

Book of Abstracts

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Contents

Keynotes	6
STREAM: POLICY AND TECHNOLOGY	9
Session 1: Regulating an Imagined Future	9
Session 2 (1): Actors, Stakeholders and Engagement in Standardisation	11
Session 2 (2): Actors, Stakeholders and Engagement in Standardisation	13
STREAM: GENDER AND QUEER STS	16
Session 3 (1): Queering STS Conferences	16
Session 3 (2): Queering STS Conferences	19
Session 4: Utopian Intra-Action in Wastelands: Towards a Queerer Ecological Science	20
Session 5: The Scientific Homo Technologicus - Reinforcement for Break-Up of Gendered Norms?	23
STREAM: MOBILITY, ENERGY AND SUSTAINABILITY	27
Session 6: Reassembling Transportation: STS Perspectives on Mobility Infrastructures, Practices and Politics	27
Session 7: The Bicycle	30
Session 9: Bottom-up Social Innovation and Transitions to Sustainability	34
Session 10 (1): Smart Energy Demonstration Projcets: From Niche to Mainstream?	39
Session 10 (2): Smart Energy Demonstration Projcets: From Niche to Mainstream?	43
STREAM: RESPONSIBLE RESEARCH AND INNOVATION STUDIES	46
Session 11: The Politics of Open Science	46
Session 12: RRI in Practice What do I need to Know on RRI and How can I Implement it?	50
Session 13: Impacts and Implications of integrating RRI into Economic Institutions	54
Session 14: STS for Policy Makers – Exchanging Views between STS Research and Policy	59
Session 15: Responsible Research and Innovation: Making the Collective Aspect explicit	62

STREAM: NUTRITION, HEALTH AND BIOMEDICINE	67
Session 16 (1): Health Controversies and Public Engagement	67
Session 16 (2): Health Controversies and Public Engagement	71
Session 17: STS Perspectives on Food and Nutrition: Materialities, Knowledge and Power	74
Session 18: Research as Development? Science and Technology Studies in Low-Income Settings	76
STREAM: INFORMATION AND COMMUNICATION TECHNOLOGIES, SURVEILLANCE AND SOCIETY	79
Session 20 (1) The Role of Webvideos in Science and Research Communication	79
Session 20 (2) The Role of Webvideos in Science and Research Communication	83
Session 21: Assistive Technologies and Transhumanism viewed from a Multidisciplinary and STS Perspective	85
Session 22: Digital Transformation and Cultural Turn	88
Session 23: Surveillance and Security Technologies as Objectson Investigation for the Studies of Science, Technology and Society	91
Session 24: Living in Surveillance Societies: When Trust (or Dis-Trust) Draws Collectives, Spaces and Future	95
Session 25: From Countercultural to Commercial — Social Change and Sustainability in Making and Design	99
Session 26 (1): Robotics and Society	102
Session 26 (2): Robotics and Society	106
Cancelled Sessions: 8, 19	
POSTER PRESENTATIONS	109

Keynotes

Situational Scenarios and the Making of the Future in the Engineers' Laboratories

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The talk presents empirical insights and conceptual considerations on how researchers and engineers in their ongoing work of inventing new technological methods, processes and devices are influenced by imaginations about the future. The empirical data are gained from studying research and development in the field of ubiquitous computing in the U.S., Japan, and Europe. They were gathered as part of the DFG research project "Scenarios as Patterns of Orientation in Technology Development and Technology Assessment". The aim of the project is to understand more precisely how engineers are guided by ideas about the future in their actual work of developing new technology. In the field of ubiquitous computing the protagonists often refer to situational scenarios, a particular type of images of the future. Situational scenarios are a kind of future concept that envisages the future reality of a new technology within its imagined field of application and allows for considerable concreteness and detail.

The results of our research on situational scenarios show that there are several ways how engineers derive technological or social requirements from the socio-technical settings depicted by situational scenarios. Some lead to rather specific technological solutions for very particular applications while others result in generic solutions for a broad range of possible uses. Situational scenarios on the one hand provide technology oriented guidance, meaning that engineers derive technological features from considering a scenario. On the other hand they provide application oriented guidance: In this case the scenario provides the frame of reference for deriving the features of promising contexts of use from the imagined new technology.

Situational scenarios are present in the innovation work we studied in different manifestations: as narrative scenarios, as implicit scenarios, or as prototype scenarios. In this talk I will focus on prototype scenarios. They are, according to our definition, more or less comprehensive implementations of the components of a situational scenario within more or less realistic laboratory settings. As I will show, prototype scenarios possess unique features as mediators between the fictional reality of an imagination and the empirical reality of the existing world. This is because prototype scenarios participate at both realities simultaneously. The paper describes and discusses three different effects and uses in innovation processes that are connected to this particular position of prototype scenarios: specification, evaluation, and demonstration.

Future of Mobility

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Transport generated over 23% of global CO₂ emissions from fuel combustion in 2013. This share is set to grow as transport demand increases. Transport urgently needs to find visions, pathways and incubation niches for radical innovations to allow carbon-neutral mobility. In this talk, we look into a vision, pathway and incubation niches. Firstly, a vision will be sketched how a carbon neutral mobility system looks like: Digitalization, Renewables, Integrated Electric Mobility Services (Hinkeldein et al 2015) and other technical aspects are important but beyond technological innovations, other important aspects such as social practices and infrastructures are also highlighted. Visions provide general orientation and start a discourse about possible and desirable futures. Secondly, the process of transition will be analyzed to identify patterns and mechanisms. This talk addresses the question of how a necessary radical innovation happens. Visions need pathways and actors willing to push the discourse into pathways for radical innovations to become mainstream. Discourses shape the construction of reality and perceived options for action. Thirdly, a case study of a German city with a major automotive production site provides an insight into that discourse: An incubation niche for a radical innovation – Integrated Electric Mobility Services – was established using local, länder- and national R&D funds. The city acted as a role model and opinion leader with bold statement for transition: a dedicated three-story building next to the main station. As a consequence a dialogue is established about legitimacy and norms – is the privately owned car the only option for mobility and should we continue producing ever more cars and provide space only to be used during peak hours? Alternatively, should we embrace the idea that change only becomes real if we make that change ourselves? The city started the dialogue with a striking argument: We offer a place for discourse. We offer the new systems so citizens can test them. We understand that the New only becomes part of daily routines if there are strong opinion leaders who understand, explain and offer the New as an opportunity.

Radiation Protection, STS, and our Comfortable Sofa

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The world is becoming increasingly aware that human activities ranging from nuclear power production to the use of radiation in medicine could be highly harmful and that protective actions should be taken. Scientists have devised sophisticated technologies to detect and control radiation. Engineers have optimized the design of nuclear reactors and medical technologies. Practitioners have been faithfully following technical routine safety procedures. Medical personnel and technicians have been constantly educated in new radiotherapy technologies. The overall approach is that if workers are trained, operators are certified, and programs accredited then safety will ensue. But despite all these, incidents in both nuclear industrial and medical sectors continue to arise. Nuclear safety and radiation protection remain major

challenges and the next frontier in nuclear science, technology, and medicine.

Cited causes emphasize failures in techno-scientific issues, insufficient training, poor organizational and managerial structures, and inadequate safety culture. Although there is an international consensus on what safety culture means and consists of—a term widely used by regulators and corporations in nuclear industry—its social dimensions are inadequately understood. In this paper, I trace the history of radiation protection and nuclear safety arguing that Science and Technology Studies scholars should take the lead in achieving analytical clarity of the key notions of radiation risk and safety culture based on the historical, socio-political, economic, and cross-national context in which these concepts have been embedded. After all, it is time to revise the notion of safety culture taking into account not only the questionable use of nuclear power for the production of energy but also the wide use of radiation in the medical sector.

Resistance and Replication: Feminists as Insiders and Outsiders in the Knowledge Economy

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The presence and status of women in higher education, science, and research continues to be a concern around the world. While the numbers of women in these fields are improving, a strong presence does not always mean a strong voice for women in these institutional arenas, particularly if they identify as feminist. Feminists inside institutions of knowledge production and dissemination may take advantage of unique opportunities to practice their politics and engage in change-making, but there are significant constraints on their ability to transform these structures while also advancing their careers.

Many countries have instituted policies and practices to increase the number of women in the knowledge economy – as university students, professors, and researchers. The existence of these policies, often accompanied by the goal of democratization (including gender equality), begs for attention to the ways organizational change and policies affect differently gendered individuals, the production of gendered knowledge, the gendered nature of work and careers, and social change.

Why do feminist scholars choose this work? How do the opportunities and constraints embedded in the gendered (and raced and classed) structures of institutions shape their careers and knowledge production? How do they engage in political resistance that subtly and not-so-subtly challenges the gendered cultures and norms (including assumptions of science) of these institutions and of society?

