Putting Community Back into Community Energy: Does Ownership Affect Support and Energy Justice for Wind Energy in Scotland?

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Wind energy often faces opposition from locals which can delay or halt projects. While community ownership of onshore wind energy has been found to increase acceptance, the reasons for this are poorly understood. Here, we compare communities' attitudes toward onshore wind energy between different community benefit schemes in Scotland using a postal survey (n = 318). Specifically, we compared their (1) support for wind energy; (2) perceptions of energy justice; (3) risk perceptions; and (4) benefit option preferences. One-way ANOVAs identified, on average, that those with full or shared ownership tend to support the wind development more, feel more involved, perceive more benefits that are fairly distributed, perceive fewer risks, and support their own benefit schemes more than the developer-led project. Due to the similarities between residents with full and shared ownership, we cannot conclude that ownership alone leads to greater acceptance. Instead, energy justice aspects may be of equal or greater importance than the type of ownership.

C.4: The context-dependency of conflict and participation issues in the energy transition

Session Chair: Sophie Kuppler, KIT, Germany

Demands for participation in renewable energy development in Germany

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In the past, the NIMBY syndrome was often considered a major reason for the lack of acceptance of new energy installations. Nowadays, it is acknowledged that many factors can play a role (c.f. Devine-Wright/Batel 2017; Lennon et al. 2019; Liebe et al. 2019). In some cases, project developers and the responsible authorities try to counteract such protests by involving the public in decision-making at different stages of project development. In this paper, we would like to discuss possible context factors that support either the emergence of conflicts and demands for participation or contribute to low public controversy over a project or even active support. We do this by drawing on several transdisciplinary research projects that we have been involved in over the past years as well as research on factors influencing the acceptability of different energy technologies. Our focus lies on projects in Germany to compare only projects within the same cultural context:

In the project GECKO, actors from the realm of practice were involved in preparing recommendations for an implementation concept for a geothermal heat plant. Our research results suggest that early citizens involvement and transparency, but also technical aspects play a role. They need to be debatable, and it has to be possible to adjust them. Another example is the transdisciplinary project APV-RESOLA focusing on Agrophotovoltaics (APV). This technology allows double land use for food and energy production and reduces land-use conflicts. Citizens and stakeholders were integrated to develop criteria and recommendations for shaping, framing and embedding APV for a societally feasible implementation. To do so, the concept of Responsible Research and Innovation (RRI) was applied at a multi-stage process. The conditions for improving the acceptability of the technology were elaborated, possible sites at regional scale identified, and the changes in perception after people have become accustomed to the system were monitored. In the project ENSURE, a demonstration region is selected, characterised by diverse forms of renewable energy production, mainly wind and solar power. The region is analysed concerning specific context factors, which supported the transformation from fossil to renewable energy plants and beyond regarding

innovative power grid systems. The case shows that local involvement, which focuses on needs and the integration of suggestions in planning, is crucial. Further, long-term benefits for the region play an important role.
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Public perceptions of hydrogen fuel

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Public acceptability of energy technologies can be key for successful development and implementation. The presentation is based on findings utilizing data from a representative sample of the Norwegian public and highlights public perceptions of hydrogen fuel and its different production methods (often labeled as grey, blue and green in public communication). Although several countries, including Norway, have strategies to increase the production of hydrogen fuel, our results indicate that hydrogen as an energy carrier, and its different production methods, is still unknown and unclear to a large part of the general public. A common misunderstanding seems to be confusing 'hydrogen fuel' in general with environmentally friendly 'green hydrogen'. Results from a survey experiment show that the production method is highly relevant for public acceptance; acceptance is high for green hydrogen, which is produced from renewable energy sources, but falls significantly for blue and grey hydrogen when respondents are informed that these are produced from coal, oil, or natural gas. Public support for hydrogen fuel in general, as well as the different production methods, is related to their level of worry about climate change, gender and political affiliation. Widespread misunderstandings regarding 'green' hydrogen production have the potential for reducing trust and fueling resistance as new 'blue' or 'grey' projects develop. Our results indicate a need for clearer communication from the government and developers regarding production methods to avoid possible 'backfire' effects in public acceptance.

What triggers protest? – Factors influencing conflict dynamics in renewable energy deployment in Germany

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The deployment of renewable energy (RE) infrastructure has evolved as a source of local conflict that increasingly impacts the achievement of national and international climate goals. Still, their dynamics are far from understood. Some escalate, tear rural communities apart and lead to years of legal disputes within the licensing process. Some projects are realized with no or only minor disruption. To researchers, project developers and local politicians alike it seems unpredictable, as to which way local energy conflicts evolve. Regardless of the case, there is a structural constant to it: competing interests between various stakeholders involved. Communities want to ensure quality of life, community benefits and have to mitigate land use competition. Residents strive for good and safe living conditions, as diverse and eventually contradicting the expectations can be. Project developers, embedded in market logics, need to realize projects as cost-efficient as possible and aim at generating profit. National or state policies are committed to a speedy expansion of renewable energies in order to meet climate goals and mitigate climate change.

Rather than identifying RE conflicts as a sign of dysfunctionality, conflicts here are seen as an important element of a democratic society struggling to find the best way through the transformation towards decarbonization. The transformation consists not only of a re-construction of fossil-based infrastructure, but it also needs to cater to the demands of a democratic state. Hence, it is important to find ways to constructively deals with conflicts where global demands of CO_2 reduction meet democratic procedures and ways to mitigate negative impact at local level.

A first step is an in-depth understanding of the conflicts and their dynamics. Surprisingly, this has been neglected in social scientific research on the energy transition so far. There is an extensive body of literature on the acceptance of RE. Here, factors that could increase local acceptance and „solve“ conflict are derived. This not only neglects various interests involved, it also does not show much success in accelerating RE expansion so far. Local conflicts are still vital and – at least in the German context – even increasing. Often recommended early participation of residents does not necessarily lead to more acceptance, sometimes it even triggers early formation of protest. Offering financial benefits neither turned out to be a silver bullet, but similarly sometimes even makes things worse.

This paper takes a different approach. It applies a conflict theoretical perspective and focusses on the importance of a just and democratic implementation of infrastructure projects. Based on qualitative research on local energy conflicts in Germany the paper aims at systematizing

factors that encourage constructive conflicts and factors that impede such development. These factors interact with local conditions, making conflicts on the one hand typical on the other very specific. Research dealing with conflict and participation in transition processes need to address this tension to develop instruments that help to deal with local energy conflicts in a constructive way. The paper also offers some preliminary thoughts on how this could look like.

"Each World Has its Participation" – Mapping the Social Worlds of System Design as Contexts of Participation in the Context of the Energy Transition in Germany.

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In the design of the German Energiewende, most conflict and –attempting to respond to it– participation takes place in very selected places: Where (problem) awareness is greatest or where landscape or economic impacts are most tangible, such as in the construction of wind farms or power line construction. However, other –sometimes much more fundamental– aspects of the design of our energy system receive far less (public) attention and offer correspondingly more limited opportunities for participation. How centralized or decentralized should the system be in the future? Which technologies, such as hydrogen or synthetic fuels, will (not) be relied upon? How should self-organizing "intelligent" power grids be designed? These are just a few of the questions arising during the energy transition as well.

As the growing literature on participation points out, participation promotes both the legitimacy and acceptance of solutions and their quality (economic, sustainable, use-oriented), furthermore the self-organization and sovereignty of participants and the democratic culture as a value itself (cf. Rohr et al. 2017, 38 ff.).

To be able to demand or offer the right formats of participation, the following programmatic questions must be asked:

1. In which places and on which topics does the shaping of the energy system of the future take place?
2. What forms of participation exist there?
3. Who is involved in which decisions?
4. Which participation formats need to be developed? And what understanding of socio-technical system design is needed for this?

Presented is the first version of a social mapping (cf. Clarke 2005) of "arenas" of controversy around the design of energy infrastructures during the energy transition in Germany with a focus on possibilities of participation. This arena is composed of social worlds of planning,

legislation, technoscientific development, investment/business model development, and consumption/prosumption, among others. All these social worlds and sub-arenas have specific perspectives on energy infrastructure development, the technical, agential, and discursive elements therein, and their respective meanings/reality. Citizens/users also take on different roles in the respective worlds and thus have different opportunities for participation and critique.

Each world builds the context for its own forms of participation so; and each participation is connected to and embedded in different practices of system design. Consultation formats in grid development planning, for example, are in the "World of Planning" and thus have difficulty accessing political targets in terms of design. Understandably, it is called for new procedures such as integrated system development planning ("Systementwicklungsplanung", cf. dena 2019; BNetzA 2022, p. 8). On the other hand, participatory information and dialogue formats in power line or RE plant construction can hardly criticize procedural forms of grid planning. And "citizens' councils," "commissions," or "platforms" (such as the newly established "Plattform Klimaneutrales Stromnetz," see German Coalition Agreement 2021, p. 62) cannot respond to specific territorial or ownership aspects in the implementation of individual adopted measures.

This socio-cartographic work of grouping creative practices of accessing energy infrastructures helps contextualizing and situating specific participation formats in the energy transition in Germany – both methodologically and empirically

A critical review of education and public engagement (EPE) initiatives associated with energy infrastructure: the case of carbon capture and storage and marine renewable energies

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Achieving climate neutrality of the EU's economy and society is a central goal of the European Green Deal. The decarbonization of our societies involves, amongst other things, the adoption of many new technologies and the construction of associated infrastructure. The deployment of novel infrastructure required for this decarbonisation, can only be successfully realized through social acceptance. This means acceptance by the public generally (of the technology), but also, and critically, acceptance by the communities set to host such infrastructure. There is growing concern for example that public opposition to infrastructure related to renewable

energy is threatening the envisaged decarbonization. Social opposition to large scale infrastructure will always be a potential issue, and communication between prospective host communities and proposed projects is therefore of the utmost importance.

The social acceptability (and by extension, public acceptance) of strategic infrastructure development –- including deployment of novel technologies such as carbon capture and storage – can be greatly facilitated and encouraged by engaging with the public in meaningful and constructive ways, especially through appropriately designed education and public engagement programs. This paper examines what constitutes effective means of engaging with the public on such issues. It reports on critical reviews of education and public engagement (EPE) programs focusing in particular on carbon capture and storage and marine renewable energy. Selected key examples of EPE were characterized through desk research coupled with the use of targeted informants. A summary of this analysis is presented, including the nature of the projects, their approach to public engagement, challenges faced, and particular successes. Building on this developed knowledge, a framework for EPE focused on contributing to greater social acceptability is being developed collaboratively with community stakeholders. The paper will detail the co-design process, and describe how an intersectional approach (considering e.g., gender, economic privilege, and life stage) is being used in its development. Finally, initial results from testing of key components of the EPE framework will be reported and discussed.

C.5: Missions – how can public policy influence the direction of technical change to meet societal goals?

Session Chair: Wolfgang Johannes Polt, Joanneum Research, Austria

The role of foresight in shaping the development and governance of the Horizon Europe Framework Programme: The case of EU missions

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In addressing long-term transformative policy challenges, exemplified in the European context by the notion of twin (i.e. green and digital) transitions, this paper focuses first on the early phases of the policy cycle, and on barriers related to the organizational context for policy preparation and sense-making. It argues that foresight activities, drawing on a combination of intra- and extra-organisational networks and processes, are promising instruments to help

overcome cognitive, organisational and institutional barriers to policy coordination, covering the full range of policies from the supply side of research to the demand side of sectoral framework conditions and regulation.

Second, beyond this government-internal function, foresight processes also provide a point of reference for other actors, stakeholders and public debates, by opening up dialogue about transitions with actors and stakeholders external to public bodies. In other words, by drawing on various types of participatory methods, both intra- and extra-organisational networks can be mobilized for purposes of shaping specific R&I policies and programmes in an instrumental sense, but in a strategic sense they also have repercussions on the wider innovation ecosystems.

Third, the long-term nature of transformative policies requires reflexivity in implementation, too, and including a substantial forward-looking element. Both internal and external networks need to be mobilised also during policy implementation in order to ensure a regular adjustment of policy challenges in light of new knowledge about future challenges.

These arguments are underpinned by recent experiences with the development of the new European framework programme Horizon Europe, and with the preparation of the fives EU missions in particular. More specifically, the paper draws on three main sources of information: i) a major foresight project in support of the preparation of the EU's next framework programme (BOHEMIA – Beyond the Horizon: Foresight in Support of the EU's Future R&I Policy), ii) a series of specific follow-up foresight project to support the EU mission boards, and iii) an analysis of the overarching process of developing the rationales and governance of missions, in which these foresight activities were embedded.

The analysis shows how foresight contributed to the building of cross-Directorates General networks within the European Commission in preparing Horizon Europe, and the stepwise opening up of the development process, which led to a multi-stakeholder approach to the set-up of mission boards as comparatively autonomously experimental spaces for designing new governance elements in Horizon Europe. It remains to be seen whether this will be followed by an equally novel implementation model for EU missions.

Transformative cancer innovation policy needs a diverse system not a narrow mission

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Half a century ago the US National Institute of Health's (NIH) 'War on Cancer' sought to emulate the successful Apollo space programme. Described as an "effort to find a cure for cancer" it ended up as a textbook exemplar of hubris and disappointment with little impact on

the overall trajectory of cancer deaths. It is therefore startling to see the contemporary innovation policy trolley laden with reheated 'cancer moonshots;' from the NIH', the World Health Organization (WHO), and the European Union (EU).

Is today's neo-mission approach justified because history has been unfair to the 'War on Cancer' or because the current offers are fundamentally different to the original? Both explanations are claimed by neo-missions' leading advocate, Mariana Mazzucato.

A Systemic Approach to Policy Transitions

Traditional mission-oriented innovation policy is narrowly focused on techno-scientific problems. The Manhattan Project and the Apollo Programme were mega-projects combining resources at scale with narrow technical scope. They were driven by a 'bold' policy approach of massive investment, a clear goal or mission, and the promises of technoscientific breakthroughs in specific fields such as nuclear fission or rocket propulsion. The pharmaceutical revolution of the 1950s and 1960s was also techno-scientific. Covid vaccines also sit comfortably within this well-known mode.

Socio-technical innovation is different. The widespread adoption of sanitation, refrigeration and telecommunications were not instigated through big breakthrough projects. They all arose from a diffuse and pervasive mix of available technologies, with a bundle of complementary social and organisational innovations. Policy often focused on standardisation, regulation, and welfare in what was essentially an emergent and complex innovation process. The system wide reconfiguration of public health and disease prevention through the 20th century, while drawing on the pharmaceutical revolution. was also a socio-technical transition.

Problems with the neo-missions

The challenge of cancer is quite different to those of traditional mission projects in terms of focus and expectation. The heterogeneity of the disease, between patients and within a single tumour confounds simplistic approaches to treatment and diagnosis. Although investment at scale is needed, the present cancer plans should increase the variety of innovation pathways and the plurality of innovation players in the ecosystem.

The 'mission' framing carries the baggage of a moonshot mentality. The articulation of a broad mission and the allocation of big resources do not in themselves offer a credible transformative innovation policy. They risk the outcome of either a too diffuse basic science research programme, or alternatively its goals will be captured by a narrow range of technoscience project advocates. To avoid this needs a clearer picture of the limitations of the prevailing innovation ecosystem and how this can be radically changed. Although the neo-mission approach acknowledges this, its roots in traditional mission-oriented policy lie in poor conceptual ground. Instead, the new thinking on sociotechnical transitions offers a far more fruitful policy repertoire to challenge regime lock-in through niche experimentation and landscape change.

Challenges for Governance in Mission-oriented Research and Innovation Policies

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Mission-oriented Research and Innovation Policies differ in the way governance structures ought to look like: they can roughly be categorized as being more narrowly targeting scientific or technological breakthroughs ('accelerator missions') or addressing more complex societal problems on a systems level ('transformative missions') (Kuittinen et al. 2018, Lindner et al 2020, Polt et al. 2021). Especially the latter ones have to deal with the articulation of societal needs, the need to create political legitimacy, the multi-dimensions alignment of policies, the involvement of a large group of stakeholders (Weber et al 2021). The five European missions that will be pursued in the context of the European Framework Programme for Research and Innovation 'Horizon Europe' (climate adaptation, soil and food, water, cities and cancer) equally face these challenges.

This contribution will take stock of the progress in setting up the governance structures – both at European and at national level - in the five EU missions, will discuss their intricate differences (from the cancer mission with its strong focus on basic research and a strong anchoring in the science community to the multi-faceted, multi-layer governance structures of the cities mission with citizens as direct stakeholders), and compare the Austrian approaches with international ones (e.g. Germany, Finland, the Netherlands, Sweden, …). The main lines of comparison will be:

- The role of science and research (and the respective communities) in the respective mission (e.g. how the science system is able to react to societal demands and what are the steering capacities and their limits to 'orient' science towards societal needs)
- The role of societal organizations and citizen engagement in the respective mission (e.g. whether and to which degree a successful implementation of a mission depends on active participation of citizens and in which forms this engagement can happen)
- The role of public policy and governments in the respective mission (e.g. how policy targets are set and how policy instruments from different fields are mobilized to support mission implementation).
- The interplay of cross-cutting mission governance structures and mission-specific initiatives, both at European and national level.

The contribution is based on the authors' involvement in the coordination of a large project in Horizon Europe (TRAMI – Transnational Cooperation in Mission-oriented Policy) which aims at supporting EU Member and the European Commission in the building of implementation

structures for multi-level mission governance. Moreover, they also support the Austrian efforts to design appropriate governance structures for the implementation of the EU missions.

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Identification of Potentials, Actors and Capacities in the Context of Mission-orientierted Research- and Innovation Policy

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(New) mission-oriented research and innovation policy is characterized by a systemic approach, thematic focus and directionality. She is different from thematic programs that also address societal goals (such as the SDGs), e.g. by means of fostering Science-Industry-Collaboration. She is also different from approaches such as Smart Specialization, which address systems, but with a view to foster competitiveness.

Evidence-based policy making in this approach has the multiple challenge to identify relevant actors, capacities and potentials, systemic gaps and develop appropriate indicators and measures. Furthermore, the incentive structures through which mechanisms and means the actors in an innovation system ‚internalize' the goals and targets of mission-oriented policies have to be identified and taken into account when designing policies. In this vein, especially the different incentive structures of universities, institutions of applied research, enterprises and funding agencies are important. E.g. for universities, their steering capacities with respect to thematic orientation and the means for such steering (e.g. in performance-based funding agreements) are of interest. For the different types of applied research institutions other framework conditions and hence other incentive structures apply (sometimes they can be direct instruments of government polices).

Any assessment also has to take into account the inherent differences of mission areas: while some are of the type of science/technological breakthrough missions (and hence a larger role of science community or the enterprise sector respectively) others are of a more systemic and transformative nature, implying different challenges for policy and governance.
This paper presents the (preliminary) findings of empirical research on the implementation of mission-oriented policies in Austria and draw conclusions also for the mapping of the European landscape of mission-oriented policies. As such, it aims to provide new insights on how this policy approach can be operationalized in the context of empirical research and feedback to policy design.

Green industrial policy, sectoral change and directionality of innovation in "era of ferment": Case study on China's early transition to electric mobility

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The study investigates the role of green industrial policy in shaping the directionality of innovation in the formative phase of sustainability transition from a longitudinal perspective in an emerging economy. Directionality of innovation is important because it has profound developmental and environmental consequences in the transition of social-technical systems. However, it is less understood compared to rate of innovation, especially in terms of how it is shaped by green industrial policy as sectoral change unfolds. Moreover, the majority of scholarly work concentrates on developed countries, while in-depth research of emerging economies is rather limited. This study fills the gap by systematically and longitudinally investigating the role of green industrial policy in affecting early directionality of innovation through case study on China's early transition of electric mobility in automobile industry, where directionality is conceptualized as consisting of two selection processes, i.e., technological substitution (diverting technological efforts from existing regime to a greener regime), and technological variation (selection of technological trajectories in a certain regime). Applying an industrial value chain perspective that refines existing analytical scope of sectoral system of innovation (SSI) framework, the study finds that dynamic portfolio of state policies that create imbalance among industrial value chains are conducive to technological substitution process. However, intervention into technological variation based on perceived comparative advantage risks creating system gaps, leading to technological lock-in to undesired trajectories and slowing down technological substitution process at a later stage. This paper adds to understanding of the political economic forces that shape the direction of innovation in the nascence of sectoral transition, as well as the mechanisms underlying this relation. Moving

beyond the “policy mix” approach in transition study, it highlights the role of industrial policy and its interaction with other policy frameworks in innovation, energy and environment spheres. The findings point to the importance of technological multiplicity in formative phase of sectoral change and cautions against state intervention that aims to “endogenize” green windows of opportunity. Hence, it bears strong implications for policy and strategy making in terms of navigating technological paradigm shift in an industrial latecomer’s setting.

Policy mix for sustainability transition - A case of India's LED transition

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The research in sustainability transition in recent times have focused on the geographical aspect of innovation and the recent experience in India signifies the importance of a globalised view of frameworks like multi-level perspective. Unnat Jyoti by Affordable LEDs for All (UJALA) is a flagship programme launched by the government of India in 2014 to promote the use of LEDs in households and replace incandescent bulbs. In this case, the development of the technology (LEDs) is not domestic, and one of the reasons behind its success is the decreasing global prices of LEDs that helped in overcoming the per unit cost impediment. However, mere low global prices without any policy support cannot drive a transition. Secondly, policy problems and solutions exist together as streams over a period of time along with the related politics, and issues are pushed to the agenda by virtue of a policy window – multiple stream framework. Hence, the politics and national discourse of energy efficiency assumes importance in discussing LED transition in India along with the global technology market.

The programme has since propelled the sale of LEDs in the country that surpassed the sales of incandescent lamps in 2018. It has been touted as one of the few successful zero-subsidy programmes to promote energy efficiency in domestic lighting. The success of the programme and its implementation offers an opportunity to understand sustainability transitions. In India, the scheme was implemented by a government-owned agency that rely on procurement strategies based on demand aggregation to further reduced the cost to customers. The LEDs were sold by the electricity distribution companies which were also responsible for electricity bills and collection in the country. Despite cost reductions, LED lamps were still ten times expensive than the incandescent lamps. Hence the distribution companies reduced the upfront cost and added the remaining cost to the electricity bills of customers as monthly instalments. Consumers were told that their bills will be lesser due to energy efficient LEDs and the new bills despite monthly instalment of the remaining price of LEDs bought will be

lesser than earlier bills. The lighting industry in the country welcomed the scheme as it intended to create a new market and assured demand for LEDs in longer term. Almost eight years since the scheme, the market seems to be taking a dominant role with private players manufacturing LEDs in India and sale occurring through usual channels.