The data for this comparative research comes from in-depth interviews with feminist scholars/researchers who work in institutions of higher education, research institutes, or as independent scholars. The analysis of the differences and similarities in institutional structures, laws and social policy, and gendered cultures, provides insight into these women's experiences as both "insiders and outsiders," and the ways we can make these knowledge economies more inclusive.

STREAM: Policy and Technology

Session 1: Regulating an Imagined Future

Chair: Rita Giuffredi, University of Bologna, Italy, CERN/Geneva,
Switzerland

How to deal With the Imagined Infallible Future of Centers of Accountability? Observations from a Control Room on One of the World's Busiest Inland Waterways

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The general public are regularly exposed to representations of control rooms but will unlikely ever visit one. They are familiar with the control room but not with how it functions.

STS, and particularly workplace studies, have studied them extensively (Heath & Luff 1992, 2000, Button 1993), but generally, despite Suchman (2007) cues, the public imagination of these sites is not taken into account. Also studies into the representation and history of the control room don't look at actual practices (Edwards 1996, Deane 2015, Mattern 2015). This study aims to connect the iconic, popular, and imagined notions of the control room with actual practices of Dutch infrastructural control rooms, in particular that of a Waterway Traffic Management Center on one of the busiest inland waterways world wide. The preliminary findings of the ongoing ethnographic fieldwork indicate a struggle for control room operators to voice their concerns about public safety and their own well being as consequences of financial cut backs. The infallible image of their workplace stands in their way.

The fieldwork is intersected by a media archaeological study of the topos remote and centralised control. As Huhtamo writes: "the facade of innovation may mask tradition, and apparent ruptures disguise hidden continuities." (2011, 28) This component shows how the topos was always about technological sophistication, ever since the science fiction drawings from the late 19th century onwards. In this respect it has shifted from a secret technology to a PR device as part of accountability efforts for those in public office (since 1940s), to a (maligned) notion in popular culture (1960s onwards), and finally as an ideal for personal media practice (starting in the 1980s). What has persisted until this day, and what the operators central to the ethnographic study run into, is the use of the control room, by politicians, for communicating accountability. The PR events tap into popular notions of the control room as a state of the art technological site, permanently imagining future events.

Here it becomes apparent that these sites not only produce immutable mobiles (Latour 1990, Suchman 1995, Vertesi 2008), but that they, so I argue, have also become an immutable mobile themselves. The hard fact that is presented, and which effaces the long cascade that precedes the image, is governance through high-tech control. Against this image of sophistication, against this technological lead, operators seek a way of giving account. Instead of calling these control

rooms 'centers of calculation', as Latour does, or 'centers of coordination', as does Suchman, I propose to label them 'centers of accountability': as they 1) track distant objects (who make themselves accountable) so they are accounted for, 2) take a public into account (routine communication, i.e. tell a barge of his slot in a sluice schedule), and 3) are part of a political cascade of accountability, where infallibility makes a safeguarded future imaginable.

Keywords: workplace studies, media archeology, accountability

Performative Narratives in European Scientific Policy-Making: Insights from Key European Science Policy Documents and Exploration of the Policy-Makers' Visions

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Collective imaginaries are crucial in causing and shaping the evolution of political decisions. In the field of scientific policy, narratives on both science and political power are invoked to sustain and justify public deliberations. More, in many cases the contribution of the two cannot be clearly separated, since they are deeply interconnected and co-produced. European science policy makes no exception; on the opposite, European decisions possibly need to anchor even deeper to powerful narratives, given the weaknesses of European institutional asset, and the long-standing "Euro-crisis". The main instruments of European scientific policy are the Framework Programmes. Since 2000 Europe has evolved from the will to turn in "the most competitive and dynamic knowledge-based economy in the world" (Lisbon European Council) to the goal of the current Programme, Horizon 2020, of building an "Innovation Union". The path followed by European policy making draws firmly upon narratives on science, economy and political power, which have been acquired and developed for the European context in the first decade of the century, and are now widely referred to in official statements. An analysis of key European policy documents sheds light on some of these, and the comparison with the Framework Programmes establishing acts – laws shaping at once EU scientific and societal development – exposes the incorporation of some political-economic narratives in the scientific field. The overarching narrative we can identify is the linear chain from scientific development to economic growth, to an overall improvement of the citizens' standards of living, which represents the main legitimation for European scientific policy. The call to combine public and private enterprises, and the faith in competitiveness as the driving force for European relaunch is also a persistent ideology integrated in European science policy. Equally important is the narrative on innovation, a real buzzword of current policies, and the one on excellence. Similarly, pushing on urgency of action and technological outcome reveal some broad policy mind-sets like short-termism and utilitarianism. A significant contribution to the reception and development of these narratives must have come from the policy officers' imaginaries about science and society, but these have rarely been explored by scholars (Nowotny 2014). Preliminary results of an ongoing research will try, keeping an eye on the narratives identified in the documents, to explore their views and attitudes, as well as their role in the policy-making process and the perception of their contribution to the policies. Finally, since no collective political imaginary can

be legitimate if it doesn't invoke citizens as its ultimate beneficiary (Nowotny 2014), also their ideas about the citizens' democratic engagement in European policy-making process will be analysed. The final aim is on one side to expose the performative narratives shaping the imagined future of European scientific research, and on the other to follow the policy making process leading to actively regulate the field, in order to understand at which steps and how these narratives are incorporated in the European decisions. [Reference to: Nowotny, H., 2014. Public Understanding of Science, 23(1), pp.16–20]

Keywords: European Union, performative narratives, scientific policy, policy-makers' imaginaries

Session 2 (1): Actors, Stakeholders and Engagement in Standardisation

Chair: Kai Jakobs, RWTH Aachen University, Germany

Standard-Setting Processes and Their Actors: The Case of Telecommunication Standards

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In the current era of rapid and continuous scientific development, technical standards constitute a significant part of quotidian reality. While being the main drivers of innovation, they ensure interoperability of technologies and by these means contribute to increased globalization and the flourishing of international trade. The processes of technical standards-development typically attract a great variety of stakeholders: in particular, this applies to telecommunication standards, characterized by large network effects and a composite normative structure.

Despite a considerable number of studies related to the impact of telecommunications standardization on technology innovation and competition, the interplay between its actors remains relatively unexplored. Yet, a detailed analysis of standardization players and their range of involvement in the development of technical norms would shed light at the mechanics of standard-setting and, in a broader sense, its (potential) influence on the society.

Taking a comparative approach, this paper reveals the extent to which various stakeholders contribute to the design and formulation of technical standards, by analyzing working procedures of the prominent Standard-Setting Organizations (SSOs) operating in telecommunications and ICT sector. In this regard, it focuses on the legal framework of the Telecommunications Standardization Sector of the International Telecommunications Union (ITU-T), the Standards Association of the Institute of Electrical and Electronics Engineers (IEEE-SA) and the European Telecommunications Standards Institute (ETSI). For this purpose, the processes of standards development are analyzed according to the following three stages: (1)

proposal for standardization project, (2) technical work on formulating of a standard and (3) approval of standard document. The subsequent normative part aims to illuminate whether the standard-setting processes of the SSOs at issue provide a sufficient level of participation for all interested actors. It suggests that the balanced representation of stakeholders in relevant standardization procedures is essential for standard's acceptance by the market. Ultimately, this paper addresses the arising legitimacy concerns by scrutinizing the mentioned processes against the principles of transparency, openness and due process.

Keywords: Technology standard-setting – Transparency – Openness - Participation

Trust in Open Standardisation?!

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The ongoing proliferation of truly ubiquitous systems like the Cloud, the Internet of Things and Cyber-Physical Systems brings to the forefront issues of trust in these technologies. This paper argues that truly open standardisation may help establish and increase trust in a standardised technology. It identifies and discusses necessary criteria of an open standardisation process and why meeting them would help develop technologies that are perceived as, and actually are, trustworthy. The paper argues that truly open standards will help increase trust in the standardisation process, its outcome – the standards - and in standards-based technologies. It concludes that standards bodies need to adopt a new attitude to 'openness' to actually enable trust in standardisation.

Keywords: Open standardisation, Trust, Cyber-physical systems

Benefits, Cost and Consequences of Standards´ Setting: A Literature Review

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This article is exploring the cost of setting standards in modern European and International economies. The costs might be in two directions: a) that of economy, b) that of ethics. We further discuss, the cost of setting standards in the Greek companies and try to explore the real cost for the (really heavily) hurt by the recent capital controls Greek economy, according to the Organisation for Economic Co-operation and Development (OECD) report for the well being of Greek people.