From the multi-level perspective (MLP), the case offers an interesting insight where the niche is global – development of LED technology and its scale production that drove down its cost; the landscape is political discourse on energy efficiency and climate change, and finally the regime is existing industry structure in India that did not oppose the transition, despite being overlooked and ignored in the implementation of the porgramme. The case offers opportunity for developed and developing countries to learn from India's experience, and for researchers to consolidate the bridge between sustainability transition and public policy research.

Stream D: Gender, Science and Technology

D.1: Towards Academic Kindness – Queer-feminist working cultures in academia

Session Chair: Daniela Jauk, The University of Akron, United States of America
Session Chair: Anita Thaler, IFZ, Austria

Strong Reflexivity and Academic Kindness

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In this presentation, I will explore the relationship of strong reflexivity and academic kindness. I will make two arguments:
My first argument introduces the notion of strong reflexivity (Kuehner/Ploder/Langer 2016) and relates it to the concept of kindness in academic research. I will show that strong reflexivity leads to increased vulnerability on behalf of researchers in all stages of the research process. In order to create knowledge under these conditions, strongly reflexive researchers need spaces of kindness among academicpeers. They need spaces to share their anxieties, desires, and hopes, they need peers who will not shy away from their tears, their revived trauma, and their feelings of hatred, fear, and love towards research participants. These spaces of support and kindness create the practical, the epistemological, and the ethical conditions for strongly reflexive research. Without them, researchers cannot use their biographies and their physical and emotional experience as a source of data. Without them, they cannot perform “strong analysis” and tell “strong stories” that will touch their audience and spark moments of performative knowledge-making. And without them, they cannot protect the emotional integrity of all their research participants – including themselves.
My second argument promotes both strong reflexivity and kindness in academic teaching and supervising relationships. Encouraging students to pursue a strongly reflexive approach to their research can help them to get a deeper understanding of the relevance of kindness towards their research participants and their academic peers. Moreover, no matter if they choose strongly reflexive methodologies or enrich other methodological approaches with elements of strong reflexivity, they will be confronted with their own vulnerability and learn to embrace it as an important tool of their research. Yet, in line with my first argument, encouraging strongly reflexive student projects requires time, skills, and attention for academic

kindness on behalf of the teacher. In this part of my presentation, I will point towards some challenges of this kind of teacher-student relationships.

Visions of a gender and queer-inclusive university in Austria

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Institute for Advanced Studies (IHS), Austria

In 2018 the Austrian Constitutional Court decided that, with reference to the Convention on Human Rights, in addition to “female” and “male” an alternative gender entry must be provided in documents and ID cards. Of course, this human right is also binding for universities. However, this topic is not only about documents and ID cards, but also about breaking up gender binarity in research and teaching, about (the distribution of) resources, about language, administration, spaces, visibility, legal issues, images, alliances, etc.

Studies show that there is still a lot of catching up to do in this context. It points out that a large proportion of trans*, inter* and non-binary respondents experience discrimination at universities and for this reason often keep their gender identity secret. Moreover, this kind of discrimination can lead to longer studies, dropping out and can even have a negative impact on students’ and faculty’s health (FRA 2020).

There is already some preliminary work dealing with gender discrimination in higher education, e.g., Hornstein (2019) on allyships. Self-advocacy organisations (such as Arbeitsgemeinschaft trans*emanzipatorische Hochschulpolitik or #NaGeH) have also published and collected material. What is missing, however, is a conceptual framework. In the Austrian context in particular, there is a gap.

Since the decision of the Constitutional Court was made some years ago, it can be assumed that the universities have dealt with this issue by now. Of course, it is the task of universities to ensure that such discrimination no longer takes place. But beyond that, what is the goal of universities? There is an opportunity for universities right now to consider how they want to define their goals for a gender and queer-inclusive, appreciative and respectful vision of higher education institutions, based on existing studies.

In addition, other interesting questions concern the positive aspects of a gender and queer-friendly university culture and what is needed to achieve it. To what extent is such a vision already being formulated and strived for by universities? Which actors are involved in achieving this goal? To what extent has this vision been laid down in university strategy documents?

Dealing with gender and queer-inclusive visions at universities is part of my dissertation on gender inclusion at Austrian universities. At the STS conference, the above-mentioned

questions will be discussed conceptually, and the results of a document analysis of Austrian university strategy documents and first results from interviews with university members will be presented. Furthermore, the question of how these visions can be operationalised will be discussed.

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Minding and Mending the Gap between Academic Kindness and Academic Justice

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As a scholar of academic justice, feminist leadership, and organizational change for intersectional equity, “queer feminist [academic] interventions” are at the center of my research and my purpose as an educator-scholar-activist. As someone steeped in the experiences of, research in, and support systems for marginalized and minoritized scholars, the possibilities afforded by “academic kindness” are as alluring as they are needed. What are ways that academic kindness can serve as queer feminist intervention, moving beyond isolated, atomized acts of individual-level interaction? Can kindness operate as a strategy alongside subversion, fugitivity, resistance and transformation? Or is kindness simply a masquerading tool of the very oppressions it aims to alleviate? Academic kindness can be framed as an antidote (as in the CFP), something that responds to poison. And yet, an antidote does not necessarily change the conditions that enabled the poison’s presence. Is it enough for kindness to provide relief? Drawing from my (distinct) research projects on engaged pedagogy and feminist academic leadership as well as a content analysis of posts on the Academic Kindness Tumblr site, this paper explores the tensions inherent at the intersections of academic justice and academic kindnessin three areas: in pedagogical settings, in (feminist) academic leadership strategies, and in peer engagements/interactions. As “sweaty concepts” (Ahmed 2017) born from and intended to transform academic institutions in neoliberal contexts, I question whether kindness can be situated meaningfully as a strategy in institutional justice work that is often predicated on oppositional critique, refusal, and resistance. I conclude with a proposal for how kindness and justice might be compatible and necessary in academic life.

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academic kindness and futures literacy : experiments towards a diversity friendly knowledge creation space

Eveline Wandl-Vogt
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In this intervention, the author focuses on experiences of 30 years in academia against a feministic and neurodiverse background.
On the example of the brand new Ars Electronica Research Institute knowledge for humanity she reflects how the applied method of Art Driven Innovation may improve futures literacy under the aspect of academic kindness as a new model. The Research Institute aims to bridge the gap between academic knowledge and applications against a background of the Sustainable Development Goals and diggs into reinventing genres to create a more inclusive, more sustainable future. It acts at the intersection of science, art, emerging technologies and society.
On the example of various case studies related to females and neuro/diverse actors in academia and the academic ecosystem of the author, she shares learnings and discusses how care might be a value driver and innovation path towards more transparency, empowerment as well as improving productivity in the Ars Electronica Research Institute knowledge for humanity and it's "knowledge creation space". She embeds the concept of academic kindness into the concept of furtures literacy to trigger a common future scenario co-design of a more inclusive, more sustainable academic future workspace. Depending on the time frame given, a theory input shall be discussed or a exerpimental co-ideation session shall take place / virutally or online /.

On a heroines' journey of living academia kind-ly: Practices, tools, and alternative myth-making from a peer-to-peer feminist STS collective

Claudia Schwarz-Plaschg[1], Denia Djokić[2]
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Contemporary neoliberal academic settings demand conformity, compromises, and forms of complicity that often undermine the very values that underpin feminist STS work. The

imperative seems to be that those who are not willing to adapt and split off parts of themselves, those who stay with or “cause” trouble (Haraway 2016), and even dare to complain (Ahmed 2021) have to leave academia. If we are not ready to exit (yet), how can we continue our research without losing ourselves and find ways of healing from the trauma that toxic academic settings inflict on us? When the pandemic hit in early 2020, this question became more salient as many of us found ourselves isolated and confronted with new uncertainties. We are part of a group of researchers at the intersection of STS, feminism, and related fields that formed during this period and started to meet regularly online. What began as a reading group with a focus on care ethics (Tronto 1993, Mol 2008, Puig de la Bellacasa 2017) immediately turned into a space in which we collectively processed the white heteropatriarchal structures of our respective academic realities; the resulting trauma of harassment, discrimination, and marginalization; and the general lack, as well as the loss, of anti-patriarchal, safe, and trustworthy role models in our respective contexts. Since then our peer-to-peer support and learning collective has continuously grown and morphed, adapting to the changing needs and interests of our members. In this talk, we share our sense-making (sense in the broadest sense of the term) practices and tools that enable and nourish our virtual feminist STS collective. We propose that in order to continue to exist in and positively impact academia from wholeness, we do not need individual role models but brave collectives that dare to show up in academia with kindness and vulnerability. We propose a new myth of academic heroine-ism that centers on transforming the individualistic guiding myths of the hero’s journey (Campbell 1949) and its adapted heroine’s journey (Murdock 1990) into a heroines’ journey of a feminist researchers collective guided by care ethics.

D.2: Gender, Science and Technology in a Virtual Academia

Session Chair: Karin Grasenick, convelop cooperative knowledge design gmbh, Austria

Complex projects, remote partners: how to digitally enhance equal opportunities

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One of the biggest challenges of large project with remotely distributed partners in enhancing equal opportunities are different regional policies and that measures have to be implemented mainly online.

The Human Brain Project (HBP, https://www.humanbrainproject.eu) is one of the FET (Future and Emerging Technology) Flagship projects. More than 500 scientists and engineers at over 140 universities, teaching hospitals, and research centers across Europe have collaborated across disciplines mainly online since 2013. Despite its complexity the HBP has played a pioneering role in advancing gender equality by improving the gender balance of scientists in leadership positions doubled from Sept. 2017 to 36% in December 2021.

A strong focus has been set on developing standard operating procedures and guidelines to be accessible for all members of the complex endeavor of interdisciplinary brain research. As such main experience have been summarised with the aim to provide online guiding tools that are easy to access and to implement in gender equality plans (GEP) for scientists and managers of sciences who might not yet have a specific gender expertise (see www.edi-toolkit.eu).

This toolkit has been cocreated with the Diversity and Equal Opportunities Committee (DEOC), an advisory body to the Project Coordination Office (PCO) and Directorate (DIR) of the HBP. The DEOC is the body responsible for implementing the gender activities planned in the HBP Gender Action Plan (GAP) addressing four areas of intervention to (i) develop and support HBP Stakeholders to share a vision on diversity and equality, setting targets, supporting, and carrying out own activities, (ii) analyze structure and processes of the HBP to identify leverage points for change, (iii) contribute to Research and Lectures at HBP related workshops and publications (Grasenick, 2019), and (iv) support, individuals, teams, leaders, offering advice on diversity in teams as well as career building workshops. The strategic outline of the GAP and its measures are available at https://www.humanbrainproject.eu/en/about/gender-equality/

The main challenges to increase the number of women in higher-level positions and in education activities have thereby been addressed successfully, as the figures demonstrate. This presentation will focus on the experiences of ow one of the largest research projects in the world with the online structures, processes and equality measures based on an inclusive strategy (Steward and Valian, 2018), thereby referring to the concrete outcomes and the feedback of participants. Key Outcomes will be exemplified be referring to the EDI-Toolkit (where EDI stands for Equality, Diversity, Inclusion).

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Decision making in virtual funding settings – does this improve gender fairness?

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The COVID-19 pandemic has dramatically changed the working life for researchers and it has as well affected the way how research funding decisions are organised and research grants are allocated.

The Horizon2020-funded research project GRANteD (2019-2023) investigates grant allocation disparities from a gender perspective. The project takes a closer look at five national funding organisations (RFOs) and how funding processes in selected funding programmes are put in practice. While peer review panel activities are in the core of analysis, the COVID-19 pandemic implied that in all five cases, face-to-face peer review panel meetings had to be shifted to virtual meetings at short notice.

In virtual meetings, the informal and formal (gendered) rules for discussion, negotiation and decision making might differ compared to face-to-face meetings. This might change the meeting dynamics and possibly the meeting outcomes.

This paper draws on the analyses of one case study, a major European RFO where a key part of the grant allocation process lies with the remote reviewers. Therefore, we are especially interested in the implications the COVID-19 pandemic had on this stage of the research funding process.

Our analysis builds on qualitative empirical data from interviews with reviewers participating in review panels, panel chairs and staff in the RFO. Further, we could observe virtual panel meetings. These two sources allow us to get first insights how digital meeting formats impact the work in the panels and virtual decision making when allocating research grants.

Remote review so far have not been studied in detail, we bring light on their general understanding of assessing proposals and how Covid19 had impacted their work. On panel level we are interested in the benefits that reviewers and panel members perceive when they act in a virtual format compared to face to face meetings. We also study the challenges and particularities when negotiating in virtual settings, focusing on how these meetings are chaired, how discussions are organised and how room for speaking is taken up. Further, we are interested if and in which way the virtual format lead to a change in the interactional patterns between panelists and between panelists and chairs and how the perceived quality of decision making in virtual panels in contrasted to former face to face meetings.

From a gender perspective we aim to explore gendered implications of the shift from face-to-face to digital meetings, like how unconscious and implicit bias factors like stereotyping, double standards or homosociability work in virtual settings. Finally we analyse the potential of virtual setting for more gender fair research outcomes, taking into account that online

decision-making meetings for panelists and reviewers might become of increasing societal relevance for RFOs due to environmental goals.

Digitalisation of Measures in Holistic Strategies for Gender Equality in Higher Education

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Pandemic lockdowns had significant impact on research and teaching as key functions of higher education. The effects of these changes depend on the field of science and, in addition, relate to the teaching load of a person. Thus, gender differences in academic workload as well as potential family obligations (Cardell et.al, 2020) must be considered more strongly (O'Meara et.al, 2017) in measures for gender equality in higher education. Moreover, long periods of lockdowns effect especially Pre- and Postdocs in their career opportunities (Carrie and Woolston, 2020).

While such developments are crucial to consider, adapting and changing strategies for achieving gender equality too has been demanding: They imply an organisational change process. Change implies resistance and defensive attitudes that are even more difficult to address in times of a pandemic. Gender equality officers and task forces can be considered as change agents who must build a powerful coalition to identify obstacles and success factors and to develop a communication and support strategy accordingly.

Graz University of Technology (TU Graz) has defined a strategy that integrates gender and diversity measures in science and teaching alike. The strategy was successfully adapted to recent developments with the Office for Gender Equality and Equal Opportunities as a driving force. It has thereby broadened the internal coalition by cooperating closely with the rectorate and service departments for research and in-house training and adapted its measures to ensure more digital inclusiveness. Lectures, workshops, coaching as well as strategic meetings have been tailored to the specific pandemic challenges. Measures include an intensive training course for researchers and lecturers at TU Graz to become gender experts themselves. Complementary, a conjoint, online only lecture of all faculties has highlighted how gender and diversity aspects are integrated in different fields of research. Both initiatives have sparked significant interest. Scientists have developed and contributed to new gender-based research topics. Additionally guiding materials have been co-created (Grasenick et.al, 2020) and online coaching for ESR was implemented.

At the conference, we will present the process and the specific measures. We will discuss obstacles and success factors for digital inclusiveness from the perspectives of scientists and

researchers as well as service departments. We also put a focus on the broader strategic context, the interrelation of different organisational functions and the need for a holistic perspective.
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O’Meara KA; Kuvaeva A.; Nyunt G.; Waugaman Ch.; Jackson R. (2017). “Asked More Often: Gender Differences in Faculty Workload in Research Universities and the Work Interactions That Shape Them”. American Educational Research Journal (AERA) v. 54, n. 6, pp. 1154-1186

About the influence of the COVID-19 pandemic on Communities of Practice (CoPs) working towards gender equality in academia: Results and learnings of the evaluation

Sarah Beranek, Sybille Reidl
JOANNEUM RESEARCH, Austria

While the COVID-19 pandemic had a gendered impact on everyone in the academic system, changing life situations, research and teaching structures, it also affected gender equality work within and between research institutions.
Our presentation displays how these effects unfolded in the Horizon 2020 project ACT and thus provide a starting point for discussions on future interorganisational exchange on gender equality in the research system. The ACT project aimed at overcoming struggles in implementing GEPs by promoting institutional change through the advancement of communities of practice (CoPs). ACT created a range of services and resources to support targeted CoPs and enabled the development of seven new, demand-driven CoPs with a total of 132 members from 26 countries in March 2020. The focus was on enabling effective sharing of experiences and lessons learnt from gender equality actions to support structural change in RPOs and RFOs throughout Europe.
In spring 2020, the CoPs were surprised by the COVID-19 pandemic. Our presentation aims to present the effects of the pandemic on the CoPs, which could be identified in the CoP evaluation. The evaluation is based on semi-structured interviews with CoP members (n=21) and CoP facilitators (n=7) from May to July 2020, as well as monitoring and progress reports

provided by the CoP facilitators. It became evident that the pandemic influenced the development and actions of the CoPs on three levels: First, the pandemic and related political measures affected the CoP member organisations, as well as the change agents as individuals. This was reflected in an increased individual workload and a change in the relevance of the issue of gender equality in some member organisations. Secondly, the CoPs had to re-plan their activities while transitioning to working online. Thirdly, the pandemic led to changes in the CoP communication and community due to the effects on the first and second level. Despite the difficulties, positive effects were also observed, such as the development of solidarity with other change agents through sharing at a more emotional level. Overall, the results display the challenges and opportunities that the CoPs faced during the pandemic and can also provide insight into the reactions and coping strategies by the CoP facilitation. The evaluation can thus provide a basis for the discussion how exchange on gender equality can or should be designed in the (post)pandemic future.

Out of sight out of mind ? Risks and opportunities of the virtual academy for gender equality

Anne-Sophie Godfroy
Ecole Normale Supérieure - PSL, France

The paper is based on my experience as a gender equality officer and professor at University Paris-Est Créteil and a researcher involved in European research. I will focus on three impacts of COVID connected with gender equality.

The first impact has been an increased workload for human resources and digital support services. Human resource services employ mostly women and IT services mostly men. IT services increased their capacity and benefited from investments to cope with the increased demand, while HR departments were overwhelmed with work without new resources. The HR staff, mostly young women, had to take time off for childcare and often did not benefit from comfortable places to work from home. This has resulted in a very high turnover of staff. The outcome is a significant delay in the implementation of action plans, gendered data collection, new recruitment processes, etc.

The second huge impact has been the degradation of students living conditions and the need to organize emergency support as well as new planning of lectures and exams. As female academics are more often in charge of students, they have been highly occupied by those new duties. As they cumulated academic care and domestic care, they had less time to dedicate to research than their male colleagues.

The third impact is on research in the making when all activities are moved online. The effects have been very differentiated: more blocking when collecting data and experimenting than when analyzing and writing, more blocking for experimental work than for theoretical research. Have female and male researchers been impacted the same way? This question is connected to the proportion of men and women in each field and subfield.

Research life has also been impacted by the end of face-to-face conferences, meetings, and teamwork. If face-to-face meetings resume slowly, some new habits will probably last as regular online meetings or the online preparation of calls for projects have proven efficient and very flexible due to the absence of financial and logistical constraints. We will explore the benefits and the dangers of such a transformation regarding gender equality, especially for early-career researchers who have not yet built a network of colleagues and been part of a workgroup.

There is a risk to find those who have fewer constraints attending on-site meetings and those who cannot overcome financial and personal constraints attending virtually, which is better than not participating at all. However, this situation may create two-speed participation and two categories of researchers, the visible and the invisible, those who can network and get funding and promotions, and the others who participate as second category spectators. It is easy to guess that there are likely to be more men in the first category and more women in the second.

We will finish with recommendations to make this transition an opportunity for gender equality and not a cause of backlash.

Networking Practices in a Virtual World and their Implications for Gender Equality in Science Careers

Andrea Wolffram
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Networking is part of scientific practice and has different dimensions with different quality for a scientific career. (van Helden et al. 2021) However, the pandemic has also inevitably changed the concrete practices of networking. Yet, what effects this has on scientific careers has hardly been studied so far. In the GenderNetz research project, the importance of networks for science careers in Science and Technology was investigated before the onset of the pandemic. One focus was on the composition of the networks, their returns, and the question of whether gender differences can be found here that account for different career outcomes. Empirical basis were 32 career biographical narrative interviews with postdocs and 31 expert interviews with professors as central gatekeepers for scientific careers, as well as

12 focus group interviews with gender and diversity officers and management representatives in Germany. The results were discussed in a series of workshops not only with postdocs, but also - based on the Change and Transfer Agents model of the European structural change project CHANGE - with the relevant stakeholders regarding their relevance for the implementation of specific gender equality measures. Due to the pandemic, however, these workshops were now conducted virtually.

In this paper, the results of the workshops will be presented and questioned in terms of their answers to the question of changing network practices in times of primarily virtually focused communication and exchange formats and their consequences for gender equality in science careers.

Literature:

Helden, Daphne L van, Laura den Dulk, Bram Steijn, and Meike W Vernooij. “Gender, Networks and Academic Leadership: A Systematic Review.” Educational Management Administration & Leadership, (August 2021). https://doi.org/10.1177/17411432211034172.

Projects.

GenderNetz – “Gender bias in women's career paths in engineering and information technology through informal support relationships and networks”, has received funding the German Federal Ministry of Education and Research within funding area "Strategies for the implementation of equal opportunities for women in education and research" under Grand Agreement no. FKZ 01FP1712, www.gendernetz.de

CHANGE – “CHAlleNging Gender (In)Equality in science and research”, received funding from the European Union's Horizon 2020 Research & Innovation Programme under Grant Agreement no. 787177, www.change-h2020.eu

Boosting the Careers of Underrepresented Researchers in Times of COVID: Challenges and Opportunities of Online Mentoring Programmes

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Times of crisis exacerbate gender-specific inequalities. This is also the case for the COVID-19 pandemic. Data shows that in academia, female researchers are currently more strongly hindered in their career progression (Witteman et al., 2021), because they already faced inequalities concerning their networks, citations, grants and tenures before the pandemic. Taking an intersectional approach focusing on age/career stage and gender, the

consequences for female early-stage researchers are not hard to guess (Holzinger et al., 2019).

In the context of the low percentage of female researchers in leadership positions and the prevalence of homogenous networks (in terms of gender, class background, and ethnicity), formal mentoring programmes are a powerful tool to even the odds. Online mentoring for women and other underrepresented groups in academia has proven to be a successful measure during the pandemic, because international networks are made possible even for researchers with care obligations, when care facilities and schools are closed, and when research trips pose health-risks. Another benefit of online mentoring is the low threshold and flexibility, as mentoring partnerships are stable and regular because they can be held independently.

In contrast to on-site mentoring, online mentoring is organised via a diversity of online tools (among others: emails, video calls, shared documents and collaborative tools like padlets or murals). This contributes to the digitalisation of career development. However, to create successful online mentoring programmes, those running the programmes need to take into account the specific setting of online meetings (compared to “offline” scenarios) and facilitate ongoing communication to check in with colleagues and peers (Grasenick/Guerrero, 2020).

Focusing on the lessons learned through developing and managing online mentoring formats, especially on its role in developing the careers of underrepresented groups, the presentation draws on three examples: One programme which has been implemented in an FET Flagship project of the European Commission (Human Brain Project), one which has been implemented in a European University Alliance (Arqus) and one at the Technical University of Graz. By analysing feedback by participants and personal insights from facilitating the programmes, the particularities of setting up and implementing online academic mentoring programmes during COVID-19 will be outlined.

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Witteman, Holly O./Haverfield, Jenna/Tannenbaum, Cara (2021): COVID-19 gender policy changes support female scientists and improve research quality. In: Proceedings of the National Academy of Sciences Feb 2021, 118 (6) e2023476118; DOI: https://doi.org/10.1073/pnas.2023476118

D.3: Rethinking digitalization technologies through feminist approaches

Session Chair: María López Belloso, Universidad de Deusto, Spain

A techno-feminist take on tele-rehabilitation

Anita Thaler
IFZ, Austria

Although cardiovascular rehabilitation (CR) is known to significantly reduce cardiovascular disease (CVD) mortality and re-hospitalization rates, and increases quality of life for all genders, women are less often referred to CR by physicians, which could be explained by multiple reasons, one of them unconscious sex and gender biases (Kentner & Grace, 2017). One CR approach, which has gained relevance during the covid pandemic, is to offer digitally supported rehabilitation, for instance by using a multifunctional data patch for monitoring of vital signs and movements, which sends data to a smartphone app.
This use case of cardiovascular disease and the motivation to close the gender gap in CR has been developed in the project VITAPATCH (2018-2021; funded by the Austrian FFG), but only because the project received funding for implementing a gender perspective in an interdisciplinary team. The FFG FEMtech research funding programme is an example of implementing a gender policy into practice by promoting gender equality in the research team as well as integration of gender as a cross-cutting issue in science and research itself.
This paper reflects the techno-feminist approach from raising awareness on the concept of "configuring the user as 'everybody' and the use of the 'I-methodology '" (Oudshoorn et al. 2004, p.30) to applying a participatory technology design approach, and discusses the various qualitative methods (workshops, expert interviews, reflexive team meetings, project log etc.) and its outcome.

Addressing "the Other" in Man vs. Machine Matches – Aspects of Gender in the Development of Software for Humanoid Soccer Robots

Tamara Gupper
Goethe University Frankfurt am Main, Germany

The idea of recreating humans in technology is not new, with stories of autonomous humanoid artefacts dating back thousands of years. Two of the better known examples come from Greek mythology and speak of Talos, a bronze statue brought to life by Hephaestus to patrol the

island of Crete and fight off intruders (Apollodorus 1921, 119), and Galatea, an ivory statue crafted and brought to life with a kiss by Pygmalion (Ovid 1916, 80–85).

While imaginaries of humanoid technology have changed since Ancient Greek times, one aspect is still strikingly similar: The strongly gendered characteristics these (fictional) artefacts are ascribed with. More contemporary hypermasculine portrayals of war robots, such as in the Terminator (Cameron 1984), show a clear parallel to the giant warrior Talos. Also sex and companion robots are not imagined so differently from Galatea, the beautiful statue warm to the touch who helps Pygmalion get over his frustration with women (see for example Søndergaard 2020, 26).

Taking imaginaries into account when investigating the production of technology such as robotics is crucial. Imaginaries have been shown to influence development processes, both because potential target groups have particular expectations of features to be implemented (see for example Maibaum et al. 2021), and because developers themselves make use of imaginaries in their work (see for example Richardson 2017).

One such imaginary is at the center of my ongoing research: A soccer game taking place in 2050, in which a robot soccer team will play – and ideally win – against the human world champion of that time. In line with other media-effective “man vs. machine” matches in the past decades, notably in chess and Go, there is an implicit understanding that it will not be the female – the Other (Butler 1999) – world champion playing, but the men’s team.

My research project focusses on the processes through which software is developed for humanoid robots. I carry out both ethnographic and autoethnographic research in a team of computer scientists who are part of a research initiative whose long term goal is to create a robot soccer team able to beat the human world champion in 2050. This is a particularly interesting field to investigate imaginaries around gender in the field of robotics, especially because soccer is connotated as a male and heteronormative sport in Europe and beyond (see for example Kaelberer 2019; Huddleston 2022). This paper will address the role of imaginaries around gender in the development of software for humanoid robots, highlighting how imaginaries are negotiated among computer scientists programming soccer robots, and how they influence the development of software for the robots.

Situational analysis as critical feminist method to analyse digital technologies: the case of HIV-treatment optimization tools

Renate Baumgartner

Eberhard Karls Universität Tübingen, Germany

HIV infections are still a relevant health issue. While treatment development and -effects have been challenging for a long time, there are now several success stories in the field. Firstly, with just a single-tablet-regime of antiretroviral drugs the viral load of the HI virus can be pushed to "undetectable", which means an HIV infection is no longer likely. Second, treatment optimization tools (TOS) to identify the most appropriate HIV therapy constitute one of the success stories within personalized medicine. This trend within medicine, resulted in the creation of many new networks between medicine, biology and computer science since the 2000s. The field of personalized medicine has furthermore managed to attract immense funding with the promise of personally tailored therapy. Since 2012, personalized medicine has been followed by a "new" hype surrounding applications of artificial intelligence, including the sub-areas of machine learning and deep learning, which has also reached medicine and healthcare.

The presentation will examine empirical material of a case study on treatment optimization tools for HIV (HIV-TOS) by the means of Adele Clarke's situational analysis (SitA). Grounded in feminist philosophy of science (e.g., Haraway's situated knowledge) this method can inform a feminist critique of power relations in the field. The current case study will show how the concepts of "social worlds" and "implicated actors" can be used to make actors visible in the field who are not organized in a social world and also in an unfavorable position of power. Various social worlds are involved in the treatment of HIV and in the development of the HIV-TOS: doctors, virologists, bioinformaticians, etc. The cooperation between different social worlds and their different expert knowledges turns out to be particularly important to select a suitable therapy together with the patient. Patients and the HI virus, in turn, were identified to be implicated actors. Further elaboration will be given to shared goals the social worlds formulate via the technology of the treatment optimization tool and the respective sub-goals of the social worlds. The analysis also shows how different social worlds divide implicated actors into different categories or types, which in the poststructuralist perspective of SitA can be regarded as discursive constructions.

Artificial Intelligence and Data: the contribution to the feminist transformation of Human Rights

María López Belloso, Borja Sanz
University of Deusto, Spain

"Women's rights are human rights". There is now a consensus on this statement (Bunch 1990; Clinton, 1995; Grewal, 1999; Gaer, 2009: 60; Nussbaum, 2016; Peters, 2018; Peters et al. 2018). Hilary Clinton uttered this famous phrase in Beijing in 1985. However, new technologies

and data science have evolved dizzying and have changed how we work or have fun through a "data revolution". However, what role do women play in this revolution? How does this "data revolution" affect women's rights?

Based on the feminist transformation of human rights proposed by Bunch in 1990, this article aims to determine what role data can play in a feminist change of human rights. Following her theory, first, we look at the violations of women's rights. We have identified two areas where these rights are threatened, but these technologies can challenge the human rights concept to make it "more responsive to women" (Bunch 1990: 496): health and security.

Thus, this paper is structured in four sections. First, we present a theoretical review of Bunch's proposal. Secondly, it describes the human rights violations identified both in health and security areas. The third section details what contribution can be made from artificial intelligence and data science to protect and improve women's rights. This paper ends by drawing main conclusions from the analysis and providing recommendations for a feminist transformation of data activisms from a human rights approach.

Integrating inclusivity in technologies – experiences from a practical perspective

Sybille Reidl, Sarah Beranek
Joanneum Research, Austria

Even though technologies are part of our life and often not optional anymore, inclusivity and a human-centred approach is not the default in technology development and there is still a lot to be learned on how to apply this to different contexts and technologies. Using two examples of two FEMtech research projects (VR4Care on the use of virtual reality in nursing homes and FEMCharge on the development of charging infrastructure for e-cars), we want to show that it is crucial to look at gender equality in an intersectional way when developing and using technologies.

In both research processes, we were able to identify relevant results for a further development of the technologies towards more inclusion by means of usability tests, focus groups and interviews with users (residents of old people's homes, care staff and relatives in one case, e-car owners in the other case) and intersectional analysis of the data obtained.

In these two FEMtech research projects, we experienced in the research process that while the focus on sex & gender was relevant, other diversity dimensions and/or their intersection quality often turned out to be the cause of gender differences. It was central for the outcome of these projects that other relevant diversity dimensions besides gender were taken into account and, these usually carried more weight than gender.

In our presentation, we will therefore reflect on the experiences with interdisciplinary and inclusive technology development against the background of current discussions on intersectionality and the reproduction of stereotypical ideas about gender, age and other personality traits in the context of technology. This shows, on the one hand, how stereotypical ideas can often be starting points for research questions and projects, but also, on the other hand, how these can be critically questioned and avoided/reduced through systematic reflection and intersectional theory and research approaches. A people-centred approach should therefore be an intersectional approach. However, as research practice shows, there are many challenges associated with this kind of research processes, which we would like to discuss/outline in conclusion during our presentation.

On the Integration of Artificial Intelligence into Artificial Reproduction: Feminist Perspectives on an Artificial Double

Kornilia Papanastasiou
National and Kapodistrian University of Athens, Greece

The paper considers the integration of Artificial Intelligence (AI) into Artificial Reproduction (Assisted Reproductive Technologies – ART) from feminist STS perspectives. This integration is exemplified in the configurations of AI technologies for embryo evaluation, embryo livability prediction, and artificial womb development, which are based on big data and algorithms that feed on them. From the late 1970s through the present, ART has been one of the most challenging fields of medicine, both technically and socially. Feminist scholars have given us insightful studies on ART, pointing to the accessibility of reproduction for new types of families, such as infertile couples, homosexual couples, one-parent families and old couples. A key issue has to do with the question of whether new assisted reproductive technologies support women's rights or reproduce patriarchy and the "tyranny" of reproduction, giving women the illusion of choice. Central here is the medicalization of women's bodies and the commodification of aspects of life like childbirth. My presentation will focus on how integrating AI into ART configurations privilege the invisible reproduction of biases, especially ones related to gender. My primary sources are articles in some of the most important international science journals (including Nature, Science, Scientific American) as well as medical publications, especially from the ART field. My interpretation of these articles relies on a symptomatic analysis of the discourses that define these articles.

D.4: Degrowth science, technology and innovation imaginaries

Session Chair: Ben Robra, University of Vigo, Spain

Innovation resistance - a key concept in post-growth innovation imaginaries

Helena Fornstedt
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When mainstream researchers study innovation, economic growth is often central (Godin 2019, p. 124; Godin, 2012) or an underlying justification for viewing firms as vehicles for positive social change (Fornstedt, 2021). Economic growth can be seen as a program of action (Latour 1999), a very large one that has also been referred to as a mega program encompassing actors across the globe. Much previous innovation research has been conducted from within the economic growth program (Fornstedt 2021). An innovation process actor aligned and compliant (Helgesson & Kjellberg, 2020) with the economic growth program follows the program's prescription, namely generating profit for a firm. It also has the identity ascribed by the program - a commercialized product or service. This view on innovation has brought a narrow perspective where many actors and programs are categorized as non-programmatic and locked out from the economic growth program (Galis & Lee, 2014) and, by extension, innovation research. The persistence to conduct innovation research against the backdrop of the capitalist system - with economic growth portrayed as societies ultimate goal - has led to an inability of the research to properly see and study the negative consequences of innovation processes (Gripenberg, et al., 2012), such as exploitation of labour (Walsh, 2021) and societies increasing ecological footprints (Díaz, et al., 2019; Carson, 1962). Soete (2019) has even argued that innovation studies are in an existential crisis due to its inability to see and deal with these negative consequences and suggest that STS research might be a way out of the crisis.

In mainstream innovation research, it has become increasingly apparent that some innovations are more desirable than others, and directionality has begun to attract more attention (e.g. Mazzucato, 2021). However, what is still underdeveloped and rarely mentioned is the need for decline (Vinck, 2017) and innovation resistance (Fornstedt, 2021; Thomas et al., 2012). These are phenomena that become increasingly important in a post-growth innovation imaginary. In a post-growth sociotechnical imaginary (Jasanoff & Kim, 2015) - such as, for instance, Raworth's (2017) doughnut economy - there is reason to distinguish between desired and less desired innovation processes. As Parrique (2019) argues, degrowth is neither generically for nor against innovation; instead, it sees the end of some forms of innovations as welcome (ex. biological weapons) and urgent need for other innovation processes (predominantly those addressing problems outside of the economy). Thus, the need for

innovation resistance is evident in the degrowth context. This paper aims to present innovation resistance as a key concept in the emerging post-growth innovation imaginary and illustrate how an STS approach can be useful in better understanding this phenomenon. It outlines innovation resistance - enacted by assemblages of human and non-human actors - as a potentially productive force that potentially contributes to avoiding wasting scarce resources - such as carbon budgets or raw materials - on innovation processes that supposedly do not lead to 'a good life for all within planetary boundaries.

Disability justice in the post-growth narrative: On feminist STS, violent techno-skepticism and cripping degrowth

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Conceptualisations of post-growth futures are expansive and heterogeneous. Fundamentally, the theory's rejection of current socio-economic structures that apotheosise growth cement it as a radical alternative to contemporary social structures that continuously enact violence onto disabled people. Central to many degrowth scholars' arguments is a prioritisation of social and environmental justice, as well as intersectional feminist thought. However, lacking consensus on the role of technology and science leads to the neglect of health and disability. There are significant atrocities associated with the current position of technology as a neocolonial, militarised and capitalist force. Nevertheless, the integration of an anti-capitalist, intersectional, crip, feminist, science and technology into degrowth must be a fundamental aspect of developing just social alternatives. Simultaneously, as a collective, degrowth scholars must now seek to critically examine the ableism within the techno-skepticism that has long held space within post-growth discourse. These scepticisms are particularly evident in the writing of Silja Samerski, a degrowth scholar heavily inspired by Ivan Illich, one of the key ideological forefathers of degrowth. Similarly, central figures within degrowth have not actively engaged with science and technology studies (STS) nor considered the implications of specific configurations of the post-growth society for disabled people.

Opening the text is an examination of the inherent consequences of separating degrowth and technology, using examples of scholars who have rejected, ignored, or misplaced the importance of STS. Following this is a reimagining of how technological advancement could manifest within post-growth, exercising narratives within crip theory and feminist STS that reject militarised, industrial, techno-capitalism. Instead, centring the experiences and knowledge of disabled people and prioritising crip expertise in world-dismantling and world-remaking. This discussion engages with examples of technology and science formulated by

disabled and allied people, that are currently being animated for radical purposes, such as crip technoscience, the digital commons, hacking, skill-sharing, and 3D printing. Emphasis is placed upon how these technologies are situated within degrowth scholarship, analysing any tensions that may arise between them and how these frictions can be addressed.

Challenging or Reproducing heteronormativity in indicator categorisation? Queering data for post-growth imaginaries.

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In dialogue with the increasing interest in queer perspectives on data (e.g. Guyan, 2022), this paper considers the unfolding discourse of alternative indicators of ecological, sustainable, and just political economies and imaginaries through a queer biopolitics. Based on an empirical discourse analysis of Degrowth, Wellbeing, and Doughnut Economics practices, texts, and other discursive resources, the analysis offers a first engagement between Degrowth studies, architectures of data collection and epistemic erasure practices, and queer theory. It seeks to critique reproductions of heteronormative orthodoxy while highlighting the possibilities of postgrowth imaginaries to learn from queer theory in the development of alternative modes of valuation.

Queer realities, expressions, subjectivities, and governmentalities vary significantly across time and space, and are often seen by neoliberal orders through discourses of commodification and promotional tourism. Indicators of traditionally-defined economic 'success' often reproduce essentialist categories of sexuality, gender, and ways of being. Categories are not neutral and objective reflections of social reality, but actively form the subjects of which they intent to purvey knowledge. Therefore, broad re-imaginings of habitable spaces, socio-natures, and value systems require an engagement with how such changes and logics foreclose or open up queer potentialities. In doing so, degrowth is conceptually enrichened and better engaged with historical and emerging frontiers of marginalisation and oppression, while queer theory opens a dialogue with a quickly expanding, heterogenous movement of radical imaginaries. It reflects inwardly on the question of who is (or can) degrowth be radical for? And what is the role of data, technology, and innovation in either foreclosing or opening up possibilities of (queer) being.

As a result, a queer degrowth synthesis – the beginning of a conversation - is better engaged with the empirical question of how the growth imperative has contributed to particular ways of seeing, spatialising, and ordering (knowledge of) queer communities, and how oppressive

relations and erasing practices can be transcended in radical imaginaries beyond capitalist-state biopoltics.

Autonomous zones: imaginaries in practice

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In pursuit of enhancing the degrowth discourse further, this conceptual paper aims to bring forth lessons from autonomous spaces, underlying theories and literatures. As sites of refusal and rejection of political and economic elites, as well as spaces of creation (Chatteron, 2005), autonomous zones are understood then to be active practices of a better today and tomorrow (Foran, 2003). At the same time, the degrowth discourse has paid much attention to situated praxis of ecovillages or community projects but not to the topic of autonomous spaces. By connecting these two fields, lessons from autonomous spaces that self-organise in post-capitalist, mutual aid and anti-extractivist ways will be highlighted with the aim to contribute new perspectives to degrowth as a situated practice. Through an integrative review, contributions from those fields will be drawn out and new insights offered in response to the rising question within the degrowth discourse of grassroots organising and state-agency, the individual vs the collective, land sovereignty, borders, and radical democracy. Differentiations between permanent and temporary autonomous zones are made, and their imaginaries and motivations explored. This creates the context of the main questions that focus on the role of innovation, here understood as organisational practices and knowledge-production processes. Whilst their crucial role in the on-going struggle for autonomy has been highlighted, e.g., by the Rojava Revolution (Dirik, 2021), little has been written about what actually constitutes knowledge in the context of autonomous spaces or what its processes are, such as formal and information education, ways of organising, or living together. For this, the author turns to literature of politics of knowledge, underpinned by theories such as social and queer ecologies (Bookchin, 2007; Heynen, 2018), critical pedagogy (Freire, 1970), and STS and performativity, that have been addressing such questions and create the literature gap of them in the context of autonomous zones. To challenge the dichotomies of individual/collective, human/nature, man/woman and how un-learning and new learning processes are taking place in autonomous spaces that lessons can be learnt from that will challenge and push degrowth imaginaries further.As the first step to a larger research project, this conceptual foundation of drawing together degrowth as a situated practice, autonomous spaces and knowledge processes, this working paper draws out important lessons on agency, praxis, (un)learning processes in pursuit of new imaginaries done in the now.

Unpicking megaproject imaginaries

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This paper explores ways to approach the infrastructural imaginaries (Jasanoff and Kim, 2015) manifest in large-scale infrastructure projects, from a degrowth perspective. Megaprojects are often defined in monetary terms (Flyvbjerg, 2014) and the calculative devices such as cost benefit analysis through which they are justified invariably rest upon assumptions of economic growth. As such they could be seen to represent the antithesis of the convivial infrastructures called for by many in the degrowth movement. Following calls for better engagement with questions of scale in the degrowth literature (Kallis and March, 2015) we argue that to dismiss mega-infrastructures as inherently problematic is unsatisfactory for a number of reasons. First, it appears to rest upon, flawed (Graeber and Wengrow, 2021), assumptions that democratic production and governance of infrastructure are only achievable at the small-scale. Second, it risks closing down the study of megaprojects as innovations towards sustainable transitions (Sovacool and Geels, 2021). As we discuss it also fails to engage effectively with a number of the paradoxes of infrastructure. For example, the way it creates unsustainable path dependencies whilst simultaneously underpinning much of what we consider socially just living standards. Living standards that are, as degrowthers point out, unevenly distributed around the globe. And, crucially, the fact that the physical manifestations of historic infrastructural and mega-infrastructural imaginaries provide the material basis of the modern world. Thus, it is through these that we can perceive and possibly act upon the existential threats degrowth makes us aware of.

We discuss the nature of the shift in the political economy of infrastructure degrowth calls for. Any shift from logics dictated by growth focused state and market actors towards the more reciprocal relationships (both with other humans and the natural world) that can be found in civil society must engage with the material reality of existing as well as planned mega-infrastructure. For the latter, this may entail contestation, demands for more responsible innovation and the bringing of different perspectives (both human and non-human) into project appraisal (Lehtonen, 2019). For the former, this encompasses an equally broad spectrum of activity from the insertion of commons management strategies into megaproject governance, through hacking and repurposing to ultimately the dismantling of infrastructures that are incompatible with attempts to live within planetary boundaries.

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From Creative Destruction to Innovation Systems based on Conviviality and Use-value: The Case for Commons-based Peer Production

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The idea that innovation and technological development must create future profits and essentially valorise capital has persisted since the beginning of the last century. Schumpeter already argued in the 1930s that technological change is one of the main drivers of capital accumulation. The process he termed ‘Creative Destruction’ was and is essentially underpinned by an almost religious faith in progress that crystalised into technological determinism and productivism. From a degrowth and postgrowth perspective that the fundamental purpose of innovation is to enable capital accumulation, economic growth, and continuous expansion of production is problematic. By questioning the basic assumptions of technological determinism (i.e. artefacts produces society), we show that ‘Creative Destruction’ emerged as a historical and situated ideology from a specific set of values and cultures that were the cradle of Western capitalism. Modern ideas of innovation stem for the needs of capitalism for valorisations. Capital valorisation imposes its logic on technology (hence innovation), definition of needs, consumption, and organisation of work. We show that the persisting mantra of ‘innovate or die’ and its underpinning values represent a hegemonic view on technology and innovation aligned with capitalist common senses. Innovation is therefore not only about progress in science and technology or the adoption and ‘diffusion’ of

new technologies, but about the creation and reproduction of a particular mode of production, a particular way of organising society and its economy. Our argument is that a counter-hegemonic view on the purpose of technology that instead emphasises conviviality and use-value is possible and needed for postgrowth. We highlight that the (re-)emerging mode of production commons-based peer production (CBPP) has the potential to align innovation and technology with such a counter-hegemonic view. The findings from several studied cases of CBPP organisations show that innovation underlined by counter-hegemonic values such as conviviality and care already exist in society, albeit in the cracks of the dominant system and its hegemonic view on innovation. Our findings further show that the cases innovating in this way are in constant danger of co-optation, highlighting the need for barriers to help a postgrowth way of innovating to flourish.