Keywords: Standards, cost, capital controls, Greek economy

Session 2 (2): Actors, Stakeholders and Engagement in Standardisation

Chair: Kai JAKOBS, Computer Science Department, RWTH Aachen University, Germany

Technical standards and the Law: the Case of the invalid Data Retention Directive

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In April 2014, the Court of Justice of the European Union published a landmark decision. For the first time, the Court declared a Directive invalid as violating fundamental rights protected under the Charter of Fundamental Rights in the European Union, namely the right to privacy and the right to protection of personal data. The ruling had effects on every jurisdiction of the EU member-states, as national legislation based on the invalid Directive had lost its legal basis. At the same time, the effect was broader than only the law. Technical standards have been using the Directive as normative reference. The ETSI TS 102657 on Lawful Interception (LI) for instance is built on requirements derived from the invalid Directive. Should the voluntary standards be amended? What about the entities already applying the standards being based on law declared to violate human rights? What is the role of "normative reference" in a standard and how binding it is? This paper aims to examine the relationship of technical standards and the law in the above case of invalid legislation as normative reference of a technical standard.

Keywords: standardization, Data Retention Directive, normative, personal data

Smart City Standards – results of an Austrian research project

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Cities are responsible for 60 to 80% of global energy consumption and thereby cause 75% of greenhouse gas emissions. Considering that on a global level already more than half of the population lives in cities – and that this number is steadily increasing - and considering the growing scarcity of resources, sustainable urban development and an evaluation process based on indicators is becoming more and more important. Several institutions have started to develop indicators for Smart City evaluation. But, without common standards it is difficult to compare urban development in a transparent and comprehensible manner. Similar indicator titles may not refer to the same objectives and often use different calculation methods and data bases.

As of yet, only few countries have started a regular national standardization process. On international level the committee "Sustainable development in communities" of the International Organization for Standardization (ISO) was established to deal with this. It has already issued

some standards addressing the definition of indicators, requirements, guidelines and methods to achieve sustainability and reduce environmental impacts on communities or regions.

In this presentation the ISO standardization as well as some outstanding national European activities will be presented, namely the German and the British roadmaps to Smart City standardisation. I will further outline what are the main aspects for standardization of smart city activities and present a “pathway to a smart city” with relevance to STS. The Austrian state-of-the-art according to interviews with smart city-stakeholders is summarized. My presentation is based on the project “Smart City Standards” of IFZ, UBA and ÖGUT which was funded within the research programme “Stadt der Zukunft” (“Cities of Tomorrow”) in 2014-2015.

Keywords: smart city, standardization, indicator, process landscape

Cloud Computing and Standardization. Implications of an Expert Workshop as a Futures Technique

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Cloud Computing (CC) describes computing models in which users access networks, servers, storage, platforms, applications/services as ubiquitous, shared pools of scalable, rapidly provisioned computing resources. Undoubtedly, CC is important for allocating and distributing IT resources: Internet of Things, Big Data, and smart manufacturing applications require dynamic and efficient management of data storage, transfer capacities, and computational power. Furthermore, a significant share of everyday communication is realized via cloud technologies—especially when considering the steady rise of global smartphone usage. Smartphones are extraordinarily dependent on CC infrastructures: only those provide the mobile devices and their installed applications (apps) with full functionality.

Consequently, when taking those two realms of life—the professional and the private domain—into account, CC must be considered a relevant technological phenomenon, deeply interwoven with a broad range of social and societal structures and processes. One central cornerstone of the emergence and institutionalization of processes, structures and social norms accompanying CC technology and its respective usage refers to standardization. According to this argumentation, sociology of technology and organization contributes to the scientific examination of standards development.

We explore this issue of standards development by drawing on results from participating in cloud-related research projects: on the one hand, by developing and conducting a futures workshop dealing with the topic of CC development within the timespan of ten years (2015-2025), we gathered German CC experts stemming from the so-called Trusted Cloud Technology Programme run by the German Federal Ministry for Economic Affairs and Energy. Those experts conducted research and development—in different groups of science institutions as well as small and medium enterprises (SMEs)—aiming at CC-preparation for trustworthy IT applications. Besides stressing the importance of such (qualitative) futures techniques for gaining insights in CC technology standardization, our contribution will highlight the experts’ critical discussion of standards development: results are clustered along the domains of privacy/security/safety, policy-regimes on (inter-)national and transnational level, infrastructures and

architectures as governance arrangements, as well as stakeholders' influence on the standardization itself. On the other hand, the contribution will discuss the applicability of such an approach in different professional realms, such as industrial cloud-based smart manufacturing solutions and smartphone apps aiming at transparent and user-adaptable cloud-services.

Keywords: cloud computing, standardization, futures techniques, experts

STREAM: Gender and Queer STS

Session 3 (1): Queering STS Conferences

Chairs: Julian ANSLINGER, Bielefeld University, Cluster of Excellence Cognitive Interaction Technology (CITEC), Gender & Emotion in Cognitive Interaction Technology Lab, Germany; Thomas BERGER, IFZ – Inter-University Research Center for Technology, Work and Culture, Graz, Austria

“Make Kin Not Babies”: Discussing queer-feminist, non-natalist perspectives and pro-kin utopias, and their STS implications

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In November 2015 Donna Haraway, Adele E. Clarke, Michelle Murphy, Alondra Nelson, Kim TallBear and Chia-Ling Wu presented their points of view to a panel discussion with the title “Make Kin Not Babies: Toward Feminist STS Pro-Kin and Non-Natalist Politics of Population and Environment” at the 4S (Society for Social Studies of Science) meeting in Denver, Colorado (quoting abstract session nr. 27, http://4sonline.org/ee/files/program_w_abstracts.pdf):

»Feminist STS scholarship has long and richly addressed biogenetic reproduction, focusing on race, region, sexuality, class, gender, and more. However, feminist STS has also largely been silent about reducing the human burden on earth while strengthening ecojustice for people and other critters as means and not ends. Can we develop anti-colonial, anti-imperialist, anti-racist, STS-informed feminist politics of peopling the earth in current times, when babies should be rare yet precious and real pro-family and community politics for young and old remain rare yet urgently needed? How can we develop collaborative politics recognizing that peoples subjected to (ongoing) genocides may need more children? How can we intervene in the relentless glut of attention devoted to problematic, costly "rights" and "needs" for (mainly richer) women to have babies as an individual "choice"? Questions: How to nurture durable multi-generational non-biological kin-making, while humans everywhere transition to vastly less reproduction? What alternative ways of flourishing can be nurtured across generations and across cultures, religions, nations? How to deter on-going anti-feminist population control efforts while generating innovative discourses that legitimate non-natalist policies and choices? How to promote research on forms of contraception women and men want (and can use under diverse circumstances) and reproductive services that actually serve? How to build non-natalist kin-making technologies and sciences in housing, travel, urban design, food growing, environmental rehabilitation, etc.? Where are the feminist utopian, collaborative, risky imaginings and actions for earthlings in a mortal, damaged, human-heavy world? Why hasn't feminist STS taken the lead in such fundamental endeavors?«

In our session we organise an interactive workshop setting, where we start with six ca. 5 min. inputs about the following topics:

Anita Thaler: "Introduction into queer-feminist, non-natalist perspectives and pro-kin utopias, and their STS implications"

Birgit Hofstätter: "Joys of aunt*hood"

Cleo Woelfle-Erskine: "Do ecologists admit queer kin?"

Kirk John Fioreck: "Work Babies, or Kin as Text"

Daniela Jauk: "What the 13 grandmothers might say about queering kin – a first exploration of indigenous knowledge(s)"

Boka En: "Non-monogamies and queer kinship"

Based on these short inputs we will create a setting to share perspectives of "pro-kin utopias". According to the "Queering STS conferences" session where this workshop takes place, we propose to collaborate on the workshop topic and see if we can create something together.

Reference:

Haraway, Donna (2015). Anthropocene, Capitalocene, Plantationocene, Chthulucene: Making Kin. Commentary. In: Environmental Humanities, vol. 6, 2015, pp. 159-165. Download: <http://environmentalhumanities.org/arch/vol6/6.7.pdf> [19.11.2015]

Keywords: kinship, non-natalist, queer-feminist, queer ecology

Antifeminist Platforms in Austria: Actors, Discourses, and Strategies of Resistance

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Within the last three decades initiatives, platforms, and associations dealing with masculinity politics in some ways emerged throughout Europe. These platforms can be differentiated according to their attitudes towards gender equality. On the one hand we can find balanced approaches, critically interrogating privilege and power of men, while also considering costs and diversity of masculinities (cf. triangle model, Messner 2000). These balanced approaches are contrasted by unbalanced men's movements who stylize men as victims of women (and feminism), while completely ignoring diversity and privileges among men.