Stream E: Mobility: A Socio-Technical System on the Way to Sustainability?

E.1: Food Justice in Alternative Food Networks: theoretical, empirical and transdisciplinary perspectives

Session Chair: Sandra Karner, IFZ, Austria

Epistemic (in)justice in Latin American seed systems

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Seed systems refer to all processes that are part of the development, maintenance, production, storage, and diffusion of cultivars. In Latin America (as well as in most countries of the geopolitical south) this includes indigenous and peasant regimes that have been and still are responsible for a large percentage of food production. Despite their relevance in feeding their communities and far away cities, these non-hegemonic actors have been historically excluded from decision-making spaces. This is in part due to hegemonic actors' framings of these practices as a stubborn primitivist obstacle towards modernization. These issues relate to epistemic justice (i.e., who is considered a knower in the system) and point to an epistemic injustice which has led to the erosion of traditional ecological knowledge (TEK) and its futural possibilities.

Over the last 20 years, non-hegemonic actors have organised in 'seed guardian networks' (SGN's) - decentralised, place-based, trans-local coalitions of actors committed to safeguarding landrace, native and creole seeds, and their associated practices of care: Seed production, storage, improvement, exchange, and trade aligned with Afro-Indo-peasant, organic agriculture and agroecological narratives-practices. SGN's have effectively created an innovative 'niche space' that has become influential at national and regional levels. This has led to the inclusion of these actors in key decision-making spaces, advancing practice-based transformations, especially through their participation in policymaking. Recent developments in Colombia, Ecuador, and Venezuela show signs of an increased interest in recognising TEK and creating novel legal frameworks and institutions to include and stimulate it.

Colombia is currently co-creating an emerging national seed system that purposefully includes indigenous actors and SGN's, after more than a decade of tensions due to the signing of international Trade Partnership Agreements and a resulting encroachment of neoliberal

policies. In 2017, Ecuador developed a new seed law that recognises and encourages TEK practices; this overlaps with a novel intellectual property rights system that allows communities to claim ownership of, and protect their knowledge/products; both instances are geared towards the attainment of 'Buen Vivir' instead of 'Development'. Finally, Venezuela approved in 2015 what may be the most comprehensive seed law in the region. Informed by a top-down eco-socialist framing, the law recognises and validates two seed systems (Industrial and AfroIndopeasant), acknowledges place-based community knowledge-holders (maestres-pueblo), and ordains the creation of a 'scientific-peasant alliance' to promote horizontal knowledge exchanges.

Though each process is different and implementation of the laws is usually disappointing, these cases point to the emergence of epistemic justice in Latin American seed systems. Furthermore, the renewed recognition of TEK and its value, may signal a move towards transmodern transitions to sustainability. Transformation processes that move from separate epistemological regimes with a massive power differential (born of Coloniality), unto a "mosaic epistemology" where difference is recognised and allowed to co-exist, and moving towards a "solidarity epistemology" where horizontal dialogue is promoted while empowering those historically marginalised.

Repossession through Community Participation: Community Seed Banks in Odisha

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Almost two decades since India's tryst with genetically modified (GM) crops and its agricultural prospects and otherwise are inseparably associated with advancements in the area of biotechnology. In this context, this paper examines the adoption of and the implications therewith in the "agri-biotech model" of large-scale commercial farming of GM crops, which requires rearticulating of conflicting perspectives, mandates and practices of various stakeholders, viz. the State, market and farming communities. Through a case study of community seed banks in Odisha, an eastern state of India, we analyse the ways in which community participation, farmers' and breeders' rights are mangled – the dialectic of resistance and accommodation in the context of the ever-increasing influence of the agri-biotech corporates on domestic agriculture policies. In-depth personal interviews with various stakeholders, viz. the plant breeders, seeds rights activists, environmentalists, ecologists, civil society organizations, and farmers have helped us understand the dynamics of varied interests, meanings, norms and values associated with ownership and control over seeds. The purpose is to simulate a debate of viewing seeds as "biosocial commons" and examining

the practices through which farming communities in Rayagada district of Odisha are resisting the corporate appropriation of seeds and attempting to reclaim these “commons” through acts of repossession to establish their autonomy. Such practices from below must be foregrounded within the larger context of their significance to furthering economic and social justice in one of the most marginalized districts in India. This paper posits the community seed banks that have fostered an effective legal and policy environment in the context of the transatlantic agri-biotech divide, on the one hand, and India’s compliance with the international patent regime, on the other.

Self-Produced Food: Value and Significance in Alternative Food Systems — And a case studies the survey of "self-produced food" in China and Europe

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Since the beginning of the industrial society, science and technology have fully intervened and penetrated into human production and life. Starting from the 1930s, a series of environmental pollution events have occurred successively, such as the Maas Valley event (1930, Belgium), the Los Angeles photochemical smog event (1940s), the London smog event (1952), the Yokkaichi Asthma Incident (1961, Japan), the Minamata Disease Incident (1935-1956, Japan), the Osteopathic Disease Incident (1955-1972, Japan), the Rice Bran Oil Incident (1968, Japan). These regrettable events aroused a sense of crisis in the public life, leading to a large-scale "environmental justice" movements which broke out in the West. But, these have not changed mankind’s path of development or the madness of technology. Greediness for continuous development has become our "perpetual motion machine". But what is the goal of development, what is the limit of development, and what do we want from development? The human race remain quite confused.

Against this backdrop, the climate change and the decrease of biodiversity are accelerating. The novel coronavirus, as a microorganism that can only be seen with a 1,000-fold electron microscope, has paralyzed the world for more than two years since 2020. On the one hand, it shows that the situation as fragile of science and technology to human society, and also exposes the weaknesses of the mankind’s development model; on the other hand, it forces human beings to show sincerity to change one’s own behavior. "The people take food as the sky" is the natural law, and ultimately the mankind depend on the gifts of nature to survive.

The history of human evolution shows that natural and social relationships have always been closely linked.

The question we pondered include the following: How has technology affected society by participating in the practice of "food justice"? How does "food justice" expand its connotation and meaning? Where is the moral binding force of man in the co-evolution of technology and food? Does humanity need to look back at the pre-industrial societies? We try to use the data analysis of the "self-produced food" survey in China and Europe as a case to demonstrate how people shift from the material level to the spiritual level, to construct the value system of culture and civilization for people and society, and to offer a reference scheme for human beings to return back to a natural lifestyle. These are the research purposes of this article.

Probing the concept of Sufficiency through studying Meat and Milk in China

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About one-fifth of the world's greenhouse gas emissions come from agriculture. Much of this relates to livestock used for animal-based foods. Rather than arguing for increased efficiency, this paper probes the concept of sufficiency to explore its potential for reducing human impacts on Earth's biosphere while preserving overall welfare, i.e., its potential for defining a 'middle way' between 'too little' and 'too much'. To do this, the paper looks at the cases of meat and milk in China. While meat was always a high-status product, milk was historically considered a 'barbarian' food, and most Chinese were intolerant to it. Both products were scarcely consumed in Chinese history but have boomed in popularity over the past 40 years. While often thought about as a change of consumer preferences, it has taken a concerted effort by the Chinese government and domestic and international actors to make both products integral to Chinese food practices.

Seeing China as a strategic research site to ask questions about the supply and demand of animal foods, I hypothesise that what has made meat and milk integral to Chinese food practices might also be 'otherwise', i.e., opening up a possibility for a future disembedding of meat and milk from food practices. Thus, using a constructivist inspired lens, the paper makes use of practice theory and 'systems of provision' to study the normalisation of animal foods in China, particularly since 1978, with China's 'opening up'. The ultimate objective of this paper is conceptual: to probe the concept of sufficiency as a useful organising principle to achieve reduced consumption – highlighted through an understanding how meat and milk have been rendered desirable in China.

Persona Based Regional Market Baskets - CITY.FOOD.BASKET

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More and more people live in cities, which are increasingly confronted with challenges such as climate change, resource scarcity and environmental pollution. [1] Hence, there has been a growing interest in analysing and designing the city as a nutritional space in terms of a circular economy in recent years. [2, 3, 4] Topics such as food security, sustainable agriculture and the bio-economy are already integrated in the Sustainable Development Goals (SDGs) of the United Nations. [5] A key objective of various efforts such as the Milan Agreement is to provide urban areas with a sustainable supply of healthy and regional food to make them more resilient. [6, 7]

To address these current and future challenges in the city as a nutritional space, the CITY.FOOD.BASKET project aims to promote regional baskets of goods as a measure to increase sustainable regional food consumption in cities such as Graz and Vienna. The project is funded by the Energy Transition 2050 program of Klima- & Energiefonds Austria. It is based on preliminary work of the Smart Food Grid Graz project [8], in which the "regional market basket" was defined as a strategic measure. On the basis of personas, regional market baskets are defined for different consumer groups and created with partners from the practice. In doing so, market baskets are implemented that correspond to the real habits of these groups. During the development process, the cycles of the urban food system from the producer to the consumer are taken into account and socially and economically evaluated. A comprehensive environmental assessment of the different products in the market baskets and their underlying production systems by means of life cycle analysis (LCA) will enable the environmental improvement of internal production and logistics systems and show consumers the various environmental effects of their food. In addition, the inclusion of actors in the project is supported by two strategic instruments, a project advisory board from practice, research, politics and media, and a citizens' advisory board.

The targeted results are an environmental, social, and economic evaluation of the market baskets, as well as an application of the defined market baskets by practitioners. The aim is to raise awareness upon the food chain and to increase an environmentally friendly and health-conscious production and consumption. Hence, the project is designed to include various food stakeholders into the research process to strengthen the link to a sustainable regional production, to increase the supply and demand of regional products by testing the baskets in the field, and to increase the innovation potential for the provision of affordable and

healthy food. The results will be shared with various consumer groups in Graz and Vienna, including two schools via the partner project "Food Stories".

‘Good Food’ for deprived urban neighbourhoods: how to establish inclusive short food supply?

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‘Good Food’ for deprived urban neighbourhoods: how to establish inclusive short food supply?
The neighbourhood environment may play an important role in (in)access to various forms of food provision systems. As previous research has revealed, alternative food networks are often exclusive in terms of accessibility due to their organisational structures as well as to affordability in terms of pricing. As a consequence, neighbourhoods with a high proportion of socio-economically disadvantaged inhabitants lack opportunities for alternatives beyond the conventional forms of food supply. This phenomenon can be observed particularly in city regions, where places of consumption and production are typically de-localised.
Against this background, we investigate within a currently ongoing case study possibilities of how to improve the food environment in the Triester neighbourhood in the City of Graz, which is characterised by a high share of socio-economically disadvantaged residents, many of them with migrant backgrounds. While in other areas of Graz an increase in short food supply initiatives is taking place, this neighbourhood is even threatened to lose on the long run its farmers’ market, which is currently operated twice a week. On the one hand the market does not attract the ‘average residents’ (anymore), on the other hand farmers’ interest to further operate the market is decreasing. In order to develop suggestions for how to improve the food supply in that area in regard to accessible, affordable, fresh and regional supply, we investigated both, inhabitants’ as well as food suppliers’ needs and expectations. Our results confirm the anticipated conflicts in interest of actors in regard to structural and organisational aspects as well as in pricing. This will need to be considered and aligned in the scope of a strategy for the further development of short food supply in that neighbourhood, which we will conclude with in our paper.

Opening the societal dialogue on the valuation of sustainability services in agriculture – experiences from a transdisciplinary project in Freiburg, Germany

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Society wants agriculture to be more sustainable: surveys show that the majority of Germans would be willing to pay a higher price for their food in return for services to the environment and animal welfare (BMEL, 2020). At the end of 2020, the EU Conference of Agriculture Ministers decided to integrate more performance-based payments into the CAP (Common Agricultural Policy) (EU Council, 2020). If every taxpayer in the EU was able to decide how to allocate these payments, they would each have 114€ to distribute (NABU, 2018). This led to the question: How would citizens allocate these 114€ in their region?

The transdisciplinary project Forming Values in Dialogue has developed a method and tool for initiating a continuous dialogue between agriculture and society. The alternative food network Regional Value Citizen Shareholder Company ("Regionalwert AG") Freiburg worked together with Agronauten e.V., the Local Food Council and the Organic Model Region in Freiburg and engaged nearly 600 citizens. The case study covered the city of Freiburg and two neighboring rural counties. The aim of this project was to find out how the citizens' priorities would impact the financial rewards that farmers receive for sustainable practices and contributions to the common good. The regional value performance calculation ("Regionalwert-Leistungsrechnung") with its ten categories across dimensions of ecology, society, and the regional economy serves as a thematic and technical basis for the dialogue as well as value-setting.

The participatory process of the valuation consists of three parts: a series of workshops and online seminars, an online survey, followed by dialogue events. Almost 200 citizens participated in workshops and online seminars where, before answering the survey, an explanatory video was shown, aimed at engaging people with little prior knowledge or connection to agriculture. Half of the workshop participants were under the age of 20. In the online survey, a total of 537 citizens participated. Representativeness from the city of Freiburg and rural counties was balanced. 367 citizens provided socio-demographic data and detailed information on how they would prioritize and valuate sustainable agricultural practices.

The participants' overall message is clear: sustainable practices in agriculture, especially in the dimension ecology should be financially rewarded. 75% of participants responded that CAP payments should be much more closely aligned with sustainability. The results show that citizens are able to allocate funding for sustainable agriculture differentially. Neither age, education nor place of residence played a prominent role. While the average participant allocated at least a portion of the 114€ to each category, the ecological dimension received the most funding, with "Climate & Water" receiving the highest value (17.21€) of all ten categories.

The Freiburg case study serves as a pilot: the method and its tools can be adapted to other geographical areas. The next goal is to develop scenarios for an actual remuneration of sustainable agricultural practices that reflect the value-based dialogue between regional citizens and farmers.

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Edible city initiatives initiating, implementing and accelerating social cohesion and community building? The case of Dresden - City of the Future

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Food systems are one of the main vehicles when it comes to sustainability transitions. All over the world a wide range of people and initiatives engage for a more ecological sustainable agriculture, healthier food, better working conditions in this sector, and ensuring food security and justice. Stakeholders range from local community garden groups to regional initiatives for community-supported agriculture to global networks for food sovereignty. Based on their activities, various strategies, experiments and action plans are in progress to make food systems more sustainable.

One approach that has received increasing attention in recent years in terms of possibly contributing to sustainable food production in an urban context is the concept of edible cities. Edible city initiatives can be considered as alternative food networks (AFN) that provide an innovative nature-based solution by offering (free) food for urban residents in public spaces. Like other AFNs they often address multiple sustainability challenges, trying to tackle not only the ecological but often also the social dimension of it. The equal social integration of a wide variety of population groups and in particular the empowerment of marginalized groups is often – at least implicitly – a desired goal.

The transdisciplinary research project “Dresden - City of the Future: Empowering Citizens, Transforming Cities!” offered the possibility of studying two of such edible city initiatives over a time-span of three years in Dresden (Germany). Thereby the focus of the analyses was on identifying and evaluating drivers and constraints for implementing these citizen-based projects and its impacts. Based on sustainability science literature dealing with transformative capacities, a conceptual assessment framework was developed to systematically capture the key action areas in which those edible city initiatives initiate, implement and accelerate the AFN. Evaluation methods to fill in the framework have been observations, standardized citizen surveys, expert interviews and document analysis. The research shows that the key action areas of the edible city initiatives have been cooperative area activation and citizen participation. While activating stakeholders, spreading project information making benefits of edible cities and its participation visible, and providing practical educational support have been at the core of the citizen participation activities, also the empowerment of citizens and fostering social cohesion and community building played a major part in this context. The data thereby reveal different drivers and inhibitors that influence social inclusion and empowerment processes. It can be shown that empowerment processes on the level of the initiatives are negatively impacted by the (1) scarcity of resources and (2) the concentration of power and skills while a positive influence can been seen by (3) transparency and (4) clear task and work structures. Furthermore, the (5) activities of other AFN and the (6) openness and receptiveness of administrative units play a major role. Zooming into the field of social cohesion and community building, the data indicate that (7) the composition of the project team, their skills, language, and own examination with experiences of marginalization play a similar significant role like (8) the acquisition of cooperation partners.

Food hubs as sites for food system transformation: Between entrepreneurial experimentation and community support

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As enterprises that build alternative local food supply chains, Food Hubs are in increasingly seen as key entities to help create more resilient and regenerative food systems. As opposed to conventional forms of food production and distribution through large-scale farms, manufacturing and retail, Food Hubs commonly operate by aggregating and supplying small-scale produced, local food. As such, they shorten supply chains and demonstrate a significant commitment to place. Sitting between people who grow food, commercial customers and consumers, they commonly claim a strong community focus and often operate within explicit

ethical aspirations for the local community. Ethical principles that Food Hubs adhere to depend on their origin and the resources available and range from supporting small-scale growers' and enterprises' financial security and access to markets, to tackling poor diets and inequitable food, to distributing food for charitable purposes. Holding a place-based approach to "communities", a Food Hub might be variously known for its provision of high quality and artisanal food, or as an alternative to food banks. Thus, while Food Hubs have the capacity to fill a gap in the local food infrastructure and diversify and regenerate neighbourhoods and towns, they might in some cases also inadvertently reinforce socio-economic challenges. This presentation explores the complex and dynamic relationships between social and business aims and "community impact", using the examples of case studies of Food Hubs from across Yorkshire, a socio-economically and demographically diverse county in the North of England.

Rural queer (dis)empowerment in community-supported agriculture

Guilherme Raj, Giuseppe Feola
Utrecht University

This paper examines if and how community-supported agriculture initiatives (CSA) (dis)empower rural queer dwellers involved in agri-food systems. One Portuguese CSA led by rural queer and non-queer dwellers serves as a case study. The CSA is located in the rural Alentejo, South of Portugal, where a conservative, traditional culture contrasts with progressive values embodied by a growing neo-rural population and reveals implicit heteropatriarchal discrimination at the foundations of local agri-food systems. Data is collected through semi-structured interviews and a focus group with CSA participants and analysed through Open Coding, followed by Focused Coding. This paper contributes to rural queer studies that have overlooked rural queer engagement in grassroots collective action.

Research on rural queer sociology, predominant in the United States, suggests that rural queer farmers (both those who own land or work at someone else's land) often engage with ecologically sound and socially just modes of agriculture and are viewed as critical change agents to foster just agri-food sustainability transitions. However, heteropatriarchal discrimination deeply ingrained in agri-food systems undermines their agency. Rural queer farmers who do not comply with gendered stereotypes or sexual relationships inscribed in the "family farm" institution struggle to have legal and financial access to farmland, access and control human and technical farming resources and secure commercial operations in the long term. Conversely, rural queer farmers employ strategies to anticipate and avoid discrimination, such as selectively revealing their sexual orientation or gender identity only to people identified as necessary, beneficial or trustworthy.

Yet, it remains unclear whether and how the participation of queer farmers in agri-food collectives impact their agency. Exploring queer farmers' engagements in collective action can cast new light into processes of collective awareness-raising of, and resistance to, social-cultural, political and economic heteropatriarchal discrimination. Additionally, the rural queer sociology literature has primarily focused on the lives and experiences of queer farmers while obscuring the experiences of other rural queer agri-food actors (e.g. whole-sellers, transporters, consumers). A well-known agri-food initiative that connects different agri-food actors and has yet not been investigated through the queer lens is community-supported agriculture (CSA).

We employ Allen's (2021) framework on feminist approaches to empowerment that distinguishes between five types: power-from-within, power over one-self, power with, power feminism, and power to pursue one's own flourishing. This variety of empowerment manifestations enables the analysis of diverse, contradictory and complementary power dynamics that can constitute a comprehensive understanding of rural queer (dis)empowerment through CSAs. This analysis of the experiences of rural queer dwellers in the selected CSA offers insights into structural and everyday barriers and opportunities for just agri-food sustainability transitions in practice.

E.2: Incumbent enterprises and sustainability transitions in energy, mobility and food systems

Session Chair: Gregor Kungl, University of Stuttgart, Germany

A Quest for Decarbonisation: How Fogeys Face the Future

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To limit global average temperature increase to 1.5°C above pre-industrial levels, as agreed in the 2015 Paris Climate Agreement, emissions-heavy industries are faced with the challenge of rapid decarbonisation. These low-carbon transitions, the goal-oriented reconfiguration of prevailing systems that fulfil our societal needs, like mobility or energy, will require an interplay of changes in existing technologies, their related infrastructure, as well as in business models, user practices, and policy (Elzen et al., 2004; Geels, 2004). Evidence from unfolding low-carbon transitions indicates that a broad variety of change mechanisms may contribute to, and accelerate, system reconfiguration including various patterns of coevolutionary interactions

between the dominant incumbent actors and new entrants (Geels, 2018), interactions between multiple niche innovations (McMeekin et al. 2019), different technologies (Andersen & Markard 2020), and the involvement of actors from parallel systems (Rosenbloom, 2019; Papachristos et al., 2013).

However, much of the previous research on socio-technical transitions, originating from the analysis of historical, emergent transitions, is focused on the disruptive dynamics of a single innovation in a single system, presenting a view where innovative entrants introduce change to overthrow solidified incumbents (Rosenbloom, 2020, Papachristos et al., 2013; Geels, 2018). While some studies have shown that some incumbents can turn themselves to low-carbon alternatives (Kungl & Geels, 2018) and can play a part in shaping industry transformations (Apajalahti et al., 2018), yet much of the existing literature characterizes regimes as coherent configuration, rather than individual enterprises with divergent circumstances and orientations (Markard et al. 2012; van Mossel et al., 2018; Mori, 2021). It is argued that this disregard for the heterogeneous multi-actor nature of regimes has led to a gap in the extant body of knowledge on how the interactions of incumbent enterprises may contribute to the coevolutionary alignment processes of a low-carbon transition.

To fill this gap, a multi-method research design is employed to capture the interaction patterns of incumbent enterprises and innovative entrants within and across different socio-technical systems. For the framework, we combine earlier contributions from the transition field on actors' roles, constellations, and strategies (Farla et al., 2012; Witmayer et al., 2017; de Haan & Rotmans, 2018) with recent insights of coevolutionary theorizing from management studies (Abatecola et al., 2020; Breslin et al., 2021). This framework is applied on empirical findings from the unfolding low-carbon transition in the Swedish transport sector, identifying distinctive interaction modes of the incumbents.

The study has value for theory and research practice. Foremost, it contributes by novel theorizing on the various modes of interactions of incumbents, and with innovative entrants, during a transition. Particularly the interactions of multiple innovations across parallel socio-technical systems are not well recorded in transition literature. This is done through a comprehensive analysis of enterprise interactions in the transport and energy sectors, and of interactions between incumbent enterprises and innovative entrants, revolving around for instance electrified heavy trucks, electric road systems, smart grids, battery storage solutions, and smart traffic innovations.