We can find examples for both in Austria, whereas men's movements mainly fall in three categories: institutionalized men's work (e.g. counseling centers), men's initiations groups, and father's rights movements (Brem 2012). While a body of work is emerging for the situation in Germany specifically dealing with antifeminist approaches in men's movements (e.g. Gesterkamp 2010, Kemper 2012, Rosenbrock 2012, Claus 2014), gender politics of men's and father's rights movements in Austria have not been examined until recently (Scambor and Kirchengast 2014).

This paper is based on the work of Scambor and Kirchengast (2014) and re-examines actors, rhetoric and platforms of antifeminist men's movements in Austria. The tropes we find in media and everyday culture span from "men as victim of domestic violence", to "failing boys" to

“divorce-victims men.” Feminism (singular, sic!) is depicted alternately as anachronism or fictitious enemy. We are also systematically fact checking popular statements and contrasting them with empirical data. Based on our analysis we give recommendations for balanced approaches to masculinity politics that are oriented towards gender equality and suggest some strategies to counteract antifeminist activism more generally.

Keywords: Antifeminism, men studies, men's movements, backlash

Session 3 (2): Queering STS Conferences

Chairs: Julian ANSLINGER, Bielefeld University, Cluster of Excellence Cognitive Interaction Technology (CITEC), Gender & Emotion in Cognitive Interaction Technology Lab, Germany

Thomas BERGER, IFZ – Inter-University Research Center for Technology, Work and Culture, Graz, Austria

Organising Transdisciplinary, Accessible Conferences

CHANGING WORLDS, Organising Committee, Vienna, Austria

What might we mean by 'queering STS conferences'? Yes, of course, queer exceeds definition. But there are a set of ethical/political/epistemological/practical assumptions that we believe to be integral to this most vocal of words. We believe that a queered (and, by extension, queering) STS conference is one that, like the term queer, exceeds and subverts definitions as well as questions and deconstructs boundaries and barriers – in our minds and hearts as well as our physical environments.

This is not just about benevolently 'protecting' those who stand on the outside of our hallowed halls/walls, begging to be let in. Quite often, 'they' will not want to join 'us' anyways. Putting up a sign 'Artists welcome – if you must' will probably not be sufficient to expand our esteemed company and horizons. And while there is an ethical/political component in actually and actively accommodating and embracing diversity, there is a strong epistemological argument in it as well, as those who are unable/d to cosy up in the confines of conventional (academic!) conferencing are probably more likely to see the poisonous needles hidden in the haystack (c.f. Collins, 2000; Haraway, 1991).

But what does this mean in practice? One thing it means is thinking about the inclusions and exclusions performed by conventions – inclusions and exclusions that we might not even notice until we find ourselves on the outside of the boundaries these conventions erect. For example, we might find ourselves on the outside of the toilets at a conference venue, instructed by the ladylike and gentlemanly signs to steer clear. We might find that our ways of conveying or constructing knowledge fall outside the bounds of 'good academic practice'. We might be kept outside by linguistic conventions and peculiarities, including the ways abstracts are written and framed. Or we might find ourselves outside the toll house, barred from entry by high conference fees without any chance for reprieve. (Yes, we're looking at you, STS Graz.)

Queering STS conferences means both thinking about these inclusions and exclusions and doing something about them. Having organised the transdisciplinary Changing Worlds conferences in Vienna, we propose a 1.5-hour workshop about these very thoughts and actions. We proceed from our own experiences in trying to bring together academic, activist and artistic perspectives in a reasonably accessible space. More importantly, we want to invite all participants to weigh in and share their experiences, thoughts, feelings, and strategies as well as form networks for queerer conferencing.

Keywords: transdisciplinarity, accessibility, conference organising

Session 4: Utopian Intra-Action in Wastelands: Towards a Queerer Ecological Science

Chairs: Cleo WOELFLE-ERSKINE, Institute for Advanced Studies in Science and Technology Studies (IAS-STs), Alpen-Adria-Universität Klagenfurt/Vienna/Graz, Austria, July COLE, Independent Scholar, Graz, Austria

Lucky, Trashy: Sunshine and Other Queer Waste

July COLE

Independent Scholar, Graz, Austria

Queer theorizing, as a theoretical contribution of a waste segment of humanity, might bring new takes on waste to political ecology. As every ecology on earth springs from the sun's foundational squandering of its rays, the industrial ecology motto of "zero-waste" is not a sustainable principle but a death sentence. I consider waste as shining, generosity, creation, relationship, spirit, taste, luck, and lifeline, and traces waste-manifestations including bioluminescence, music, sweat, infrared, air, and laughter. I hold out the popular song "That Lucky Old Sun" as a sound text contrasting this model of waste with the capitalist industrial systems that capture excess labor and the waste-related rhetoric that sponsors and enforces marginalization and murder of black, poor, queer, and other disposable humans. "Queer ecologies" are broadly recognized as entangled with waste: abjection, flamboyance, irredeemability, outbursts, seed-spilling, reproductive refusals, poetic excess. But accounts of these "ecologies" often don't go beyond ecological metaphor, and recent multi-species scholarship often disavows intra-human responsibility in its turn to the more-than-human. Critical race theory, indigenous studies, black studies, and trans theory provide tools and optics for a reparative encounter with waste as inextricably enmeshed with uncontainable life.

Keywords: Sun, waste, queer, poetics

Response-Ability for Techno-Ecological Wastelands? Thinking with Roma Photography in a Former Military Training Area

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Unprecedented environmental changes in the era some call the Anthropocene give renewed impetus to the ecological necessity of thinking beyond entities towards an understanding of the inseparable entanglements of human and nonhuman, nature and culture. They also suggest that 'the technical' (such as the conventional and alternative energy structures) has become an integral part of ecology. While the science of ecology has long focused on the power of relation-creation, life and death, and disruption and resilience, queer theory has emphasized the importance of disordering, slow violence, disposable human and more-than-human bodies and other forms of damaged life. Oriented towards other wordings that can be conjured from within

the here and now, queer ecologies have also embraced an ecological ethos of living with injury without the recuperative horizon of fixing it. This paper contributes to the attempt to fertilize the science of ecology with approaches of queer and feminist new materialisms. It examines what queer ecologies could mean for rethinking response-ability towards that which cannot respond with suffering or death, and how an ecological ethics committed to the rupture of indifference might rest on facing 'the inhuman' (Barad 2012). It does so by turning to a post-industrial former military training area in northern Bohemia. This is a wasteland of particular kind: a place of profound ecological disruption and soil and ground water contamination but also a refuge for rare animal and plant species, as well as displaced and impoverished human communities often deemed unassimilated(able). The paper explores techno-ecological interrelations by drawing on the experiences of biologists and collaborative research with Roma women who were given analogue cameras to document their involvements with the place. Considering their photography and ensuing stories as world-making devices, the paper examines the women's attuned attentiveness to a range of energy infrastructures in and of the landscape: uranium pipes, aqueducts and solar fields are provocations to think through what kind of interrelations, response-abilities and affects are enacted and incited, and what this might mean for STS research practice.

Keywords: response-ability, energy infrastructure, new materialism, inhuman

Slime and the Other

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What we call slime – glandular secretions, slippery mucosal linings, the thick fluids that fill the eyeball and the egg sac – connects animal and human in the shared project of navigating liminal spaces between bodies. For many molluscan and fish species, slime is a material and a method by which the body buffers itself from the environment, and an extension of the body that is not a body.

This project explores notions of queer and its inhuman affinities with slime and the other. Our term mollusk is derived from the Latin word mollis, meaning soft or supple. Mollis was a Roman term for a homosexual man or woman – softness and suppleness have long been coded as queer. Molluscan bodies and human bodies share a basic design plan – a tubular, central, mucus-lined interface between the self and world that is the gastro-intestinal tract, one lined with mucus and figuring prominently in queer forms of eroticism.

Slime is protean, and human and gastropod are entwined all the way down; yet through a process of enclosure, we have become alienated from the foundational materiality of our own bodies, and our kinship with others who use their own slime to navigate their environment. Paradoxically, humans reproduce the utility of mucosal slipperiness in the world of the machine: the slippery high-temperature viscosities of engine oil that roll the camshafts of engines in their orbits, and pistons in their cylinders, as well as the thicker, slower, cushioned lubrication of grease packed into the race of a bearing. Eve Sedgwick called identification a force that can carry us across even ontological cracks, seemingly unbridgeable divides. Can slime be an imaginal material that carries the human across the great schism of the human/animal divide

and beyond? How can a queer inhumanism shift these entrenched binaries?