How do incumbent manufacturers respond to the pressures of the energy transition? - The case of the energy equipment manufacturing industry in China

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Recent energy transitions research has shown that incumbents may reorient themselves towards innovation and new business models, reorganize themselves to diversify their activities, in addition to stay inert and resist and lobbying to move back. Most of these researches explore enabling factors, barriers, and contexts that incumbents change responses to external pressures and niche development, taking cases of energy providers that are featured by technological, infrastructural, institutional, and behavioral lock-ins. However, they have paid scant attention to energy equipment manufacturers despite that they are key elements of technological complementarities in energy supply system.

Against this backdrop, we explore responses of incumbent energy equipment manufacturers, and drivers and contexts that they change their stances toward reorientation and diversification. For this purpose, we first conduct a literature review on the responses and drivers of incumbents, and those of manufacturers to develop an encompassing analytical framework. We then apply this framework to China's major incumbent energy equipment manufacturers to conduct an empirical case study. We employ an integrated analysis of business strategy and financial performances of individual incumbents as an analytical methodology.

Our findings are summarized as follows. First, incumbent energy equipment manufacturers can reorient their business models away from fossil-fuel technology manufacturing toward new renewable energy manufacturing and service supplier, in addition to diversify coal power business geographically. Second, the government ambitious wind and solar targets, and the development of long-distance, ultra-high-voltage transmission lines have created domestic market for ocean wind and solar thermal, in which dedicated renewable energy manufacturers have not yet acquired sufficient technological capability to join, thus incumbent energy equipment manufactures can compete. Third, coalition with domestic electricity generators and favorable asset positions enable them to acquire and form coalition with international niche innovators of ocean wind and solar thermal technologies, while the Belt-and-Road Initiative pushes them to proliferate coal power business through geographical diversification. This enables incumbent energy equipment manufactures to reorient their business model without dividing their business to compete with dedicated renewable energy manufacturers unlike Western countries such as Siemens, GE and Hitachi. Finally, internal drivers such as asset positions, experience and history of international business and diversification, and formal and informal relations with electricity generators engender different responses among the Chinese energy equipment manufactures.

This paper has three main contributions. First, it builds an analytical framework that explains incumbent manufacturers' heterogeneous responses. Second, it adds some empirical novelty

to drivers that incumbent manufacturers change their stances toward reorientation and diversification, and thus advance sustainable energy transitions. Third, it demonstrates Chinese specific contexts that enable incumbent manufacturers to proliferate, and make them drivers for sustainable energy transitions.

Strategizing under uncertainty - explaining truck manufacturers different approaches in the transition to zero-emission vehicles

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The transportation sector needs to drastically and quickly cut its emissions to reach global CO_2 emission reduction goals and zero-emission vehicles (ZEVs) have been developed as one solution. Currently, however, many different types of ZEV, such as battery-electric vehicles (BEV), hydrogen fuel-cell vehicles (FCEV) or gas vehicles (CNG/LNG/PtX), and their respective infrastructures are available. Especially in the truck sector, which is understudied but makes up more than 20 % of global CO_2 emissions from transport, no clear technology pathway to transition away from the dominant diesel trucks has crystalized yet. Vehicle manufacturers favour and lobby for different (combinations of) technologies and it remains a research gap why this is the case under which circumstances theses strategies can change. Since all manufacturers have the same intention of maintaining and extending their market power, the reasons for these different strategies can be expected to be of a non-market nature. This research project hence follows a socio-technical perspective, as utilized by innovation research in sustainability transitions, and integrates concepts from non-market strategy research. Sustainability transitions literature has dealt with both multi-technology interactions [1-3], and different determinants and outcomes of corporate activities, such as expectations [5], innovation strategies, and political influence [4]. This paper combines these theoretical strands to answer the following research question:

In how far can (institutional) expectations and dynamic capabilities explain the differences between truck manufacturers‘ alternative technology strategies and corporate political activities?

Researching corporate strategies requires expert knowledge and organizational insights, which are difficult to obtain face-to-face. In a multi-method design, interviews are therefore supplemented with a document analysis. Media coverage and corporate publications such as annual reports, are analysed to gather information on model releases, strategic statements, collaboration efforts and other significant events. Germany is chosen as the focal research case due to its prominent role as an automotive country. 2018-2021 is set as a time frame to

capture strategies before and after the first EU CO_2 emission standards for heavy-duty vehicles of 2019. Ten interviews with key managers of major truck manufacturers have been conducted to date and are currently being coded. As an extension of the research agenda put forward by Wesseling et al. (2015) [4], the analysis will provide further insights into "why incumbents change their strategies" (p.103) and why these strategies differ between between automotive incumbents in a multi-technology transition phase.

[1] Andersen & Markard (2020). Multi-technology interaction in socio-technical transitions: How recent dynamics in HVDC technology can inform transition theories.

[2] Dijk (2014). A socio-technical perspective on the electrification of the automobile: niche and regime interaction.

[3] Sandén & Hillman (2011). A framework for analysis of multi-mode interaction among technologies with examples from the history of alternative transport fuels in Sweden.

[4] Wesseling, Farla, & Hekkert (2015). Exploring car manufacturers' responses to technology-forcing regulation: The case of California's ZEV mandate.

[5] Budde, Alkemade, & Weber (2012). Expectations as a key to understanding actor strategies in the field of fuel cell and hydrogen vehicles.

Incumbents in the Sustainability Transitions: The case of Equinor (Statoil)

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The research on incumbents in the sustainability transitions, though rapidly growing, is still in early stages. This paper contributes to this emerging field and investigates incumbents' interaction dynamics with the sustainability transitions. Specifically, it addresses the proactive role that incumbents can play to drive the change. Focusing on the energy sector, this research investigates Equinor's (Statoil) pathway to adapt and adopt the change. It builds on the socio-technical transitions literature and employs the multi-level perspective as an analytical framework to examine Equinor's socio-technical regime, landscape context, and competing niche innovations and technologies. A case study of process tracing is used to explore the changes and causal mechanisms that underline Equinor's interaction with the sustainability transitions over periods of times. The research draws on both primary and secondary data sources including interviews with company representatives and industry actors in addition to desk-based analysis of the company's publications and news. The outcome of this research will add to the understanding of how incumbents engage in the sustainability transitions and how they can play a proactive role to accelerate the change.

Incumbent lobbying for transition

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What role do incumbents play as stakeholders in policymaking that is aimed at accelerating the energy transition? The Dutch national Climate Agreement of 2019 sets out the transition strategy towards 2030 and 2050 for business and industries in the Netherlands across five major sectors (Industry, Electricity, Mobility, Agriculture and Buildings). The process through which this Agreement has come about is characterised by intensive stakeholder involvement: both representatives of companies (such as Shell and Akzo Nobel) and NGOs like Greenpeace were closely involved in a 1,5-year consultation and negotiation trajectory. In this presentation, I discuss what this involvement of incumbents entailed, what their lobbying activities looked like, and how this shaped, or at least influenced, the national Climate Agreement.

The reason for involving stakeholders in the (or any) decision and policymaking process, is first and foremost their knowledge of both the technical but also economic possibilities and constraints of their specific sector. By giving incumbents a seat at the discussion table, policymakers – who tend to lack such technical knowledge – may thus be able to develop policy that aligns well with the reality of the business or industrial sectors. At the same time, however, these stakeholders have their own business interests that might not align with the policy goals, in this case the acceleration of the energy transition and achieving the Paris Agreement goals. Giving stakeholders a prominent seat at the table also enables them to defend their own interests – possibly by presenting the one or other technical solution as more attainable.

What we know is which stakeholders have been involved in the Climate Agreement negotiations, and we also know the outcome of the process – namely the Dutch Climate Agreement. What we do not know yet, is what happened at these tables: what discussions have taken place at the table, which topics could (not) be addressed, on the basis of which considerations were particular policy options accepted or denied? In other words, whose interests have been served by the Climate Agreement and whose have not?

Presenting the findings of a one-year qualitative study of this rather explicit case of stakeholder involvement, the focus will lie on the dynamics between incumbents, NGOs, labour unions and SME actors. Central themes will be the power dynamics among different types of stakeholders and between stakeholders and policymakers, the way in which the pre-formulated topics to negotiate were mostly the incumbents' cups of tea, and how there was hardly any room to address other relevant topics and technical options outside the pre-formulated scope of the negotiations. It will thus show how the set-up of the negotiation

process significantly, and possibly intentionally, favoured incumbent interests, and how other stakeholders had rather limited clout in the negotiations.
One overarching conclusion of this study of the Dutch National Climate Agreement, is that while overwhelming business engagement in these talks suggests a willingness of incumbents to change, the conditions for achieving an agreement are not necessarily the conditions that also make incumbents agree to fundamentally change.

Controllable vs. Contested Futures: A Comparative Study among Swiss Energy and Food Incumbents

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Incumbents in the energy and the food sector share many similarities. Both are part of long-lasting socio-techncial regimes with often highly specific and regulated national characteristics that are at the same time increasingly influenced by global trends and technological developments. While sustainability transitions create opportunities and challenges for both actor groups, we find that incumbents in the food sector consider a broader range of possible futures than incumbents in the energy sector.
We conducted two separate interview series with representatives from the Swiss energy and the food sector with a focus on their respective future-orientation. In the interviews with representatives from electric utilities, we found that energy scenarios play a key role for internal decision-making processes. While some of the larger utilities have modelling departments to develop their own energy scenarios, utilities generally also refer to externally developed energy scenarios. We observe that the selection and interpretation of particular energy scenarios is highly dependent on their alignment with corporate strategy and the representative's personal expectation towards the energy future. In contrast to their historical significance and methodological origins, energy scenarios are thus not used as explorative tools that consider multiple possible futures, but act as ex-post legitimators for strategic decisions. Among utility representatives, the belief is that together with other industry players, the future development of the sector can be shaped collectively.
In the interviews with representatives from the food sector, we find that incumbents expect sustainability transitions to bring a variety of changes that are hard to predict and that cannot be entirely controlled by the actor constellations and power distribution of the current regime. In particular, incumbents in the food sector perceive much more pressure to link landscape-level shifts with consumer interests. For example, we find that incumbents interact with start-ups even if these pursue business models that are potentially disruptive to the industry.

The uneven acceptability of futures that are radically different form the status quo between energy and food incumbents has implications for their interaction with niche actors as well as how they employ their discursive and political resources. Experimentation with and testing of products and services that deviate from established regime practices are more likely to be incorporated among food incumbents. In contrast, energy incumbents invest more resources in the development of a broad, yet commonly accepted, vision of an energy transition that can be disseminated to strengthen the belief in the industrys' performative power.

What determines incumbent actors' behavior in sustainability transitions? Applying Lewin's Field Theory to the case of the food industry

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Earlier work on sustainability transitions, including the prominent Multi-level Perspective (MLP; Geels & Schot. 2007; see also Geels, 2005), has portrayed incumbent companies as part of the existing socio-technical regime, thereby contributing to stability and maintenance of the status quo. More recently, however, scholars have shown that incumbent companies show very heterogeneous responses to sustainability movements depending on different kinds of pressures (e.g., political pressures, social movements, market developments; Kungl & Geels 2018; see also Turnheim & Geels, 2013), as well as firm-specific, socio-economic, and institutional factors (Mori, 2021). Under certain circumstances, incumbent firms may even strategically position themselves as central actors in emerging fields (Apajalahti et al. 2018). In other situations, incumbents may delay or ignore transitions toward a more sustainable society (van Mossel et al., 2018). Because „mainstream actor reorientation is essential to drive the diffusion of societal embedding of niche-innovations and associated system transformation" (Geels, 2021, p. 45), it is crucial to understand under which circumstances incumbent actors will change their practices to contribute to sustainability transitions.
On a related note, researchers have called for a better understanding of agency (Köhler et al., 2019) as well as the underlying psychological processes (Geels, 2021) of mainstream actors. Accordingly, some have begun to analyze the conceptualizations of agency in the different theoretical streams underlying the MLP (Geels 2020), the requirements for theories on micro-foundations to be incorporated in the MLP (Huttunen et al. 2021), and potential psychological theories that may be promising amendments of the MLP (Bögel and Upham 2018; Upham et al. 2020). Although these works have shed light on many important blind spots in earlier theorizing, they still do not provide an overarching theory which, for example, explains why managers of incumbent companies initiate and sustain sustainability transitions (e.g., by

creating niche innovations), why they maintain existing regime practices, or how exactly changes in the ‘landscape’ are related to these actors’ behavioral choices.

The present conceptual article suggests that Kurt Lewin’s field theory (Lewin 1947a 1947b, 1951), one of the most influential theories of social and organizational change (Burnes 2004; Burnes & Cooke 2013; Stouten et al 2018), may be suitable to explain incumbent actors’ behaviors in the context of sustainability transitions. Field theory provides evidence-based explanations of individual behavior within a social field, thereby integrating individual-level mechanisms (e.g., managers’ beliefs about threats) with social dynamics (e.g., changed customer demands). Field theory is commensurable with the prominent multi-level perspective but enables a more detailed understanding of agency in sustainability transitions as has been called for (Köhler et al., 2019).

In the conference contribution, I will sketch the basic assumptions of field theory and show how they can be used to explain the behavior of incumbent actors in an industry area. These theoretical arguments will be illustrated by using examples from a field study in the Austrian food industry. I will close with a discussion of the theoretical and methodical implications of using field theory for understanding incumbents’ behavior in the context of sustainability transitions.

Stream F: Sustainable Food Systems

F.1: The Smart Urban Last Mile Logistics – Funded Fantasy or Pathway to liveable cities?

Session Chair: Jürgen Suschek-Berger, interdisciplinary Research Centre (IFZ), Austria
Session Chair: Günther Illek, IFZ, Austria
Session Chair: Melanie Troppe, IFZ - Interdisciplinary Research Centre for Technology, Work and Culture, Austria

Data-Driven Participatory Workshops as a Means of Developing Concepts of New Mobility

Kay Cepera, Julius Konrad, Marlon Philipp, Johannes Weyer
TU Dortmund, Germany

Developing new concepts for urban mobility requires both the consideration of needs of potential users and profound expertise to achieve public acceptance. This requires methods allowing the combination of insights from empirical data as well as attitudes of relevant stakeholders such as providers and users.

We present a concept for participatory workshops as an example for such a method: Following a large-scale survey with 10.000 participants from the Ruhr Area's three largest universities, we developed four broad scenarios that serve as an input for a series of participatory workshops. These workshops include scientists, students, and administrative staff from these universities, aiming at investigating their individual mobility demands. The participants have been selected based on their individual status, location, and mode choice.

As a first step, using the futures wheel approach, we enriched our data-driven scenarios with individual inputs to examine challenges and impacts for each scenario. These scenarios include new mobility concepts such as using universities as mobility hubs as well as classical approaches such as a focus on bicycle usage. Additionally, prototypic personas have been developed to solidify our scenario design.

As a second step, these results have been condensed into bundles of measures using the design thinking approach. This aims to generate tangible output that can be used both for discussion with providers of urban mobility and for agent-based modelling. With this approach, a mutual exchange between users and experts has been established to ensure a constant

interchange of ideas and concepts. The outcome of this interchange has been a set of specific measures, tested by simulation experiments.
In a final third step, these measures have been presented to users and stakeholders to obtain further input and to achieve validation. Measures developed with this approach will be implemented into real-life laboratories during the next project phase.
This presentation aims to introduce our mixed-method concept and present our workshop results as an illustration of this concept. We will show that purely data-driven concepts may lack important factors only ascertainable by in-depth qualitative research.

The role of urban and regional planning in promoting sustainability energy transitions in the transport sector

Ida Grundel, Kristina Trygg
Linköping University, Sweden

To be able to meet current and future climate challenges there is a need to transition our societies to become more transport efficient. As a result, many of our infrastructure systems within energy and transport are currently under change or must change in future. Hence, they are also challenging former and current planning practices. For example, cars have, for a long time, been in focus for spatial planning practices and how to plan our cities. Therefore, urban and regional planning could be some of the most efficient instruments to support urban and regional transitions and to build future sustainable cities and regions. However, few planning practices contain sufficient strategies and instruments to evaluate social, organizational and technological consequences to support sustainable and inclusive innovations within the transport sector. For example, the integration and coordination of innovations and new technologies such as autonomous cars and the electrification and digitalization of transports can be crucial in the transition to more sustainable cities and regions, but they are not necessarily taking social aspects into concern. To deepen the understanding of the planning systems potentials to contribute to a sustainable transition this paper aims to discuss the possibilities and hurdles that traffic planners and officials face together with available tools and instruments to support a sustainable (socially, environmentally and economically) transition of local transport systems. The empirical data builds on a survey that was sent out to Swedish municipalities together with complementary interviews in a number of municipalities. In line with former research, this research shows that planners knowledge, former experience and perceptions matters for how planning is carried out in practice (e.g. Henriksson, 2014; Hull, 2008; Tennøy, 2012; Tornberg, 2011). This also means that planners attitudes towards technological change and especially towards traffic planning are crucial. These aspects also

include the capacity of including e.g. gender aspects in planning and designing our future cities (e.g. Forsberg & Stenbacka, 2018; Kronsell, Dymén, Rosqvist, & Hiselius, 2020; Winslott Hiselius, Kronsell, Dymén, & Smidfeldt Rosqvist, 2019).

What shapes urban logistics governance?

Subina Shrestha, Rafael Rosales
University of Bergen, Norway

Sustainable urban logistics aims at increasing the efficiency and effectiveness of the logistics supply chain, whilst minimizing the negative externalities associated with it. As it becomes increasingly evident sustainable urban transition cannot be met by excluding urban logistics, attention to urban logistics has grown several folds in the past decade, both in policy and research. In the European context in particular, the 2011 EU White Paper brought urban logistics into the forefront of transport and urban planning by setting an explicit target of "essentially CO2-free city logistics in major urban centers by 2030". Two commonly applied approaches for sustainable urban logistics across European cities are: (1) integrating urban freight into sustainable urban mobility plans (SUMPs) or other existing local plans and (2) developing a separate sustainable urban logistics plan (SULP) . Different cities have used concepts urban experimentation, living labs, smart and sustainable cities, and lighthouse cities to pilot projects on sustainable urban logistics.

In this context, it is sensible to argue that the proliferation of urban logistics planning at the city level can be attributed to EU targets and national targets (i.e., multilevel governance), as well as initiatives of transmunicipal networks that cities are a part of (i.e., polycentric governance). Such a framework is commonly used and well-documented in the urban climate governance literature but remain scant in urban logistics research. This research aims to contribute to the current logistics governance literature by answering the question: How have international and transmunicipal networks shaped sustainable urban logistics planning? Is scaling out (horizontal replication of experiments) evident across cities?

This research combines theories of multi-level and polycentric governance with policy mobility perspectives to unpack how urban logistics policies traverse across different governance levels and city networks, who adopts them, and how they mutate to fit the context of the cities that adopt them. Empirically, this study builds on four Norwegian cities as case studies and applies process tracing to explore how EU level documents have shaped the trends in logistics planning at city level over time and across networks. This research will identify the plausible mechanism(s) across the specific case studies and compare whether these mechanisms differ among the cases (and how).

Stakeholder involvement for sustainable urban logistics

Rafael Rosales
University of Bergen, Norway

Progress towards zero emission logistics requires the cooperation of established stakeholders, but also the consideration of innovations in urban logistics. Public authorities in Norway, as elsewhere in Europe, have in recent years expanded their focus on transport policy beyond personal mobility to include urban logistics in their planning processes. Through living labs and freight partnerships, urban authorities have engaged with urban logistics stakeholders and applied methods of policy experimentation to arrive at solutions for sustainable logistics. Nonetheless, logistics actors in Norway continue to perceive that they are excluded from policy processes that affect urban logistics, or that their perspectives are not considered in policy proposals even if they are included in policy processes. Experimentation and urban freight partnerships have led to an increase in focus on urban logistics and how to make it more sustainable, and despites this, this paper will argue that administrative capacity related to logistics continues to be low in Norwegian municipal and regional administrations. Urban authorities have taken a more active role in facilitating urban logistics, as opposed to leaving private actors to work for a more energy efficient and sustainable logistics themselves. Whilst it appears that existing cooperation between the public and private sectors has led some Norwegian cities to assign roles related to urban logistics, cities such as Bergen continue to have little administrative capacity related to urban logistics. As a result, logistics stakeholders show little interest in official policy processes due to a perceived lack of influence in these processes. This paper considered lessons from interviews and surveys of different logistics stakeholders to plan workshops that would bring together urban authorities and private stakeholders. From these workshops, and considering innovations in urban climate governance, this paper seeks to contribute to reconciliation between different road-users and to more active public governance of urban logistics. It will consider the situation in Norway's four largest cities – Oslo, Bergen, Stavanger, and Norway – and compare how different forms of cooperation have led to different forms of public governance in these cities.

Livability in the city: towards sustainable parcel delivery with the ULaaDS - solutions

Domien Stubbe
VIL, Belgium

On-demand delivery of parcels is on the rise. Partially due to the Covid-pandemic, but also because of the digital revolution in the last decade, more people rely on e-commerce or home deliveries. a convenience for the end user, but a burden on the livability in the urban areas: E-commerce is inherent to a logistics transport need, and thus traffic which leads to a toxic emmissions and unsafe road accidents.

The pressure on logistics is high, with expecations of end users that deliveries are fast, cheap and emmission-free in the future (In accordance with Green Deal objectives). Cities, companies and knowledge institutes are in search of solutions, supported by regional and international funding initiatives such as Horizon. One of the running projects is ULaaDS: Urban Logistics as an on-Demand service. A horizon 2020 project with 24 european partners, creating sustainable solutions for last-and first-mile transport in and out of the urban area. Sustainable has been interpreted here as an ecosystem of: Planet, zero-emmissive delivery; People, creating an more livable inner city; and Profit, creating business models for sustainable urban logistics.

ULaaDS defined two theorethical solutions: collaborative and shared urban logistcs models, and integrated passenger and urban freight networks. Five theorethical schemes can be linked to those solutions, and will be combined in a real-life testbed in the inner cities of Mechelen (Belgium), Groningen (The Netherlands) and Bremen (Germany).

In Mechelen, two trials will be held. In the first trial, multinationals Bpost and UPS will collaborate with local bike courrier EcoKoeriers to optimze the pick-ups in the inner city (first-mile logistics). By using each others' logistics services and assets (such as cargo bikes and a micro hub), the local parcel delivery can be done in a fully zero-emmissive way. Empty rides can be avoided and optimal routes can be calculated. In the second trial, an autonomous vehicle will drive around passengers at a business park, but the vehicle will also contain a parcel locker: companies at the business park (as well as their employees) can use it as a pick-up/drop off point for parcels.