Keywords: Slime, other, queer, inhumanism, gastropod, mollusk, animal, liminal, gastrointestinal, machine, viscosity, mucus

My Dead Cutie: Extinction and Mourning Multispecies Communities **Cleo WOELFLE-ERSKINE**

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My queer reading of the iconography of ecological science draws on queer theory on public mourning as politics, to consider the political and ethical potentials of a collective public mourning for species facing extinction. In September, a scientist using the hashtag #cuteoff shared original photographs of their research subjects, challenging the visual dominance of human and mammalian cuteness with photographs of slime molds, plants, slugs, bugs, and strange fish. Many were incidental photographs taken while in the field, showing the everydayness of encounters with roughhousing cheetah cubs or rare scorpionfish dragged up from the deeps. The photographs provide a glimpse of 'nonstandard intimacies' (Berlant and Warner) – tiny animals perched on or wrapped around the poster's finger, or large ones held in a trap or firm embrace while the scientist collected samples from it. What none of the photographs showed were dead research subjects, nor the absence, via extinction, that Bird Rose calls double death.

While some of these photos were taken in the lab, many were taken in wastelands—a term that doubly signifies blasted landscapes (Tsing) and English commons— "lands that were potentially, but not yet, improved" (Goldstein). Many of these scientists' research charts, documents, and models ongoing extinction, yet none chose to post pictures of their dead cuties, nor narrate their own pain of extinction (van Dooren).

Employing an ethnography of the trace (Muñoz), I look for signs of public grief and mourning in science communications on twitter and at academic conferences. In encountering interspecies love demonstrated in the #cuteoff, I bring queer thinking about the AIDS crisis to bear on public ecology in a time of extinction. What is lost when love mixed with loss and pain is hidden from view? Scientists are on the front lines of the sixth mass extinction, watching intimates die at alarming rates. Can queer approaches to premature death and transgender approaches to making-monstrous (Stryker) via environmental contamination politicize these deaths as ACT UP did for AIDS deaths? What radical politics and transformative potentials can arise from publicly witnessing these transgressive intimacies, even or especially among more-than-human others who are dying because of human (in)action?

Keywords: queer, mourning, extinction, ecology, scientists, social media, imagery, multispecies communities

Session 5: The Scientific Homo Technologicus - Reinforcement for Break-Up of Gendered Norms?

Chairs: Kristina BINNER, Johannes Kepler University Linz, Susanne KINK, Karl-Franzens University, Graz, Austria

Scrutinizing the (Gendered) Norms of the Engineer as Paradigmatic Homo Technologicus

Bianca PRIETL

RWTH Aachen, Germany

Considering the entanglements of technological artefacts and processes with scientific research and work, some voices within STS discuss the partly disparate unity of science and technology as “technoscience(s)” (cf. Wajcman 2008; earlier Haraway 2000 [1985]). Less attention has so far been paid to the intertwining of technological or engineering epistemologies and scientific work. That is, what are the belief systems, orders of knowledge and gender norms conveyed by engineering practices and technical artefacts that are thereby transported within the realm of the natural sciences? The call for papers has hinted at this idea by referring to the possibility of scientific work getting “higher, faster, further”. Before discussing this question it is, however, necessary to take a closer look at the respective norms and values that form the pillar of the figure of the so-called homo technologicus, if one is not to reproduce stereotypical and monolithic images of the homo technologicus as “the nerd”.

Thus, this paper proposes to take one step back and take a closer look at the cultural and socially contingent concepts of “engineering” and its epistemologies as it is proposed within Engineering Studies (cf. Downey/Lucena 1995). Making engineering itself the object of sociological and gender research, the questions to be asked can then be formulated as follows: What characterizes the engineering activity? What are the professional norms that constitute the subject of the engineer as the paradigmatic homo technologicus? And, which gender norms shape the engineering subject?

In order to answer these questions and thereby develop an understanding of what it means to do engineering or work technologically that are considered increasingly influential for scientific work, I am drawing on own empirical data as well as relevant literature. On the basis of qualitative interviews with Austrian and German engineers, I am analysing their professional self-understanding from a gender perspective. Data analysis thereby focusses on the discursive construction of the idea of working technologically and of the figure of the engineer as well as on the gender norms attributed to these concepts. On the content level it is the relationship between technology and nature as well as technology and the social that are of importance when it comes to doing ‘real’ engineering. On the basis of empirical findings it is argued that engineering and working technologically are understood as largely isolated from ‘natural’ as well as social surroundings, fostering among others ideas of objectivity and neutrality, including gender neutrality. Claiming gender neutrality, explicit exclusions of women are rarely mentioned, whereas more subtle inscriptions of masculinity can be found within professional norms of the engineer and doing engineering. Sketching an image of the gendered homo technologicus as

rationalistic, instrumentally oriented, highly structured and efficient 'man', the paper concludes by giving an outlook on possible effects for 'technicized' scientific work.

Keywords: symbolic gender norms, engineering, technology, dis/continuities

The Neglected Body of the Female Scientist

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The picture of the ideal scientist including normative expectations of analytical competence, objectivity, and rationality has been thoroughly investigated (cf. Acker, 1990; Faulkner 2007, 2008; Fritsch, 2014; Knights & Richards, 2003; Metz-Göckel, 2009). So far, less emphasis has been given to how the scientific body is constructed (cf. Bell & King, 2010; Bell & Sinclair, 2014; Fotaki, 2013). Drawing on biographical-narrative accounts of women from a European SET university (Haas et al., 2016), I investigate embodied academic practices.

While in management the notion of the "ideal" organizational member corresponds with a strong, healthy and beautiful (male) body, the situation is far subtler in academe: The picture of the ideal scientist (cf. Acker, 1990; Faulkner 2007, 2008; Fritsch, 2014; Knights & Richards, 2003; Metz-Göckel, 2009), does – at first glance – not describe a specific body. Instead, academic work is seen as mindful and bodyless (Bell & Sinclair, 2014). However, this separation of the mind from the body also refers to the distinction of mindfulness – as a stereotypical male attribute – vs. emotion – a stereotypical female attribute – (Hope, 2011). The mind-body – dualism leads to sexuality and femaleness as a taboo (Gherardi & Poggio, 2001; Kelan, 2012). Women are perceived to have a deviating body (Bell & Sinclair, 2014; Fotaki, 2013; Simpson & Lewis, 2010). First analysis of data shows both, the need for neutralization of the female body in order to adapt to the inherent existing norms, but also the ongoing ascriptions to the female body as a sexual entity. This leads to an ambivalent situation for them as they have to cope with an irresolvable contradiction: They are required to behave according to the existing standards of embodiment and to not disrupt the masculine order on behalf of their bodily performance and otherness (Bell & Sinclair, 2014; Kenny & Bell, 2001; Trethewey, 1999), but at the same time cannot escape their bodily appearance. For women, the way to express and perform their bodies then seems quite limited and the normative ideas about the scientific body go hand in hand with the exclusion of those who do not fit in; no matter if they seem to be too female, too high, too emotional or too sexual.

The marginalization of the female body – and thus the marginalization of women in research – has consequences not only for the understanding of academic cultures, but also on the way how scientific knowledge and expertise is produced, negotiated, altered and further developed. The relationship between body and knowledge production therefore needs to be further investigated in detail (Bell & King, 2010; Bell & Sinclair, 2014). In my research about the neglected body of the female scientist, I thus concentrate specifically on the analysis of bodily experiences, expressions, and accounts, including the above-mentioned contradictions, ambivalences and challenges for female scientists.

Keywords: the scientific body, gendered norms, embodied practices, the ideal scientist

Bringing Gender into MINT or: On being Othered

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Nowadays, knowledge gained within the boundaries of a single academic field is not considered being sufficient to answer the so-called “big societal questions” (Schulz 2015) and “hybrid problems” (Jahn 2008, 24) this more and more complex world is facing. Hence, interdisciplinary research projects promise to find joint methods and insights to handle these challenges, convicted “that every discipline relevant for a certain problem-oriented issue is able to contribute to an integrative understanding of the problem” (Arnold/Gauber/Wieser 2014, 112, German quote translated by myself). In this paper, I want to reflect on my own work as a member of an inter- and transdisciplinary graduate school engaged with the topic of hybrid lightweight materials for the use in the (auto)mobility industry. In the research proposal, it is argued that those materials represent a key technology for a more ecology-friendly mobility meeting policy requirements for the reduction of emissions. One goal of this research environment in which engineers, physicists, chemists and sociologists are brought together, is to sensitize the participants for a holistic approach on the development of technologies by introducing them to STS and Gender Studies into their schedule and encouraging them to think about who they are constructing for and about the societal impact their work might have. My dissertation project is an ethnographic study within this graduate school. Soon after joining the group, it struck me at that I do not only have to play different roles but that these roles “other” me on different levels: First as “the social scientist” conducting research with qualitative methods formerly not known to the other colleagues who consider those neither objective nor scientific. Second, I am the only expert in STS and Gender Studies and therefore asked to deliver my knowledge about “the society”, this reproduces the idea of science and technology being outside of society. But it is not only my scientific background that “others” me: As one out of two women among ten other men, organizational work is often distributed to me – because “women are better at this”. After showing how “othering” processes work in this specific research environment, I want to ask if and how newly gained knowledge on (the social construction of) gender and technology affects the discourses and practices of my colleagues; be it in their own research, the exchange with other graduate school members or with me and my work in particular. Empirically, this paper draws from ethnographic data, group and personal discussions conducted throughout the last year. My reflection will theoretically be based on the concept of “othering” (de Beauvoir 1953, Reuter 2011) and seeks to find ways to deal with these phenomena in a fruitful way to add to the discourse on how to create productive interdisciplinary research environments.