In Bremen, containerized cargo-bike delivery will be tested. Freiight will be delivered outside the city and brought to inner city micro hubs. The containerized measurements of the packings will downsize the handling time (and cost) and optimize the use of the vehicles. In a second trial, (e-)cargo bikes will be provided for private logistics, and placed at strategic points. A rental scheme will be provided. A third aspect in the Bremen trial will combine private taxi-services and parcel delivery.

In Groningen, a park&ride mobility hub outside of the city will be expanded with logistics services, such as e-cargo bike rental and publicly owned parcel lockers, used by multiple logistics providers. In a second trial, the covenant of local merchants in the city will collaborate in a sharing scheme of zero-emmissive vehicles.

Next to the trials, the ULaaDs-project focuses on creating stakeholder engagement, creating data-influx for qualitative analysis of the proposed solutions and replication activities.

Awaken Sleeping Assets for Smart Urban Logistics Solutions

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The Awaking Sleeping Assets Project (ASAP) focusses on the challenges for urban logistics that cities face posed by new developments driven by digitalization and the increasing urbanization. Most cities and their authorities are challenged by the opposing needs of ensuring urban supply of goods and economic strengths versus the need to improve quality of city life by reducing emission and congestion. Also, urban spaces are growing increasingly valuable and scarce and should not have to be used for logistics purposes.
Therefore, ASAP strikes new paths by aiming for three overall goals:
(1) to activate and promote underused or inactive infrastructure or resources for sustainable urban logistics.
(2) to provide testing structures (testbeds) for innovative urban logistics systems that create valuable data.
(3) to finally combine activities (1) and (2) to build a new Sustainable Urban Logistics Planning platform (SULP-Platform).
The consortium unites research organizations with public and private stakeholders from four different EU-countries (AT, DE, FR and SE). Based on the Awaken Sleeping Assets concept there are currently 14 active “testbeds” that function as living labs for various innovative Sustainable Logistics Solutions in five cities (Düsseldorf, Hamburg, Paris, Stockholm, and Vienna). 11 further testbeds are planned.
Fed by the data collected from the existing and active testbeds as well as from performance simulations of selected new testbeds with focus on digital solutions the consortium aims to create a SULP-Platform. This platform will function as a central instrument where public and private stakeholders can find information needed to perform a SULP. In addition to this “How-to-SULP” guideline information will be provided on implementing alternative logistics concepts that are based on the ASAP concept by providing the user with everything from easy to follow, short instructions to scientific background and information on best practice examples. A special focus will be on the interaction between urban areas, goods and logistics concepts and their impact on SDGs.
An important first stage in the project is to create a catalogue of potential sleeping urban assets from the testbed classes. These range from Neglected Routes (waterways, bus/bike lanes,

tracks, or tunnels), Underused Resources (vehicles for passenger transport or empty running vehicles) to Idle Infrastructure (empty buildings/shops, train stations, car parks, loading zones, etc.). An in-depth analysis establishes their respective advantages, suitability for logistics but also potential barriers for their use and their weaknesses. This analysis will be matched with research that defines different classes of urban areas regarding their socio-geo-statistical parameters. Through this matching an advantageous urban area for each respective testbed class and urban logistics solutions based on the Sleeping Assets principal can be defined. The SULP Platform will also provide information about relevant stakeholders and the type of goods that can be transported.
This presentation will provide an overview of the results and achievements of the first year of research and implementation in this JPI Urban Europe financed project.

The cargo bike as enabler for sustainable last mile city logistics

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Today cities are confronted with several challenges related to climate change. The European Union has therefore launched the 'climate-neutral and smart cities' mission, to trigger a development to climate-neutrality. As the transport sector is responsible for about a quarter of all greenhouse gas emissions in the European Union and the urbanization level is about 75%, more sustainable distribution schemes applied in city logistics are important means on the way to a climate-neutral future. To achieve this, small alternatively-fueled vehicles, like cargo bikes, seem to be an appropriate mode of transport in urban areas, since they cannot only reduce logistics-related greenhouse gas emissions but also other harmful pollutants like particulate matters or nitrogen oxides, but also mitigate congestion in urban areas.
While cargo bikes are particularly flexible and fast in dense urban areas, they possess a comparatively restricted loading capacity and have a potentially limited range. Therefore, the adaption of logistics processes to cargo bike usage comes along with some challenges, such as the selection of the appropriate cargo bike type, the suitability of the products and the proper delivery radius. Additional measures like adapted routing algorithms or the implementation of micro depots within an urban area, which can be used as intermediate storage facilities but also to consolidate deliveries, need to be considered. Therefore, benefits and challenges of cargo bikes have to be thoroughly evaluated when planning to integrate these emission-free and flexible vehicles in urban logistics processes.
Results of a number of national and international research projects point out the potential of cargo bikes as an excellent substitute for, as well as combination with, conventional delivery

vehicles in inner-city areas when considering parcel-sized deliveries. Prerequisites for a successful implementation are (1) commitment of the company, (2) support by the municipality and (3) appropriate integration of cargo bikes in the company's urban delivery scheme by means of suitable vehicle routing algorithms, which consider for example the usage of mixed fleets, synchronization between vehicles to transfer goods or intermediate storage of goods.
The impact of using cargo bikes can be seen in the reduction of emissions (carbon dioxide, nitrogen oxides and particulate matters) and of the number of conventional vehicles required especially in city centers. Calculations for Vienna show the potential of a significant decrease of transport-related emissions caused by parcel delivery in the city center. A pilot study in Innsbruck points out the applicability of cargo bikes as delivery vehicles specifically for densely populated city districts. The Circular Economy Research Network of the European University E³UDRES² is dedicated to developing and evaluating innovative logistics concepts together with citizens and stakeholders, facilitating the use of cargo bikes, in different European countries. Using cargo bikes for appropriate deliveries in city areas can contribute to emission reduction as well as to increased livability in cities.
E³UDRES² is co-funded by the Erasmus+ Programme of the European Union.

dynamic access control as an incentive for last mile city logistics

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Within the Horizon 2020 project Token, we investigate the possibilities for blockchain within urban logistics. Starting from the needs of the stakeholders (city, local merchants, logistics players), we decided to focus on access control.
Cities implement regulations to create a more livable place to live. Window times for deliveries or a traffic plan for passage, parking policies... With positive results, less motorized vehicles in the inner city. But there is a downside: the logistics players experience more pressure to finish their deliveries and pickups in time.
At one hand, we see a rise in the need of logistics deliveries (rise in e-commerce, more people living in cities,...). The delivery of goods is made more difficult because of the access regulations: you can no longer pass right through the city center, but you must go back to a ringroad to drive around the city, there are no parking spots available and searching one takes time (or the driver parks right in the middle of the street, creating an unsafe situation for other road users). This means more time needed to finish the deliveries. At the other hand, window times severely diminuish the delivery possibilities. In reaction to these rules, logistics players

will send in more vans, half-full, to finish the deliveries in time. An extra vehicle creating emmissions and disturbance in the inner city.
Together with research institute Imec, the city of Leuven, and the stakeholder groups of logistics players and local shops, we defined the needs for deliveries. All stakeholders want a more optimized, safe and sustainable way for delivery, but all groups acknowledge that the financial cost for reaching this goal is high. So we came up with the idea: can we give incentives for good behaviour? Can we give extra time for delivery if you come in fully loaded with a zero-emmissions van? Can we reserve parking spots if you deliver / pick up local goods? And how do we define (data-wise) a local good? Can we create a system to judge, grant and control this in real-time?
The control system is called a Dynamic Access Controller. Stakeholders are connected with the system through their own transport planning systems and the control system is integrated in the Token - data platform, a datastorage and brokerage platform built up with blockchain for protecting the data. Products of local producers and shops are given a 'local goods' token, which the system recognizes. The transport planning system of the logistics player will ask access (for example: 'i'm coming in the city tomorrow with a fully loaded zero-emmissions van, with local goods'), the DAC will evaluate the request and grant extra access outside of the static window times. Strategically placed ANPR-camera's in the city will control the vehicle.
Within Token, the first basic version is being developed, and tested during the first and second quarter of 2022. After Token, we will continue the development of this system, hopefully with the help of new interested research / industrial / city partners.

F.2: Autonomous vehicles and their public: new regimes of testing, experimenting, and public formation

Session Chair: Nikolay Rudenko, European University at Saint Petersburg, Russian Federation

Under the public radar? Exploring the role of diverse publics in real world testing of automated driving systems

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Real world testing of automated vehicles (AV) is proliferating and takes many forms. As a result, the public has increasingly become an important part of how socio-technical change

related to AVs and intelligent road systems is imagined and developed. Diverse constructs of publics have been evoked to answer questions related to the acceptanceof new technologies, their useability and the wider future social organization of automated vehicles. In this context, the expectations of how automation and digitalization will deeply transform and disrupt future mobility systems have been important for legitimizing technologies where public consultations also have played a strategic role in policy-making to create acceptance (Haugland and Skjølsvold, 2020). In this presentation, we however, draw attention to the fact that the development of automated driving systems, as socio-material processes, are already happing in real life. New advanced driving technologies are gradually introduced to users, but these incremental changes often go 'under the radar' of public scrutiny. However, we should not be sleepwalking in face of socio-technological change as this would represent missed opportunities for deliberation and governance (Winner, 1983).

This presentation is an attempt to contribute to new understanding of potential ramifications of AVs and intelligent driving systems, by focusing on a type of public seldom scrutinized when anticipating AV futures; we will focus on professional truck drivers and their use of driving assistance systems (DA) which may be seen as first steps towards automated driving. Through studying the everyday adoption of these systems, we show how automation is shaping mobility practices in ways that are highly situated and which (co-)produce unexpected outcomes (Ryghaug et al, 2022). As an example, we observe adverse and unwanted effects like increased surveillance of driving behavior that push drivers to manipulate and gamify systems in ways that compromise road safety. In such instances, the innovation processes have been entirely privatized, while the negative consequences are carried by users and people on the road. We thus see an important, but often neglected, role for governance initiatives in such incremental innovation processes to include publics in relation to specific user-contexts, and to form a continuous dialogue with users that can generate deliberation on the unexpected issues that will emerge through technology use.

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When does the testing end? Testing on behalf of users

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Radical innovations engage a multiplicity of actors, and their responsibility boundaries are often fluid. The development of innovative technology implies a need for long-lasting and iterative moves between various stages – such as design, production, prototyping, testing, or usage. Testing becomes more and more significant because it reflects the struggle for quality assurance (Yang et al 2009). Testing of technologies is a dynamic activity that includes social and, in a certain sense, political relations (Pinch 1990). Recent trends of technological development encourage the involvement of diverse people, not just engineers, to grasp hidden and non-obvious issues before the technology goes massively wild. Following Marres' idea of testing beyond the laboratories (2020), we argue that current users of autonomous vehicles (AVs) are early adopters and on their behalf also participate in the testing of technologies. There are at least two ways in which users participate in the testing of AVs. On the one hand, there is continuous testing of self-driving technology manifested by the developers. For example, neural networks, the core of object detection and recognition, are continuously developing and improving as long as the number of driven kilometres and situation encounters increases. In public discourse, Tesla company was many times blamed for selling Autopilot as a feature that continues to change through the enhancement of technology. Their users may be recognized as beta testers, which status has not changed through the years. However, Tesla engineers view this fact as a strong advantage of their technology. Another company representative, Waymo, also does not deny that rides with their AVs help to contribute to a continuous and iterative process of testing. Thus, here, we can observe that the development of AVs does not end when the user enters the car.
On the other hand, users may demonstrate their recognition of an early adopters' role in a technological change. For example, a Waymo enthusiast JJRicks has recorded his drives which serve as a guide to AVs for a wider audience. Another recognition of users as testers reveals during the examining of videos of Tesla and Waymo users uploaded on YouTube. Although these companies represent different levels of automation, they both have representations of testing. Users frame their experience in terms of expectations/reality, constantly evaluating technologies, also demonstrating the comparison with their driving skills. In addition, they often focus on interaction with interfaces. This user status as an early adopter reflects a certain trend in technological production: users become a part of the development – as if engineers learned academic literature on the social construction of technologies and the role of users there. However, such an approach may result in an even more dispersed

responsibility for the consequences or risks, which users [have to] take when they just buy expensive tech things.

We want to elaborate on the following questions. In which ways are users involved in the development of AVs? In which situations are engineers working alongside users? Is there a transparent responsibility boundary for users? How do users interact with AVs?

Platform public and its discontents: controversy mapping of the impact of autonomous vehicles on the cities

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Today it has become inevitable in the literature that autonomous vehicles (AVs) are a radical innovation that may bring about profound changes in many domains. Although many authors agree with this suggestion, there is an ambiguity: whether these changes will be for good or bad? Will we live in AVs' heaven or hell?

These questions are particularly eligible when we ponder upon the impact of AVs on urban space. Will AVs increase the average VMT? Will they bring about advanced urban sprawl? Is it possible they get rid of the parking places or make them rampant?

Several authors address these questions and answer them based upon their own methodological and theoretical frameworks (e.g., with the help of a backcasting scenario approach). Others make their efforts to ask stakeholders themselves: e.g., by interviewing them, conducting focus groups or surveys. On a large scale, these stakeholders are experts.

What we find notably missing in the literature is the work with the public. According to the fundamental values of STS, participation of the public should be an essential part of the construction of every important technological system. Since AVs are so widespread and supposed to bring profound changes in many walks of life, we believe it is essential to scrutinize what the public thinks about them.

Some papers are devoted to citizen deliberation sessions, but there is always a danger that people who participate in it are a particular group of people inclined toward the topic of autonomous vehicles. Moreover, the same interaction frame on those sessions may constrain participation.

In our speech, we want to make the public visible with other means, i.e., with the help of the digital method "controversy mapping." This method aims at gathering public issues about science and technology on the internet, particularly on different platforms like Twitter or Reddit. In contrast to other methods, it may shed light upon the public's more natural and dynamic process of issue-defining. However, it does not mean that controversy mapping is a more valid

and objective research method. Quite the opposite, it stresses the unique traits of particular platforms to make people argue with each other and create and make public new issues.
By relying upon this method, we want to trace controversies around the impact of AVs on urban space. To do that, we want to gather, analyze, and interpret the most critical issues in public discussions about AVs. We gather our data from Twitter, utilizing and adapting conceptual and methodological strategies presented in controversy mapping. Our critical additions to the methodological part include different textual and statistical analysis methods, including particular methods like topic modeling and linear regression. Topic modeling will be used to define key problems around AVs controversy; linear regression will help us understand the most popular and trending problems.
We believe that it may add another new dimension to the academic discourse about AVs and the changes they entail. It also allows us to extend the issues by examining what the public thinks about AVs.

Challenges in assessing road users' attitudes toward driverless mobility to engage them in co-designing novel data-driven alerts for cyclists

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New forms of automated mobility can be regarded as a socio-technical change that requires a broader perspective from public and road users as developments in this area will directly influence society's mobility behavior in the future. Open innovation methods enable the inclusion of a variety of stakeholders with different perception of trust and security in driverless mobility. This is also already acknowledged by the European R&I partnership for Connected, Cooperative and Automated Mobility (CCAM), which aims at establishing a user-centered and inclusive mobility system, increasing road safety while reducing congestion and environmental footprint (CCAM SRIA 2021:65). As a result, new automated mobility solutions are increasingly being tested in public spaces, in so-called "living labs" or in field trials under real-world conditions. However, the roles and influences of road users in such open innovation research processes are said to be determined by type and degree of participation, prior knowledge, attitudes and capabilities (Sopjani et al. 2018; Füller et al. 2017 cited in Beck et al., 2021:29). Thus, the purpose of this work is to examine how to determine road users' prior knowledge, skills, and attitudes toward automated mobility and self-driving cars so that, based on this, a high involvement intensity and long-term effect on the outcome of technology research can be achieved.

We explore this issue in the ongoing collaborative Austrian technology research project “Bike2CAV”, which deals with the development and validation of data-intensive methods for cyclist collision avoidance through vehicle-to-x communication” (www.bike2cav.at; funded by the Austrian Federal Ministry; 2021-2023). The project process is supported by open innovation methods and its organization encompasses partners from research, a traffic safety association and a digital mobility service provider steering a large cyclist-community.
We used an empirical mixed-methods approach, beginning with a quantitative survey that explored cyclists' needs for data-based alerts (n=892; 2-4/2021), followed by two qualitative user focus groups that developed ideas, and an expert user workshop that evaluated and prioritized three design ideas for the modes of the warning signals e.g. auditiv, haptic or visual (n=43; 5-10/2021). It was part of the survey issued among the city-cyclist community to identify and assess the attitudes towards self-driving cars, done with the scale for Affinity for Technology Interaction (Franke et al. 2018). Additionally, we asked for estimation of individual cycling behavior (high/low risk). In addition, willingness to participate in such a complex research project was queried and interested study participants were invited and selected based on their individual ATI scores, safety perception towards automated mobility and gender-roles.
The respondents' predominant affinity for technology has served as an ideal starting point forengaging road users, who can be divided into those with a low and increased propensity to take risks. Through such a rigorous selection process of external stakeholder, we achieved a balanced and even distribution of road user representation that influenced the further planned intensity and impact of the future open research process, such as the integration of road-users and public representatives in testing and providing feedback to research prototypes in a real test environment.

One Hundred Million Deaths: Do AVs kill people? Of course, that’s what cars do.

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The publicly performed visions and discourses surrounding autonomous vehicles are an exemplary instance of a sociotechnical imaginary. It uncritically extols the virtues of AVs, disseminated by a diverse assemblage of agents, human and non-human (including the automobiles themselves). For the most part, STS informed interventions have been skeptical of the claims made on behalf of AVs. From the Model-T Ford to General Motors annual design changes the history of automobility is a history of a succession of sociotechnical imaginaries, each of which contributed to the reproduction and expansion of automobility writ large. The

most significant property of AVs is that they are the most recent of a succession of sociotechnical imaginaries (STIs) within the hyper-sociotechnical imaginary that is automobility. By determining the public of AVs and engaging such public(s) in the socio-technical development of AVs, STS becomes one of the agents in the business of invoking solutions and visions of a better future, to be arrived at by technological innovation. To insist that AVs are social objects, and that if they are to "work," however that might be defined, requires attending to the social, not just the technological, is to suggest that the problems are remediable, if only the engineers would listen to the social scientists. STS has now entered the field, and its criticisms cannot but contribute, performatively, if not intentionally, to the development of the AV STI, and ipso facto, the reproduction and sustaining of automobility. We ask: are AVs radical innovations at all – radical in the sense that they open up innovation space for a new imaginary to emerge? Much of the STS research on AVs is not external to the AV STI, but is part of the STI. There is an alternative STS approach, one that is critical of AVs not because of any ostensible sociotechnical deficiencies they might possess, but because they contribute, as have all previous automobility STIs, to the reproduction of automobility. Where one stands in the politics of that reproduction is the central political, and ethical, issue. To focus on crashes and AVs, or on greenhouse gasses and EVs, is to lose sight of automobility, a form of life that has rhizomatically expanded across and transformed the entire planet. At its core are multiple forms of slow, epistemic and ontological violence, all beyond the physical violence that are called "accidents." Focusing on finding the publics of the AV/EV STI suggests that there are solutions to problems of violence if only done better and in a more co-productive manner, and we (the public) no longer need worry. By framing the problem within STS differently, we suggest that the radical innovation is not AVs or pointing to their publics, but finding the public that may be engaged in coproducing a new imaginary, that of post-automobility. Mobilizing material semiotics and vital materialism this contribution recommends an alternative sociotechnical politics, directed towards envisaging a future post-automobility world. This paper questions both the (unintended) consequences (the expansion of automobility across the globe) and the ethics of AV research.

Autonomous vehicles and their public: opportunities of socio-technical integration in the spread of AV technology

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Although the overwhelming majority of research on autonomous vehicles (AVs) is technological and natural-scientific in nature, more and more social-scientific researches are

conducted. Most of these researches, however, are designed with a narrow focus and are mostly centered on the acceptance of technology by means of the well-known TAM and UTAUT models. In the course of these researches a certain limitation arose, respondents filling in the questionnaires have typically never encountered an autonomous vehicle. In addition, there is no information available either on the biological process experienced, neither on the way people would deal with the significant changes the widespread use of autonomous vehicles could cause in their everyday life: new travel habits, new business models, new connection networks, new urban structures, new daily routines etc. Likewise, few researches point to the crucial role cities play in establishing the infrastructural, land-use, legal and regulatory conditions needed for the technology's safe operation.

Thus, it seems that although currently the vast majority of street tests are primarily technological in nature, they could be also used to address a number of issues that would facilitate the social embedding, acceptance, and diffusion of AVs. One of the methods of responsible innovation, socio-technical integration – which combines technical-scientific processes with social science aspects – has promising opportunities to promote the complex social embedding of AV technology.

The aim of our theoretical research is to create a socio-technological integration that would maximize the advantages of the autonomous technology and minimize its drawbacks. As a first step, we will review international studies on autonomous technology from the perspective of responsible innovation. The well-known special features (uncertainty, unanswered questions, ethical dilemmas, etc.) need to be researched in-depth and the less known ones need to be explored. We are also exploring alternative approaches in this area, such as the possibility of using neuroscience methods that can provide important information for understanding human physiological responses. Based on these, we broaden the perspective of technological acceptance of autonomous vehicles and interpret AVs in their complexity, integrated into the host environment. The concept of AV readiness associated with this is broken down into its components, and an attempt is made to assign RRI dimensions and RRI keys in order to promote the socio-technical integration of street tests.

How to Make Autonomous Vehicles' Trials Public? New 'Experimental Mode of Industrial Innovation' and the Constraints of Public Reporting on Testing

Andrei Kuznetsov[1,2]

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The development and testing of new technologies changed drastically in recent decades. Autonomous vehicles (AV) or self-driving cars exemplify these changes conspicuously. First, AV developers widely use simulation tools both to reduce costs of engineering and testing and to pre-play millions of possible scenarios in the math-based environment before going out to the actual laboratory or road testing (Leonardi, 2009). Second, they displace tests and demonstrations of AVs from the closed-off laboratories to the less controlled environment of public roads, thereby suggesting a new 'experimental mode of industrial innovation' (Laurent, Tironi, 2015). The implication is that n these living laboratories, it is not just technologies, but the whole societies are being tested (Engels, Wentland, Pfotenhauer, 2019). Third, since some of the leaders in the AV industry came from an IT technological culture, they tend to consider their innovations not as finished products but as services developed through early beta-testing and subsequent patches.

It seems that in the case of AVs we are witnessing a new approach to the development and testing of technologies. It may appear that unlike the older approaches of making technologies behind closed doors and then releasing the finished products into society, this new 'experimental mode of industrial innovation' definitely makes AVs public and more socially adapted. However, the experimental character of these trials and their engagement with the various publics has been problematized and criticized (e.g. Marres, 2020 a,b). It turns out that many public demonstrations of AVs' viability are just 'advertisements of perfection' which are 'doomed to succeed' (Stilgoe, 2018: 34).

In this paper, I will explore the changes in the development and testing of AVs and their controversial character. I will analyze reports of the public AV trials by the leading companies and discussions of these reports by professionals and the 'lay public'. Particularly I will connect this analysis to the study of scientific publications in the early STS and Actor-Network Theory. The discussion of artificial, constructed, and even 'fraudulent' character of the scientific report that distorts the actual research process (Barber, Fox 1958; Medawar, 1964; Latour, 1976; Latour, Fabbri, 1981) will help me to look at the reports on the sociotechnical trials in a new way. This perspective is pertinent due to the scientification and 'laboratorization' of the AV trials and their sites of testing (Marres 2020a). The analysis of the tension between constraints of public reporting and messiness of the actual testing process also helps me to reflect on developers' problems to make AV trials public and experimental.

Stream H: Teaching STS

H.1: Designing the Socio-Technical – Teaching Design & Sustainability

Session Chair: Stefanie Egger, The Invisible Lab, Austria

The challenges of social appropriation of science and technology. The experience of a class on science and its publics

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Since 2015 I have been in charge of the seminar Encounters and Relations between the Sciences and their Publics. It is an elective subject of the master's degree in Social Studies of Science and Technology at our University. In this master's degree converge professionals from health sciences, social sciences, designers, engineers, lawyers and a few scientists, among others.

In this course, we propose to discuss about the meeting points and communication around science and technology and anything likely to establish scopes and distances between the production of expert knowledge and popular representations, public appropriations and political uses of it. Theoretically, some central categories are worked in these discussions: popularization of science and technology, public understanding of science, public communication of science and technology, public engagement in science and technology and social appropriation of science and technology.

Social appropriation of science and technology is one of the central issues, since it has been set up in our country since the 90s of the last century (Bustos et al., 2012) and it even has a place in public policy from the Ministry of Science and Technology (Minciencias, 2020).

In the policy, appropriation is conceived as a process that summons citizens to dialogue and exchange their knowledge, reflections and experiences, promoting environments of trust, equity and inclusion to transform their realities and generate social welfare, and is generated through the management, production and application of science, technology and innovation. Appropriation is using the knowledge learned, improving it or acquiring a new one, exchanging it and applying it to transform realities (Minciencias, 2020).

In the Sciences and Publics course we are interested in reviewing how the path to policy necessarily passes through the deficit models, through experts and laymen, participation and citizenships, concepts that necessarily make those who can be audiences or recipients of policy and others who cannot. We based our work in case studies and own experiences that

include topics ranging from social/environmental activism, journalism, hacking, data and information management, museums, school scenarios, co-creation projects and participatory design or community radio stations, among many others, based on the personal interests of each group of students. It is also reviewed that the idea of public and audience is built under the needs of an economic model in which the knowledge of science, technology and innovation is produced.

The central question of the course, which is its recurring concern, asks how to work with communities? The students themselves realize that getting rid of these traditions in which the expert "helps" the "ones who do not know" is the great challenge and reflection on these questions from the classroom is the objective of this presentation.

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AN ACTIVE AND INTERDISCIPLINARY APPROACH TO KNOWLEDGE ACQUISITION ABOUT WOOD; THE SUSTAINABLE MATERIAL OF THE FUTURE

Vesna Starman, Črtomir Tavzes, Jaka Gašper Pečnik

Innorenew CoE, Slovenia

The most important didactic approaches towards better and, above all, longer-lasting useful knowledge acquisition of natural sciences and technical content are; active teaching and cross-curricular approach to subject matter. As a sub-set of the former, a research teaching can act as a bridge between different disciplines' knowledge presentation. Even the use of technology in education can only be effective if it is supported by appropriate learning and teaching strategies. In this paper we will present the content and activities of the workshops held and conducted for primary school students between 11 to 14 years age group (the last triade in Slovenia's 9-year primary school education system). Students were introduced to selected topic about wood as a material by connecting teaching disciplines of biology, physics (emphasis on mechanics), chemistry, technics and technology, environmental science, economics, and sociology, to gain new knowledge. With the research teaching method, where they were placed in a role of an active creator, and thereby discovered new knowledge on their own. Such approach led towards achieving the positive effects on the understanding of

wood's biological role, its physical and mechanical properties, and interrelationships among them. In turn, that enhanced their awareness on the importance of wood as a material and strengthening their knowledge and competence in wood use. Students learned to utilise knowledge and skills in problem identification and solving, while developing complex and critical thinking, innovativeness, and creativity. Furthermore, they were acquainted with environmental aspects of using wood as an alternative replacement for, less-sustainable materials, and very basic implications thereof on economy and society. The effects of this approach on the level of interest towards learning (motivation), subject matter understanding and knowledge accumulation, and the longevity thereof were measured by exit surveys given to the students. Additionally, the changes in teachers' attitudes toward teaching their courses (willingness and ability to use active and interdisciplinary teaching), and inclination to interact with teachers of other relevant subjects were surveyed separately. The results clearly show a positive effect of the described approach, as the interest level in the students was higher compared to "classical", ex cathedra subject matter presentation. Students especially reported the satisfaction with the utilisation of modern ICT tools in the learning process. The understanding and knowledge accumulation was more than satisfactory. Additionally, the teachers reported enthusiasm about the active and interdisciplinary approach but reported reservations in the possibility of interaction with teachers of other courses (time and resources constraints, interpersonal relations, overprescribed curricula (not enough teacher autonomy), less than desired support from school leadership, etc.). Based on the results, our approach will be refined, and recommendations to system changes in teaching will be prepared.

A Collaborative, Interdisciplinary Undergraduate Course on Generative Art: Past Practice and Ideas for the Future

Craig Jackson, Jeffrey Nilan
Ohio Wesleyan University, United States of America

In this presentation we discuss the ideas underlying a recent course offered at Ohio Wesleyan University in Spring 2020 on generative art. This course was a collaborative effort between two professors: a mathematician who studies complex systems such as the Earth's climate, and an artist who works in photography, book arts, and textiles.

Starting with a definition of generative art as "art in which the artist deliberately cedes control over some significant aspect of their work to an external agent" we worked with twelve undergraduate students to create generative art across a range of two dimensional media, both digital and physical. We took particular inspiration from the sketchbook drawings of Annie Albers, motion-tracked bug drawings by Harvey Moon, models of so-called self-organizing

systems like traffic flow and lizard skin, the combinatorial art of German collective Troika, the averaged images of Jason Salavon, and the generative processes that shape the Earth's landscape.

The original intention for our course was to utilize both computation as well as a variety of photo and textile processes to produce generative physical artefacts. The advent of the covid pandemic, however, and our institution's subsequent move to virtual instruction, led us to shift our focus to production of work that was more compatible with screen-based display.

Our aim here is to share our ideas with other educators interested in teaching courses on generative art, as well as to gather new ideas from current practitioners and theorists to further refine our course for future in-person offerings.

From outsiders to insiders. Design students during the Pedagogical Innovation Week.

Catalina Codruta Dobre, Andrea Aragone
Université libre de Bruxelles, Belgium

Since 2015, the Faculty of Architecture (Université libre de Bruxelles) organises the 'Sémaine d'Innovation Pedagogique' (SIP) (En. Pedagogical Innovation week). The format proposed is an intensive one-week long design workshop for architecture and landscape architecture students (2nd and 3rd year Bachelor and 1st year Master). During this week teachers, researchers or practitioners are invited to propose a workshop on the theme of their choice. The particularity of this pedagogical setting lies in the variety of workshops that emerge each year with their specific methodological approach. Two common aims can be perceived: (i) to develop the capacity of students in having a reflexive approach to their practice and (ii) to confront students with real-life settings in relation to various actors (e.g. scientists, academics, artists, public authorities, civil society or users of the city). Thus, a co-creational pedagogical setting emerges that offers the opportunity for students to tackle societal challenges related to sustainability.

Based on participatory observations by the author in organising design workshops each year focusing on environmental participatory design, the paper looks at the extent to which this specific pedagogical configuration can foster a better understanding of the role of designers and design researchers in answering complex contemporary challenges by relating research, teaching and societal engagement.

The paper explores two types of interactions that emerge in this pedagogical setting: the role of the designer in relation to the object of study and the micropolitics behind the process. Firstly, the paper emphasises that the roles of the designer and design researcher and their boundaries with the object of study are intertwined. The paper is based on the work of Ever

and Louis (cited in Louis, Reis, and Bartunek 1992) to make a distinction between different roles: an insider, as a designer who produces knowledge while being an actor, and an outsider, as a designer distancing him or herself from the study. Even though, the distinction between insider and outsider is rarely made in practice, it can guide students in understanding their different roles in designing for a world that is under transition. Secondly, the paper draws from action research literature, to define micropolitics as the 'behind-the-scene negotiations' that are carried out inside organisations (Herr and Anderson 2015, 78). Within a process of action research, researchers (and also designers) collaborate with a wide variety of actors, because sources of knowledge exist in different places and organisations.

From this perspective, the SIP becomes more than a pedagogical setting, but a place of experimentation for developing innovative ways on how designers and design researchers can contribute to a sustainability transition either by designing, by carrying out action research or by developing a research by design approach.

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Stream M: Mobility: Sustainable, Safe and Convenient – Challenges of the Upcoming Mobility System

M.1: Mobility: Sustainable, Safe and Convenient - Challenges of the Upcoming Mobility System

Session Chair: Günter Getzinger, TU Graz, Austria

Insuring future automobility: The UK and Dutch car insurance response to connected and automated vehicles

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University of Oxford, United Kingdom

Connected and Automated vehicles (CAVs) are transforming road-transport. Within this transformation, motor vehicle insurers are one of the key involved stakeholders. This paper explores car insurers' expectations, challenges and activities around the development of CAVs. It draws on a literature review and 31 qualitative interviews with insurers and other experts in the United Kingdom and the Netherlands. The analysis confirms challenging, simultaneous local and international, discussions about 1) the shift in liability from drivers to automated driving systems, 2) a commercial conflict over in-vehicle data access and 3) the future of shared mobility. Interviewees anticipate that the outcome of these discussions will affect their underwriting, risks, claims processes, business models, product offerings and competitive strategies. The analysis highlights a range of responses from incumbent insurers to the development of CAVs, which differ across both countries and insurers, yet can be classified into three typical activities: (non) participation, lobbying and learning. The paper concludes with a number of political and scholarly reflections.

Barriers and Strategies for Responsible Transition to Sustainable Individual Mobility Through E-Vehicles: A Case Study of E-Vehicles in New Delhi, India

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The outbreak of the COVID-19 pandemic had an adverse impact on collective mobility through public transportation. The effect of the pandemic on commuters is mediated through social-demographic locations of individuals such as gender and income level. Due to the contagious

nature of the pandemic private/ individual mobility became the preferred choice among commuters. Thus, creating an opportunity for the e-vehicle market and sustainable mobility. It was predicted that, in the wake of COVID-19, small e-vehicle diffusion will get a big boost. But, initial trends are not encouraging and have a substantial gender gap. The data shows an increase in the fossil fuel-based vehicles sale and e-vehicles share still remains at the fringes. Despite the enthusiastic government support and favorable policies, the e-vehicle market stays stagnant in Delhi, where the field study is based. Many versions of smaller e-vehicle have been launched without any success, which is also discouraging to the innovators. It is in this context; the adoption of RI practices offers a sound strategy for the future. Thus, the primary objective of this research paper is to 'identify the barriers in the diffusion of the e-vehicle from user's perspective which are functional to respective innovating firms'. This research study has used both secondary and primary data. For collecting primary data, a field study was conducted in Delhi. The research was designed by using the modified RI Framework. The RI framework was modified to make it reflexive to the cultural variations especially in the context of India. The universe of the study included stakeholders- women, e-vehicle innovators & manufacturers, e-vehicle drivers. Survey and semi-structured interviews were conducted among the identified stakeholders along with a Focused Group Discussion with experts. Collected responses were transcribed and analyzed. The study has revealed that lack of 'empathetic understanding' along with eco-system infrastructural issues is the biggest barrier in realizing the full potential of e-vehicles for sustainable transportation. The use of a 'live continuous feedback loop' from the ideation level itself has the potential to enhance the chances of success of an innovating firm. The study is significant for creating gender-equity-based sustainable mobility scenarios, which have implications for the economic sustainability of the innovating firms and sustainable transitions of the transport systems in the cities.

Escaping carbon lock-in to frequent flying in academia: An exploration of the room for manoeuvre of universities

Anna Schreuer
IFZ, Austria

Building on previous research that highlighted the need for and the barriers to reducing academic flying, this paper explores the room for manoeuvre of higher education institutions to take action in this area. In particular, we investigate how university staff and central actors in university management evaluate potential measures to reduce academic flying. We apply a single case-study design with an online survey directed at university staff, complemented by

semi-structured interviews conducted with key actors from university management. We use descriptive statistics and qualitative content analysis to analyse our data. We find considerable support among university staff in principle for implementing measures to reduce academic flying, but also serious concerns, especially towards restrictive measures. However, also restrictive measures find support if they are perceived as fair and viable. Actors from university management face a tension between tailoring policies to the needs of different departments and schools, and non-discriminatory treatment of staff. They see their room for manoeuvre limited by potential resistance and non-compliance of staff as well as by larger framework conditions external to the university. Dedicated leadership is needed to facilitate broad commitment within the university and to avoid responsibility shifting between different governance levels. Although several papers have addressed the behavioural and institutional forces that sustain extensive flying in academia, this is one of the first contributions investigating the potentials and challenges of taking action to reduce air travel in higher education institutions.

The Greater Good: Consumer Adoption and Public Interest in Autonomous Vehicle Deployment

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Bar Ilan University, Israel

Automated Vehicles (AV) as radical innovation have the potential to disrupt the Auto and Transport industry, transform transportation into mobility, product to service, and ownership to use, offering enormous direct and spillover socio-economic benefits and undetermined risks.
However, the entities that are leading the innovation, incumbents, and newcomers, while envisioning a long-term mobility transformation, overlook consumer adoption of the innovation, while postulating its long-term societal benefits.
This presentation argues that while all consumers are citizens, not all citizens seek, accept, and envision the consummation of innovation in the same way. The role of consumers is to evaluate the product, while long-term societal goals are in the public and citizen interest domain.
Building public trust is therefore the bridge between AV as a consumer product and its long-term goal to transform mobility. It’s a crucial component in the creation of a relationship with the consumer, as societal responsiveness to technology is mutually shaping both technology and society creating a "normative transformation" (Reins, 2019)
AV manufacturers bypass building trust and openly communicating with the public in favor of relying on the long-term public interest for societal benefits[1] of AV.

Looking into AV Regulatory regimes, these are tasked with legitimizing a policy and creating a regulatory regime that will enable AV deployment, while endangering the public in the short term, for long term safety benefits[3], countering public sentiment in a sociocultural setting where "society will unlikely tolerate road accident fatalities caused by machines " (Shalev-Shwartz et al., 2017)

The EU regulator is designing a robust regulatory infrastructure policy for harmonization, as a basis for economic competitiveness, societal well-being, risk avoidance, and consumer confidence, by using amendments of treaties and member state legislation in the fields of civil and public law, norms, and standards.

As the envisioned technological disruptiveness of AV's is morphing into a long-term vision, this paper seeks to establish a framework for understanding variation between radical innovation, as a consumer product and radical innovation as a long-term goal, the former which relates to consumers the latter to public interest.

[1] elimination of road fatalities, promote aged and disabled independence and non-reliance of assistance, lower insurance and healthcare costs, reduction of fuel consumption and travel time, in shared mode - reduce traffic congestion, reduce the need for parking spaces could free real estate, solve first/last-mile transportation.

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Stream S: Transforming the Energy System

S.1: Solar Energy in the Global South

Session Chair: Anna Schreuer, IFZ, Austria

Urban Climate Change Experiments in Gandhinagar, India

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Independent Researcher, New Delhi, India

Climate change has become a major sustainability issue in the Global South cities. In response, the study utilized ‘urban climate change experiments’ framework to understand the urban climate governance in the case study of National Solar City Project in the Gandhinagar city of India. The case study focuses on the roles of actors in establishing institutional arrangements for implementing solar city project and then linked with the path-breaking innovation of 5 MW Solar Rooftop Project. The case analysis is based on both primary and secondary data. First, the study found the shifting institutional structure for the project which signifies the connections of national and urban government while governing climate change. Second, the study revealed the well co-ordinated national and state policy networks leading to the innovation of solar rooftop project. Structuring PPP model, offering Green Incentive and generating clean energy without land constrains are the key innovations which make the solar rooftop project successful. Third, the solar city project has led to the reduction of carbon emissions at the city level which is effective in reducing climate change. Despite having some impacts, the urban actors faced challenges while promoting solar technologies due to lack of public acceptance.

Power imbalances in solar home system markets in Sub-Saharan Africa

Muez Ali, Tash Perros, Julia Tomei, Priti Parikh
University College London, United Kingdom

During the last decade, there has been a significant increase in the adoption of solar home systems in low-income households in Sub-Saharan Africa. The systems are provided by a new type of energy company: part-utility, part-fintech. Low-income customers are provided with solar home products and offered a choice of financing mechanisms. Most companies require their customers to make an initial upfront payment followed by monthly instalments

until the total cost of the product is paid off. Some companies offer solar home products as a service and the customers pay a recurring fee for as long as the products are being used. These new models of financing electricity access to low-income households have attracted much attention and a lot of praise from international development and financial organisations for their potential to increase electricity access, and by extension, contribute to poverty reduction, increase economic activity, and help poor countries meet the Sustainable Development Goals. Drawing on some preliminary interviews with experts in the field, this paper aims to shed light on potential areas of ethical concern in the markets for solar home systems. We identify three areas of potential concern. First, the geographical separation between service providers and customers, specifically regarding the ethics of remote deactivation and repatriation of profits. Second, accumulation and handling of large amounts of customer data by service providers for use beyond better service provision. Among other things, this introduces issues of information asymmetry between service providers and customers. Finally, the novelty of the approach means that the lack of government regulation and the lack of competition in most markets for solar home systems puts customers at risk of exploitation with potentially destructive consequences. The aim of this paper is not to downplay the importance of PAYG models, but rather to examine the risks of unintended consequences so they can be proactively mitigated. We hope that this will help ensure PAYG energy transitions are just, appropriately regulated and permanent.

Will solar energy escape the 'curse' of natural resources?

Carole Brunet
UQAM

The resource curse haunts countries whose economies have become dangerously specialised in the exploitation of a single resource. This curse threatens countries whose economies are poorly diversified, oriented mainly towards the export of their non-renewable natural resources such as oil. What about the exploitation of an abundant renewable natural resource such as solar energy? Based on a case study of six solar power plants in six African countries, our paper analyses the extent to which the impacts of the exploitation of these energy systems contribute to this curse. Our results reveal four findings, symptomatic of the resource curse: (i) the emergence of conflict situations (ii) fragile local development (iii) latent financial risk (iv) limited economic development leverage. In short, the resource curse linked to the use of renewable energies seems to bring another challenge to the landscape of our energy transition.

S.2: Transforming the Energy System: Decentralisation, User Orientation, and Local Engagement

Session Chair: Anna Schreuer, IFZ, Austria

Democratizing urban energy transformations: Community energy activism in Bosnia-Herzegovina and Denmark.

Ulrik Kohl[1,2]
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Community energy is increasingly seen as an important driver of sustainability transformations (Seyfang & Haxeltine, 2012; Caramizaru & Uihlein, 2020; Ruggiero et al. 2021). A wide range of benefits are associated with communities taking control of their own wind and solar farms, or other renewables: they cut down carbon emissions; local economies develop sustainably; they raise awareness and solidarity; energy prices go down, etc. (Brummer, 2018).

Citizen-driven energy initiatives have already played key roles in clean energy transitions in countries like Denmark and Germany, but now appears to be in crisis (Bauwens et al., 2016; Gorroño-Albizu et al., 2019). Bosnia-Herzegovina presents a different, but also problematic panorama. The country relies heavily on some of Europe's most polluting coal power plants and the government plans a massive expansion of the coal industry, instead of a transition to renewables. In these changing and challenging socio-economic conditions, it is crucial to understand more of the background and potential for grassroots' agency on energy transformations.

How to move forward with community energy activism in times of crisis? This problem field has multiple spatial and socio-technical dimensions. I conduct mixed-methods comparative analysis of selected case studies of community energy initiatives in Denmark and in Bosnia & Herzegovina, including both solar and wind farm cooperatives as well as locally-owned municipality-led energy transformations.

Energy activists and planners in the two countries face seemingly different challenges. Nevertheless, my project attempts to co-create knowledge and contribute to shared solutions, at the same time as contributing with less common aspects to academic research on sustainability transformations: a new geographical scope, a process-focus, and a participatory action research (PAR) approach to community energy.

The purpose is to better understand the potential for democratizing Europe's clean energy transition through the empowerment of small urban collective actors and their decentralized production of locally owned renewable energy.

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User-oriented Design of Open Data Platforms

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Our fossil-fuel based energy system is to date challenged by the need to reduce greenhouse gas emissions to achieve a decarbonized energy system, and by the increasing trend of digitalization, which opens various new opportunities to design a sustainable energy system. The ongoing smart meter roll-out provides temporally available energy data on individual households. Different smart services and products provided by energy supply companies and other companies in the field of energy management offer new ways to educate consumers, to manage production and consumption, and to strengthen the role of renewables. However, whilst the increasing availability of data, and even open data, has led to new services in terms of open data platforms in other domains, like e-governance, such offers remain scarce in the energy sector. In addition to data-driven energy efficiency and innovation, such open data

platforms have the potential to create collective value in the form of information transparency and system change.

In a representative survey conducted in July 2021 (n= 700), we therefore investigated the overall acceptance of an open energy data platform, and specifically addressed what features potential user would prefer with a Conjoint experiment. Which characteristics of the components of an open data platform such as operator, type of use, contact partners, motivation, privacy or comparison options do Austrian households prefer? Preliminary results suggest that end users would prefer that such a platform would be operated by a public institution, and they see a benefit of said platform for themselves rather than for optimizing energy planning on a local level or for the national energy system overall. Moreover, the provision of information as well as the possibility to compare energy data with other households are considered as very attractive by end users. This information on key design features can provide a decisive indication for the establishment of an energy open data platform.