Keywords: Othering, Gender Studies, STS, Interdisciplinarity, Ethnography

Integration of Gender in Research Content: Superficial Variation or Sustainable Change?

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Gender equality policy in science and research pursues three main goals at European as well as national level: First to increase female participation in male dominated fields and in leading positions (reduction of vertical and horizontal segregation). Second to abolish barriers for women in their career development (organisational change). Third to integrate a gender dimension in research content. To pursue these goals, several measures have been implemented during the last decade in the European Union as well as in Austria. The development of female participation in all fields or in leading positions is represented by quantitative indicators and monitored on a regular basis (e.g. SheFigures). Furthermore several studies focus on organisational and cultural change in research organisations (e.g. case studies conducted within EU-funded projects addressing structural change in research organisations like INTEGER, STAGES or GENOVATE). Hence empirical evidence is available for the first two of the three gender equality dimensions in science and research. The situation differs with regard to the third dimension. A review of gender equality policies in ERA countries shows that several countries introduced gender criteria in research funding or supported the consideration of gender in research content through specific programmes (see Lipinsky 2014 or EC 2014). Although policies are in place there is hardly any evidence about effects of the integration of gender dimension in research content. How is gender operationalised? How are research questions formulated when gender is considered? Do research questions formulated indicate a change of gendered norms? How is gender expertise integrated in research teams? How do different settings to integrate gender expertise influence research organisation or focus of research? The paper focuses on research projects funded within a national programme to integrate gender in research content. The analysis is based on research proposals as well as self-description of projects (e.g. webpages). The paper starts with a description of different gender concepts used in proposals as well as how gender expertise is integrated in research teams. Based on that review it will be discussed to which extend different settings are expected to initiate a sustainable change of research organisation or research content. Finally the limitations of the integration of gender in research teams and research content coming up in the analysis will be discussed as starting points for further development of the programme.

References: Lipinsky, Anke (2014), Gender Equality Policies in Public Research, Luxembourg, Publications Office of the European Union. European Commission (2014): European Research Area. Progress Report 2014, Luxembourg, Publications Office of the European Union.

Keywords: gender, research funding, research content, gender expertise

STREAM: Mobility, Energy and Sustainability

Session 6: Reassembling Transportation: STS Perspectives on Mobility Infrastructures, Practices and Politics

Chairs: Jan-Christoph ROGGE, Berlin Social Science Center (WZB),
Alexander WENTLAND, Munich Center for Technology in Society (MCTS),
Germany

Construction of Losers and Winners in Smart Mobility Innovation Policy in the Netherlands

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Mobility innovations are deeply ingrained in societies, enabling us to perform certain actions and movements, which are essential for participating in the hyper-connected world (Hannam, Sheller, Urry; 2006). These innovations can be considered political as they unevenly allow various means and comfort of access to different societal groups. According to dominant policy frameworks, these groups (target groups) should be equally treated in policy as they share similarities. For example, two equal user groups in jurisdictions or that share similar problems and require similar solutions in policy (e.g. pedestrians in The Netherlands and in Germany, or fuel and electric based car users). However, this is not the case according to the social construction and policy design framework. Policy-making (implicitly) differentiates between groups with the same characteristics by distributing to these different burdens and benefits, or wins and losses. This generates normative concerns of democracy, inclusion, and justice. In this research, we reflect on how social, technological, economic, and environmental wins and losses are distributed among target groups, and how these processes raise questions of the political nature of innovation.

Current research on social construction in policy has focused on social policy, specifically in the areas of health and welfare (Ingram, Schneider, Deleon; 2007). The role of science and technology, however, has been largely ignored. Hence, drawing from the Science and Technology Studies (STS), we demonstrate that considering the way in which specific technological innovations enable actors to perform certain actions within society, is essential for understanding the process of construction of target groups. Furthermore, STS insights enable us to reflect on (implicit) technical and social exclusion of user groups through given innovation designs, or through non-consideration in innovation policy (see e.g. Wyatt et al., 2002).

We draw on different disciplines to explore a new field of smart mobility, which is arguably reshaping current transport policy domain. Smart mobility is leading to the emergence of mobility target groups, such as drivers of electric vehicles. This also generates new wins and

losses for the groups. Furthermore, smart mobility is gaining increasing attention because it comes with great promises about solving societal issues such as congestion and air pollution. However, through the processes of excluding some target groups, smart mobility may fail to solve social challenges in an inclusive way. As an emerging policy domain, smart mobility is confined to a forward-looking policy agenda and we are interested in reflecting on what role STS could play in guiding more inclusive innovation policies.

Empirically we focus on Smart Mobility policy in The Netherlands. Specifically, the efforts of the 5 November group, who developed a roadmap for smart mobility in the Netherlands for the period 2013-2023 ('Better informed on the road '). This document provides the basis for strategic planning in using smart mobility innovation by the Ministry of Infrastructure and Environment, and its implementing agency (Rijkswaterstaat). Using research methods based on the document analysis and semi-structured interviews, we show how this roadmap distributes wins and losses among (smart) mobility user groups.

Keywords: innovation policy, smart mobility, target populations construction, Dutch mobility agenda

Visions of Urban Sustainability Transition - Planners and their Environmental Imaginaries

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Transportation has become one of the key pillars in the fight against climate change and other environmental hazards. The high increase in mobility and carbonized means used to facilitate this mobility are increasingly recognized as important areas for intervention. But how change in mobility patterns and decarbonization of transportation systems can be achieved has been a widespread and controversial topic. Transition narratives in both research and policy arenas have, to a large degree rested on structural, linear and dichotomy driven approaches to planning. Here, individual modal/behavioral changes, technological innovation, new policy implementation, are just some of the key aspect of the new paradigm. The relational and socio-technical aspects of this change are thereby on the margins of debate, while the actor is almost lost in the regime discourse. In particular, the everyday negotiating and accountability practices related to environmental knowledge management and planning are being left out.

This presentation aims to contribute to the growing STS-field that explores sustainable socio-technical transportation assemblages. Drawing on a constructivist and ANT driven perspective, I want to investigate environmental knowledge practices in sustainable transportation planning. The following questions are asked: How are new transportation challenges accounted for and negotiated in the changing landscape of transport planning? Who are the important transition actors? How is 'new' environmental knowledge enacted in the everyday practices of these actors? My data consist of interviews and fieldwork in transportation planning units in Belgrade, focusing on three different transport systems as case studies – the metro, parking and bicycling. Growing automobile mobility, increased urbanization, unregulated city development, unresolved

and unfinished infrastructure projects, together with new demands for environmentally consciousness and EU integration, are creating new challenges for assembling the city's sustainable future. This is a particularly interesting case as it can allow us to view how transport is being re-imagined in a large-scale transition context and how and where environmental knowledge fits in.

Keywords: sustainable transition, transportation system planning, environmental knowledge, transition actors

Reconceptualizing Transportation: The Case of the Freight Transport and Logistics Sector

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The paper is discussing the reconceptualization of transport with regards to the freight transport and logistics sector. With globalization and modern societies (although reflexive) as dynamically progressing societies and economies (Beck, Rosa), freight transport and mobility demand is further increasing. Global trade and competitive economies are pushing freight mobility demand causing tremendous environmental and climate burden. For reconceptualizing this sector on one hand technological change is a major driver. On the other hand next to the technological reorganization of freight transport, a debate regarding the reorganization of production and consumption as such including respective institutional reforms towards re-regionalisation and near-shoring of production chains with de-growth or other alternative economy concepts is emerging. The paper is discussing different strands or reconceptualization regarding the freight transport and logistics sector. The paper is discussing on one hand technological and organizational change towards improved freight transport modes (including technological utopia) and modal shift (i.e. the European policy strategy shift to rail and waterborne) and on the many other concepts. On the other hand the paper is looking as well at alternative concepts for example along with an economy of provision and gender sensible economic action - for conceptualizing freight mobility for sustainable production and consumption.

Keywords: freight transport, logistics, demand growth, degrowth, economies of provision, gender sensitive economic action, sustainable production and consumption

Public Transport Infrastructures and Services in Dar es Salaam, Tanzania: Placing Users into Urban Transport Narratives?

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Urban transport infrastructure and services is a very established discourse in the Global North – North America and Europe – and now in emerging industrial nations in Asia. While in the Global North the discussion on urban transport has probably exhausted issues of better infrastructures, services and alternatives, in the Global South the discussion of urban transport is at the

embryonic stage discussing about poor infrastructures, services and tariffs (cf. Gewalt et al, 2009). Taking into account that little has been done on understanding the infrastructures and services across disciplines; this paper seeks to employ a historical perspective in contributing to the STS by discussing how state, technology and people have related over time through urban infrastructures and services in a historically-loaded city of Dar es Salaam, Tanzania. Contrary to other works on Dar es Salaam (Sykes 2012; Pochet and Oliveira 2007), this work builds on the hypothesis that users have been discussed in the backdrop of urban transport narratives at the expense of services providers, namely, the state and private sector. It will argue that analyses of urban public transport in fast growing cities of the Global South, like Dar es Salaam, should include users as they form an important category in tripartite relationship between infrastructures, users and services. To achieve the narrative reconstruction, the paper will use written primary and secondary sources retrieved from the archives and libraries in Tanzania and United Kingdom and it will limit its discussion in the period between 1949 and 1999. The paper will conclude by pointing out that urban master plans, transport infrastructures plans and designs (cf. Master Plans for Dar es Salaam, 1949, 1968 and 1979) over the period did not provide alternatives to the users like incorporating spaces in roads for cycling or future electric or fuel powered city trains hence putting users at the mercy of state and motor vehicle service providers.

Keywords: Transport Infrastructures, Dar es Salaam, Master Plans, Users, Transport Services

Session 7: The Bicycle

Chair: Bernhard WIESER, Institute for Science and Technology Studies (STS), Alpen-Adria Universität, Graz, Austria

The Risks of Cycling: From Injury Prevention to a Population Health and Environmental Problem

Rony BLANK-GOMEL

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Over the last three decades bicycle helmets have spread over much of the English-speaking world, often supported by law, and have made inroads into Europe and the Middle East. They have recently lost some ground, as several states and municipalities repealed helmet laws and some experts oppose helmet promotion altogether. The 'helmet wars', as they are sometimes known, involve political and cultural components and often raise strong emotions. Yet, both proponents and opponents turn to science to support their case.

The current study provides a historical analysis of the scientific debate over the risks of cycling, conceptualized as a shift between two accounts of risks. The pro-helmet risk, consolidated by the early 1990s, is focused on injury prevention. The health benefits risk is focused on public health and environmental problems. While the latter was available since the early 1990s, it became more influential in recent years.

I trace the development of this debate using bibliometric analysis of scientific knowledge (a total of 1,902 papers, collected using relevant keywords from the ISI Core Web of Science), analyzed using the CorText platform. I show the shift resulted from the entrance of new kinds of expertise into the debate, particularly public health, transportation, and urban planning. In addition, I use in-depth interviews with relevant experts and activists, as well as close readings of influential scientific and 'grey' texts to identify how the changes in the networks of expertise were intertwined with new ways of representing the actants involved.

I first trace the rise of the pro-helmet account of the risks of cycling, originating from a particular configuration consolidated during the late 1980s and early 1990s in the US. This configuration relied on the mechanical effectiveness of helmets in managing the impact reaching the individual cyclist's brain during a crash, and on the presentation of cyclists as requiring education and then compulsion in order to use helmets.

The alternative 'health benefits' account of risk, developed during the 1990s and 2000s, included the re-imagining of links, changes in the representation of some actants, and the introduction of new actants. I focus on the following examples. First, the relationship between cyclists and helmets was challenged: cyclists may 'compensate' for increased safety by riding more dangerously, and helmet laws or helmet promotion may deter people from cycling, causing an overall loss in public health. Second, 'the standard cyclist' was fragmented into different kinds, most notably the female cyclist and the old cyclist. Finally, 'the potential cyclists' were introduced into the equation, as well as 'the environment', emerging as another victim of reduced cycling. These join 'the existing cyclists' who took center stage in the pro-helmet network

I suggest that the process described here supports Beck's re-modernization thesis, although applied here for a mundane risk. The bicycle helmet, previously a risk-mitigating technological artifact operating through a closed mechanism, is becoming a 'quasi object'. Its utility is dependent on various disputed psychological and sociological characteristics, and it has become a source of potential new risks.

Keywords: bicycle helmet, mundane risk, re-modernization, bibliometrics

Sensing the Ride: Bodily Sense-Making of Bicycle Design Changes in Sales

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The bicycle nowadays is a technological object being subject to continuous change and development, whether by an innovation driven cycling industry following annual product cycles similar to other consumer products, or by riders tinkering with their bicycle to align it with their bodies, affects, and ride environments. I argue that ongoing technological developments not only affect the object bicycle, but furthermore relations of human-technology-environment by both irritating and enabling them. Design changes are said to affect situated riding practices and to being materially accessible through the body in practice. But how are such at times miniscule design changes supposed to be felt? How does it matter for our relations to the bike and riding practices? And what actors are mobilized in order to make sense of current design

changes in cycling?

To approach and investigate this set of questions the setting of sales situations in local bike shops is chosen, within which rider and (prospective) bike are positioned to each other by and with mediating sales persons. With them enrolling imagined riding environments, a fitting and desired relation of bike and rider is (re)negotiated and established both discursively and materially, as also tentative experiences of touching and test-riding bikes are provided. Drawing on empirical material from my ongoing doctoral thesis, I aim to contribute to broader questions concerning the role of the body in bicycle economy and how it incorporates the sporting practice and environment.

Keywords: technological change, bicycle, affects, sense-making

Right on the Bike, for the Right to the City: The Role of Bicycle Community in Urban Renewal of Belgrade Waterfront

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Ten-kilometer stretch of the Sava riverbank in passing through the central zone of Belgrade is a unique and continuous public space. Diverse in content and in level of urban development, spaces are seamlessly connected by bicycle path, conjoining Sava with Danube riverbank. This path eventually became a symbol of public recreational space of the city.

In recent years, the state and the city authorities have re-actualized the old idea of urban renewal and development of the right bank of River Sava by initiating a €3.5bn mega-project "Belgrade Waterfront" which provides 100 hectares of central riverside area. Although authorities pompously promote "Belgrade Waterfront" as the most important project for the citizens of Belgrade which will significantly improve their quality of life, civil initiatives and organizations have become its sharpest critics. First phase of development was initiated by the pilot project 'River Sava promenade' stretching 1.8 kilometers along the riverbank. The Project has established an ambiguous attitude towards bicycle path, which becomes a front line of conflict and misunderstanding between city authorities and civil organizations. In this paper we will analyze important role that cyclists take to confront non-transparent and non-inclusive urban renewal of Belgrade waterfront.

Keywords: Belgrade urban renewal, Belgrade waterfront, public spaces, bicycle communities, sustainable urban planning

Development of Urban Mobility Innovation in China: the Case of E-Bike

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The studies of socio-technical transition including transition to low-carbon mobility systems have so far focused primarily on the formal side of transportation but have missed out informal sector which defines the cities in developing world (Sengers and Raven, 2014). In this presentation the case of e-bike mobility is used as a window to analyse the social transformation in Chinese society. I will focus on major challenges for e-bike users in China in the context of the overall tightening policies towards e-bike mobility but at the same time increasing demand for cheap individual environmentally friendly mobility solutions. User-led innovation in the domain of e-bikes in China already demonstrates the potential use of e-bikes in the future and on global scale (eg. as cargo, delivery vehicles). The data obtained from the extensive fieldwork in the framework of "Low Carbon Innovation in China" project show: 1) The role of e-bike innovation for Chinese urbanization is underestimated and overlooked, 2) Regulation of e-bike mobility in Chinese cities is highly fragmented, 3) E-bike users (often despite their simultaneous possession of cars) are regarded as people with a lower education and socio-cultural status (suzhi), thus downgrading two-wheeled mobility and emphasizing automobility as a true indicator of high social standing. The presentation will discuss various "bads" and "goods" of e-bike mobility as seen primarily by actual users and opponents to its use in Shenzhen, Shanghai and Beijing as well as potential scenarios of e-bike mobility development in China.

Keywords: e-bike, China, urban mobility, low-carbon transition

Bijker's Bicycles Revisited

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The bicycle case study by Trevor Pinch and Wiebe Bijker has become a classic in STS literature (Pinch & Bijker 1984, Pinch & Bijker 1987, Bijker 1995). STS peers know it well, they use it for their work and they teach it to their students. There are a number of good reasons for that. Their study presents an important argument and represents an important cornerstone for STS. Pinch and Bijker raise the question how we think about technology in general and about innovation in particular. The paper introduced new conceptual approaches for overcoming simplistic ideas of technological determinism. Yet, its biggest achievement is perhaps its programmatic agenda: understanding technology as socially constructed.