In search of the governance models and ownership structures of the local collaborative energy production and exchange initiatives in Poland.

Agata Stasik, Alicja Dańkowska
Kozminski University, Poland

This paper explores how Polish actors engaged in early-stage experimentation with local collaborative energy production and exchange perceive the future of this energy pathway and their agency in shaping its further development. Particularly, we are interested in the local collaborations' potential to make the energy transition process more just and embedded in local communities through different models of ownership and participation.

The energy transition in Poland poses serious challenges due to the country's dependence on coal for heat and electricity production, which results in a lack of political will to navigate the change. However, in the last years, the growing pressure from European Union climate and energy policies mobilized an effort to allow for greater decentralization and diversification of the energy system, which calls for new organizational models allowing for RES proliferation. One visible sign of this shift was the introduction of an "energy cluster" definition to the Polish legislation in 2016. Energy cluster was defined as a civil law agreement that may include natural persons, legal persons, scientific units, research institutes, and local government units for the generation and balancing of energy from renewable energy sources or other sources within a local distribution network. However, six years later, it is evident that despite the readiness of local actors to experiment with novel solutions, the binding legal framework

hinders the efficient operation of energy clusters; among 66 certified clusters, only a handful actually manages to produce and exchange energy.

At the same time, the changing energy landscape - experienced as skyrocketing energy prices, but also new technological possibilities and legal developments - stimulates further experimentation. Specifically, expected changes in the regulations connected to the implementation of the RED II and IEMD Directives that allow for operations of Renewable Energy Communities, Citizen Energy Communities, Virtual/Virtual Prosumers, or Virtual Power Plants among other forms of cooperation, as well as the high priority of climate change mitigation under European Green Deal promises new possibilities for local collaborations.

Against this background, we explore how these two factors shape the local actors' perception of the future development of the community energy pathway in Poland: first, the experiences of local communities with cooperation as "energy clusters", and second, the changing European climate and energy legislation. The study is based on the in-depth qualitative study of eight energy clusters and explores their representatives' plans for further engagement in local energy production and exchange under the new legal regime.

Stream T: Cross-Cutting Themes in STS

T.1: Cross-Cutting Themes in STS

Session Chair: Bernhard Wieser, TU Graz, Austria
Session Chair: Armin Spök, TU Graz, Austria

Open scholarship, domestic mastery and learning from the past

David Benjamin
Photonica

This paper will discuss certain aspects of Open Science and pathways for sustainable transitions from the viewpoint of autoethnography, ethnoarchchaeology and the diverse set of concepts known as 'sustainable innovation,' as explicated by Rene Jorna. This view became apparent to the author from daily life and living in a Norwegian dwelling, where organics recycling in the kitchen is mandated, and has thus inspired reflections and awareness of the embodied nature of sustainability, along with the dimensions of resource flows management in the dwelling and the nearby neighborhood. This awareness has inspired thinking about my own research efforts and those of other authors in ethnoarchaeology, autoethnography and the archaeology of daily life that can reasonably provide insight, mearning and learning about sustainable futures for daily life and the management of the dwelling as construciton and sustainable dwelling as sets of practices.The archaeological view of sustainability has some value for STS research. The field actively engages with two key areas of knowledge: Firtst, the present eras's view of the relationship between material culture and the guiding paradigms and physico-mental practices of past societies and second, builds models of past societies and their practices of daily life and dwelling in the landscape that reveal knowledge about past successes, failures and mearnings of interest for our efforts for sustainable lifestyle construction and maintenance.

Conceptualising SME sustainability transitions as a driver for policy change

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Monash University, Australia

Amid several grand and wicked environmental challenges, research on policy responses to enable sustainability transitions and urban transformations is gaining popularity. There is an

emerging body of research regarding the sustainability transitions of small and medium-sized enterprises (SMEs), and how these can be supported by existing policies, and spur future enabling policies – particularly in urban settings. More often, researchers and policy actors rely on the sustainability scholarship to identify barriers for sustainability transitions of SMEs, and design policy responses to address those barriers. However, we argue this approach is limited because it ignores the critical role of policies in enabling these transitions through addressing the barriers for transitions. Transitions root from innovation experimentation and their wider diffusion, and destabilisation of systems that support unsustainable products, processes, and practices. Therefore, it is essential to examine both the barriers that hinder individual SMEs from uptake sustainability actions, as well as barriers for society-wide transformations. Moreover, we also argue that the means of SMEs overcoming several barriers (such as negative attitudes of SME owner-managers, cognitive limitations, and effective communication mechanisms) are relatively under-explored and under-represented in policy responses.

Adopting a bricolage approach, we review the sustainability, transitions, business, and behavioural economics scholarships to conceptualise the sustainability transition process of SMEs to propose a set of conventional and non-conventional enabling factors necessary for policy interventions to reduce barriers in SME sustainability transitions. Conventional enabling factors include the provision of financial and non-financial resources, the provision of technical knowledge and capacity-building sessions, stringent command and control measures, and direct information-sharing mechanisms. Non-conventional enabling factors include, among others, fostering social learning and the participation of informal policy and transition actors in the SMEs sustainability transition process. These non-conventional enabling factors, which address several barriers that SMEs encounter in sustainability transitions, are poorly addressed in the sustainability and business scholarship, and as such, are missing from policy responses targeted at SME sustainability transitions. This paper proposes a new conceptualisation of how the SME sustainability transition process drives policy responses that support urban SMEs. Our empirical focus is on the Accommodation and Food Services Sector in Melbourne, in the State of Victoria, Australia, which has a policy goal to halve food waste by 2030. The Accommodation and Food Services Sector in Melbourne is predominantly represented by SMEs and is responsible for generating a significant proportion of food waste in the State. Therefore, this paper lays the basis for characterising the existing policy support SMEs receive to achieve this policy goal and guides new areas for enabling policies in the future.

“No mask. No hose. Just sleep.” Preliminary results regarding passive human-machine interaction in sleep apnea therapy.

Svenja Reinhardt
University of Marburg, Germany

One of the most common chronic diseases throughout the world is sleep apnea. According to Lyons et al. (2020), roughly one billion people worldwide suffer from these nightly breathing difficulties. Since the beginning of the successful establishment of sleep labs in Germany in the 1980s, digitalization always played and enormous role to diagnose such sleep related issues. In the sleep labs, patients will be examined in a polysomnography and used as a medium to produce data. Therefore, the patient’s body is connected with sensors and electrodes to the polysomnography devices. The data will then be transformed into graphs and diagrams to evaluate the bodily functions regarding the assumed sleep problem. This is done to form a bridge between the patient’s body in the sleeping state and the medical personnel. Thereby, the bodily sleep knowledge is transformed into a medical negotiable one and eventually, sleep apnea is potentially diagnosed. After diagnosing, many patients use different kinds of positive airway pressure therapy devices such as CPAP, BPAP or APAP. These devices help the users to breathe while sleeping and are adjusted to the individual sleeping bodies and habits. The device pumps air via a mask and a hose into the patients’ mouth or nose while sleeping. It can therefore be understood as exogenous materiality used to elongate the user’s life through helping to sleep with less apneas. Just about a year ago, a new way of the permanent, nightly treatment of obstructive sleep apnea was recognized as refundable by German health insurance companies: the so-called Inspire Sleep Apnea Innovation. The implanted device works similar to a pacemaker and stimulates the hypoglossal nerve under the tongue via electrical impulses (Inspire 2022).

From this as a starting point, I am planning to present the preliminary results of a (video-)ethnographic study conducted mainly in two sleep laboratories in German hospitals. In my contribution, I will focus on the specific therapeutical human-machine interaction created in the therapy of sleep apnea especially via Inspire. In the specific social world (Zifonun 2016) of sleep laboratories, people with different professions negotiate the order of the hospital ward in diagnosing and treating sleep apnea (Strauss et al. 1963). Thereby – via the polysomnography which is carried out – the patient is constructed as an abstract body (Wolf-Meyer 2008) as well as the performed sleep as an epistemic object for medical purposes (Rheinberger 2006). This leads to an extraordinary insight into human-machine interaction, as the instrumentalized human is asleep and passive during the interaction and only the medical personnel supervise as well as control the used devices. Additionally, the sleep data produced not only in the laboratory but in the nightly (non-)use of the PAP or Inspire device, is

statistically edited, and evaluated. Lastly, I will discuss the theoretical implications of reflexive scientification in the sleep medicine as an interplay between medical hermeneutics and the fully instrumentalized patient following Wagner (1995).

Sustainable infrastructuring of participatory practices in cultural heritage: A back-end examination of museum work

Quoc-Tan Tran
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The advent of digital technologies and experimentation with participatory approaches have put memory institutions in a bind. On the one hand, these institutions have begun to rethink their social roles and responsibilities, tinkering with novel approaches to caring for and working with memory objects. They are, on the other, pulled back by the prospect of losing the authoritative power and legitimising role as active agents in the construction of cultural and collective memory. Within this context, the critical question addressed by this contribution is: How can memory institutions reconcile envisioned socially inclusive futures with their current understanding of what participation means in their everyday practices. By delving into this continuous alignment of museums' participatory memory work, this contribution aims to elucidate the museums' commitments to participation and social inclusion. It demonstrates how background negotiations can lead the institution to infrastructure changes associated with a participatory mindset or in circles of inaction.

STS scholars' infrastructuring strategies (Karasti et al., 2010; Karasti & Blomberg, 2018; Marttila & Botero, 2017) provide a long-term perspective on the process of infrastructural development and change, as well as the use and maintenance of knowledge associated with memory-making practices in museums. Several applications of the STS-oriented infrastructure perspective have thus far proved – albeit to a limited extent – the lens's advantage in revealing the ongoing, hybrid, and complex nature of museum activities (Macchia et al., 2014; Macchia et al., 2015). While it is essential to understand whether and how information circulation and knowledge construction can be effective and meaningful among stakeholders, the sustainable infrastructuring perspective has not been applied to the potential for participation and social inclusion in museum work to date.

My contribution considers how specific institutional contexts influence the way in which museums reconcile their participatory visions with their current understanding of what level of participation entails in their work. The infrastructure studies conducted at National Museums in Berlin and Swedish National Historical Museums enable a close-in, ethnographically informed examination into socio-technical components of infrastructure, as well as new-

coming components and how they affect the existing installed base. Assessing the installed base's capacity for expansion and its receptiveness to new infrastructure components requires a sustainability-oriented, infrastructural-ecological approach to investigating the museums' day-to-day operations, interaction between the actors who carry them out, and the conflicts and ambiguities inherent in the intersection of multiple lines of work – with shared imaginaries of museums as sites and sources of participation and social inclusion.

TECHNOLOGICAL INNOVATION SYSTEMS IN THE AGRIBUSINESS: Evolution and Motors

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The concept of the motor of innovation has not been enough understood and developed in the literature about innovation systems (Köhler, Raven, & Walrave, 2020), which one exception is the paper by Walrave & Raven (2016). This theoretical lack (Köhler et al., 2020) represents a research opportunity regards necessity to understand better the dynamics of technological innovation systems (TIS), especially how TIS functions and interaction evolve (Bergek, Jacobsson, Carlsson, Lindmark, & Rickne, 2008). Besides, there are three new functions that are being considered keys to understanding the TIS dynamics: coordination (Markard, Geels, & Raven, 2020) (Planko, Cramer, Chappin, & Hekkert, 2016), sociocultural changes (Planko et al., 2016; Markard et al., 2020), and the whole systems analysed (Markard et al., 2020). Besides, we do not notice research on TIS dynamics in Agribusiness. So, this research aimed to analyse the evolution and interaction over time of the functions (Bergek et al., 2008) of a technological TIS based on the concept of innovation motor (Suurs, 2009). Then, the research objective was set to analyse the evolution and interaction overtime of the functions and motors in agribusiness. To address the objective, a case study of the innovation system associated with the technology of production of cage-free pullets for laying eggs in Pelotas/RS/Brazil was developed. The data have been collected through interviews, documents, and observation. They have been analysed through the concept of the event. Events are central elements of what the subject does or what happens for them (Abbott, 1995). The events have been allocated to each function (Hekkert, Suurs, Negro, Kuhlmann, & Smits, 2007). The results are showed that there are three innovation motors, which are: motor of Science and Technology (started in 1999); motor of Entrepreneurism (started in 2017); and motor of Building the Systems (started in 2019). After analysing the results, we conclude that a) the TIS functions (Hekkert et al., 2007), and innovation motors (R. Suurs & Hekkert, 2012; R. A. A. Suurs, 2009) are appropriate to analyse an Agribusiness TIS; b) in the motor of

Entrepreneurism the new function of whole systems analysis (Markard et al., 2020) is central. It has been considered because entrepreneurs have been lobbying on government agents, who had to solve local problems, specifically about lacks which are identified at local supply chain; c) in the motor of Building the Systems the new function of coordination is central too (Markard et al., 2020; Planko et al., 2016). It has been considered because entrepreneurs have created a network to coordinate local resources and create a shared agenda; d) the motors of innovation have been evolved in a sequential way, and it associated with cumulative causality Suurs (2009) e, Suurs e Hekkert (2012); e) notice the tipping point influence each time that a new motor was created Mey & Lilliestam, 2020).

Culture and transition design in the fashion system

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In addition to technological change, the fashion industry has evolved thanks to the energetic social and cultural changes that have defined the modernization process from the beginnings of industrialization to the post-industrial phase. However, the creative potential of the socio-cultural dimension is not sufficiently represented in the model of innovation and transformation that this industry - a highly oil-dependent sector for synthetic fiber production and global transportation - requires towards a scenario of sustainability. A transformation in the values that underpin the unsustainable fashion production and consumption model is needed, but such processes occur cumulatively and incrementally. In recent years, however, a design approach has emerged as a strategy to generate radical innovations at the level of values and meanings.

This research investigates the possibilities of design as a strategic framework for harnessing the transformative potential of the sociocultural dimension in types of innovation that enable a sustainable transformation of the fashion industry. Creative Economics has identified various impacts of culture on a diversity of innovation levels, but this causal relationship, by assuming culture as a "soft" or "hidden" component of innovation, undervalues its capacity for agency, which has been a claim in cultural sociology and fashion studies for several decades.

To fill this research gap, this article adopts Design for Sustainability Transitions (DfST), a recent perspective that integrates strategic design into systemic innovations. This framework is better suited to connect a transformative conception of culture as it understands systemic innovation in terms of institutionalization processes based on the production and reproduction of social values and norms, where design is integrated as a method to catalyze these social processes.

The DfST framework is used as a lens for reviewing the literature around the connections between design and cultural-based innovation towards sustainability. The methodology consists of a systematic review of 32 references under a transdisciplinary approach, which is materialized in a heuristic tool that allows integrating the fields of culture, design and systems innovation, and defining the selection criteria of the references analyzed.

The results map a multiplicity of approaches that privilege the cultural dimension of fashion system transformation such as craftsmanship, fashion design activism or social fashion design, and allow us to explain why these cultural practices, instead of marginal, should be considered as potentially transformative.

These results suggest that cultural economics should include the transitory perspective of design to increase the value of culture in innovation and, on the other hand, a cultural turn of innovation, as proposed here, would improve the analytical capacity of the Design for Sustainability approach, which would broaden the field of applicability and bring more dynamism to territorial innovation policies.

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Agricultural Pest control technological transitions in Punjab, India: Sustainability Transitions perspective.

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Within a few decades after independence, India was transformed from a famine hit and hunger ridden country to a food surplus nation. This phenomenon is known as the Green revolution, and Punjab was its epicentre. Consequently, India became self-sufficient in food production and net exporter for many crops. On the contrary, Punjab is facing a drop in agricultural productivity, dwindling groundwater level, environmental degradation, soil and water body contamination with agrochemicals and bioaccumulation in the food chain; constant fear of pest resistance and the rise of new pests, along with high farmers' indebtedness, and severe threat to human health.

Agrochemicals are part and parcel of the productivist agriculture regime, which principally depends on three High External Inputs (HEI), including High Yielding Varieties; Agrochemical-fertilizers, pesticides; and Equipment- farm machinery and irrigation technology. Pest control technologies, pesticides or the Genetically Modification approach have always stayed at the

centre of the debate due to the immediate health impact on humans. Punjab is one of India's largest agrochemical consumer states, which makes the agri-food system in the state unsustainable. Furthermore, the prevailing climate change led to extreme weather events that will adversely impact the already fragile food production system. Hence, transitions towards a sustainable farming system are required.

A prior understanding of the evolution of the present agricultural pest control technology is needed to prepare transition strategies from unsustainable to sustainable. Consequently, the current study deploys the Multilevel perspective (MLP) of sustainability transition theory and Strategic Niche Management to analyze the interaction between the incumbent regime and rising niches of organic agriculture in Punjab state. The study focuses on one sub-regime of the HEI regime, which is pest control technology. Since the inception of silent spring, pest control technology has attracted many criticisms from the scientific community. Further, the pest control technological led sub-regime has incorporated incremental innovations by combining Genetic modification with high-yielding varieties, yet not able to counter the unsustainable nature of productivist farming in Punjab.

The study aims to investigate emerging fault lines within the incumbent regime and how it tries to solve sustainability, human and environmental health. Hence, the main questions the paper will try to answer are; how the historical socio-technical transitions in the agri-food sector in India came about and how the incumbent regime actors are interacting with rising niches concerning sustainability and human health. This conceptualization is critical to comprehend the global south context, where the market and state forces did not play a potent evolutionary force to lead the transitions in contrast to the global north.

The study uses analysis of primary and secondary data with the help of a literature survey approach. In conclusion, the case study reflects the crucial role of the state in nurturing and transitioning from the subsistence mode of agriculture to the modern productivist agriculture in Punjab, India and highlights the current dynamics of incumbent regime actors.

Socio-technical transitions: a logistics perspective

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There is a growing theoretical interest in exploring the role of enterprises in sustainability transition studies. Organisational actors (e.g., enterprises) are considered crucial in supporting or preventing transitions because they are heavily involved in niche and bridging market development, as well as mass-market consolidation and destruction. Previous transition studies tried to categorise enterprises by identifying different levels of the socio-technical

system in which they are embedded. Recently, transition scholars have agreed that the dichotomy of incumbents and new entrants provides a limited understanding of the role of enterprises contributing to socio-technical changes by adopting different innovation strategies. As a result, transitions may result from the strategic reorientations of incumbent enterprises, niche-regime interactions, and the involvement of 'mature entrants' in niches.

Accordingly, socio-technical changes may involve the interactions between multiple niches and regimes. However, transition studies often focus on single and radical technology innovation embedded in part of the supply chain. This is partially related to the research focus on the evolution of single socio-technical systems, such as mobility, energy, and agriculture system. Transition scholars are encouraged to adopt new approaches to understand multiple innovations and system reconfiguration, and more empirical evidence is thus needed to develop and refine the dichotomous conceptualisations of enterprises' innovation activities in transition studies.

This study used a comparative case study methodology to extend our understanding of how logistics innovation activities and their associated socio-technical systems can be viewed from a firm-level perspective. By adopting a service ecosystem view, this study tried to explore the role of enterprises in socio-technical transitions, more specifically, we used logistics innovations as an empirical lens to understand the 'whole system reconfiguration' approach. Two companies were chosen as cases for this exploratory and comparative study: one represents an established firm in logistics services, and another one is a fast-growing digital freight forwarder. Innovation projects were selected as the unit of analysis, which helped understand the factors associated with successful or less successful innovations. This comparative case study provides evidence of three possible changes that the case companies could bring to the current production and consumption systems. These three changes are (1) changing logistics strategies; (2) changing logistics trends; (3) changing production and consumption patterns.

Integrating a dynamic perspective of enterprises as actors who continually create value propositions has two major contributions to transition theory. First, this research provides a balanced view of companies and moves beyond the niche-actor and regime-actor dichotomy, and firms' value propositions can contribute to niche-level innovations by forming logistic strategies and regime shifts by changing production and consumption systems. Second, this research helps redefine the role of distribution activities in transition studies (e.g., logistics and transport services, energy services) because the results show that logistics activities could play a proactive role in reconfiguring production and consumption systems.

Efficiency in Energy Systems: Are we missing anything?

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Energy efficiency (EE) is not only described as one of the lowest cost energy resources with multiple benefits but also considered a potential policy instrument in limiting GHG emissions (OECD/IEA, 2014; National Academies of Sciences, Engineering, and Medicine, 2021). In the residential sector alone, EE investments offer significant energy saving potential and emission reduction between 20-25 percent (Dietz, Gardner, Gilligan, Stern, & Vandenbergh, 2009; Wada, Akimoto, Sano, Oda, & Homma, 2012). However, some scholars and practitioners have raised concerns regarding the conceptual, methodological, and practical limitations of the energy efficiency actions in realizing net energy savings, carbon reductions, and equitable outcomes (Wamburu, Grazier, Irwin, Crago, & Shenoy, 2021; Dunlop, 2019; Figge, Young, & Barkemeyer, 2014; Keay, 2011; Shove, 2018). Lately, it is also being realized that the techno-economic abstraction of energy efficiency alone may not be sufficient in explaining and limiting the residential energy use in line with the national and global carbon emission commitments (Sorrell, Gatersleben, & Druckman, 2020; Mourik, et al., 2017). To meet the long run sustainable energy transition goals, a growing body of research identifies the need for studying the energy systems from multi-disciplinary perspectives that bring out its human and social dimensions along with the techno-economic considerations (Carley & Konisky, 2020; Cherp, Vinichenko, Jewell, Brutschin, & Sovacool, 2018; Ingeborgrud, et al., 2020; Sovacool, 2014; Foulds & Robison, 2018; Shwom & Lorenzen, 2012). With few exceptions, however, the underlying synergies, conflicts, and dynamics between the actors, and institutions appear to have not been adequately researched. In this study, we conduct a thematic review of the literature on the energy efficiency objectives, actions, and outcomes from a science, technology studies (STS) perspective to explore the underlying dynamics, synergies, and tradeoffs between the different actors, institutions, and situational contexts. We identify five broad conceptual themes that highlight the statics and dynamics of the energy efficiency actions and outcomes-(i) economic efficiency versus sufficiency actions; (ii) role conflicts at the individual, household, and institutional levels; (iii) long term goals versus short term politically feasible objectives; (iv) demonstrable savings versus normative ethics and equitable ideals; and (v) public policy goals versus market-based frameworks. We believe that reconciling the efficiency actions and outcomes from the above thematic perspectives will be crucial for the sustainable energy transition at different scales. Even if it is not possible to satisfactorily align the synergies and successfully resolve all conflicts, a better understanding

and healthy discussion of these challenges will certainly help in evidence-based policymaking and getting intended outcomes.