More than 30 years after its first appearance in Social Studies of Science in 1984, I suggest to review that paper (and the later versions of it) and explore how we can add to the story Pinch and Bijker began to tell. There are two aspects I would like to examine: a) facts about the bicycle and b) the SCOT framework.

Keywords: Bicycle, SCOT

Session 9: Bottom-up Social Innovation and Transitions to Sustainability

Chairs: Victoria PELLICER SIFRES, Sergio BELDA MIQUEL, INGENIO - Instituto de Gestión de la Innovación y el Conocimiento (CSIC-UPV), Ciudad Politécnica de la Innovación, Universitat Politècnica de València, Spain

Rethinking Policies to Face Climate Change. Insights from Two Grassroots Innovation Experiences

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There is no doubt that assuring a sustainable development for present and future generations is one of the greatest challenges our planet lives. However, many authors suggest that efforts made so far to address Climate Change (CC) don't seem to have been successful due to how CC is being perceived, interrogated and narrated from mainstream approaches (O'Brien, et al., 2010). Some voices consider that the dominant approach is almost exclusively focused on regulations, policies and changes in behavior; it is based on a top-down approach; lies on the idea that the climate system and society can be controlled through proper policies (Adger, et al. AI, 2006); exclusively value scientific-rational knowledge and do not face the underlying structural causes that are at the root of CC. We stand up for an alternative approach to CC that could be able to consider elements that are absent in mainstream approaches, based in three main issues:

1) The importance of values, beliefs and world visions that people have about CC, as well as alternative actions and strategies to confront it emerging from communities.

2) There exist grassroots initiatives, coming from below, where innovation occurs through informal learning processes. In these processes, alternative perspectives are articulated, as well as proposals, technologies and social arrangements for addressing the challenge of CC, on the bases of people's lives and aspirations.

3) These innovations can contribute to the transition towards an alternative model of socio-technical configurations, thus addressing the systemic bases of the challenge of CC.

In order to build our framework, the paper develops original connections among ideas coming from three different fields: grassroots innovation for socio-technical transitions, human development and learning in social action.

First, in the field of innovation studies, grassroots innovation (Seyfang and Smith 2007) refers to networks of people and organizations that generate new "bottom-up" solutions for sustainable

development; solutions that respond to local situations and to the interests and values of communities involved. This approach is based on socio-technical transitions literature, and offers a multi-level and multidimensional approach to change, connecting macro, meso and microprocesses. Second, Human development approach helps us both to build a framework which considers people's aspirations and perspectives, and to introduce a normative reference based on values such as: equity, diversity, sustainability, participation and empowerment. Finally, we combine the mentioned ideas on grassroots innovation with insights from adult education literature, where processes of learning in social action have been studied as emergent, informal, non-planned, tacit and incidental ones (Foley, 1999).

In this paper we analyze two cases of innovative grassroots initiatives taking place in Spain: a national-scale green energy cooperative and the case of several associations of local organic buying food in the city of Valencia. We use both: primary sources (semi-structured interviews, discussion groups and participatory observation) and secondary sources (web and written documents analysis).

The field work will allow us to test the relevance of the framework to capture alternative and practices discourses to confront CC, as well as to evidence that grassroots initiatives are experimenting alternative models and contributing to the transitions towards more sustainable models in different systems.

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Keywords: Grassroots Innovation; Climate Change; Learning in Social Action; Socio-Technical Transitions

Ideas, Visions, Practices - The Influence of Cooperative Traditions on Denmark's Early Wind Power Sector

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Wind power has become a key technology for the transition to sustainable energy systems. In several countries it significantly contributes to the electricity supply (e.g. about 10 % in Germany, 20 % in Spain and even 30 % in Denmark). Today, the implementation of wind power policy may often occur in a top-down mode. But in 70s and 80s the application of this

technology required complex socio-economic processes that didn't become a success in every case. The early wind turbine designs that became the basis of the sector's growth were made in Denmark. Moreover, in this country the first wind turbine market emerged during the late 70s. Against this background the paper deals with the socio-technic culture of Denmark and especially emphasizes the role of the cooperative tradition that guided the whole development of the early wind power sector. The bottom-up style of this sector was a crucial precondition for the industrial breakthrough. The overarching question is, in which way did the cooperative tradition – in ideology and practice – shape the process of innovation?

The following paragraph provides an outline of the presentation. There are three societal spheres that are inspired by cooperative ideas. First, the context of technical innovation: For the early stage of technical innovation in the wind power sector, the Danish folk high schools play a major role. The folk high schools are ideologically based on the progressive ideas of equality and collective learning that were especially advocated by Nicolai Grundtvig who founded the first Danish folk high school in 1849. In the 1970s these schools became the place where a scene of amateurs and ecologically inspired engineers, craftsmen and technical students gathered and exchanged knowledge on wind turbine designs. Between 1975 and 1978 about a dozen of wind turbine manufactures started business. These small and micro entrepreneurs mostly were part of this wind power scene or got their designs from its members. Second, the wind turbine operation cooperatives. During the 80s, local cooperatives that were founded for the collective ownership and the operation of a wind turbine became the predominating model. In the middle of the 90s, about 250.000 Danes were co-owner of a wind turbine. Third, the regulative dimension: The Danish government supported the wind power sector in a way that clearly preferred local cooperatives and excluded most other ownership types (e.g. private owners with profit motivations). The support was limited to the buyer's own energy consumption. Furthermore, the support was restricted to the distance of three kilometers between the location of the wind turbine and the owner's residence. The final part summarizes the early diffusion of the Danish wind turbine design to other countries.

Keywords: Cooperative Tradition, National Innovation Systems, Socio-Technical Innovation, Sustainability, Wind Power

Social Innovation in the Alternative Pedagogies: Bottom-Up Experiences

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Climate change is just one more consequence of the economic, social and political, unsustainable models where all societies are living nowadays. In order to move toward new ways of understanding sustainability and sustainable development, is necessary a paradigm shift in the way we accept and live our lives. The importance of education in people's formation is a crucial matter in the construction of societies' imaginary: "Only in education can be born true human society and no man lives outside it. Therefore, the choice is between alienated education for domestication and education for freedom" (Freire, 1965) This is why more and more social

bottom-up initiatives are seeking to build alternatives to traditional hegemonic models of education: educational initiatives guided towards freedom, equity, sustainability and social justice. Some authors (Seyfang and Smith, 2007) have studied the application of the MLP approach (Geels and Schot, 2007) to the bottom-up initiatives, identifying them as grassroots innovations who are promoting transition to sustainability. Focusing on different initiatives in the field of alternative pedagogies that are taking place in the Spanish State, we propose: - first, to systematize and present different existing types within these educational initiatives; - secondly, following Social Innovation (SI) definition (Moulaert et al, 2013) as well as grassroots innovation definition (Seyfang and Smith, 2007), we suggest: a) to analyse which of these initiatives are grounding on social innovation concepts, b) which of them are assuming grassroots innovations towards sustainability, and, therefore a social transformation; - finally, according to recent studies on grassroots innovations perspectives (Smith et al, 2015), we will attempt to categorize the different grassroots innovations taken into consideration some analysis dimensions. With this, we will get a mapping with the different niches situation in the field of education, and we will start a discussion on the ability to get the achievements that different niches have.

Keywords: grassroots innovation, education, sustainability , alternative pedagogies

Exploring Reflexive Governance in Sustainable Urban Transitions: the Role of Citizens

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Cities are placed in the centre of environmental debate often presented as a promising intervention level, as innovative 'low-carbon laboratories', potentially capable of developing cohesive strategies that could help to reduce or mitigate emissions, improve resilience and thus, shape transitions towards sustainability. Cities are also seen as the solution to overcome the slow pace of national and global action on climate change and as capable of collaborate in forming visions and strategies in accordance with scientific knowledge, and using local knowledge to support decisions, tailor their responses to local needs and to initiate actions grounded in the local environment. At the same time, there has been a growing awareness that governance of sustainable transitions may require of a specific type of governance depicted by its reflexivity, multidimensionality, relationality and ongoingness. In particular, previous literature on sustainable transformation agree on the importance to pay attention to efforts in relation to five aspects: visions and aims need to be shared and become situated as part of the process; experimentation and learning are mechanisms through which new solutions and pathways are developed; the gathering and management of an heterogeneous assemblage of actors and different loci; feedback needs to be integrated in the system; and a long-term orientation. This type of approaches has been named under the idiom of reflexive governance. Yet, the governance aspects of such processes however remain unclear and more research is needed on empirical cases. Voss and Kemp (2005) argue that reflexive governance refers to a type of societal problem treatment that is alternative to the rational problem-solving approaches and is characterized by the management of recursive feedback relations between different steering loci. This approach can be suitable for grasping the multifaceted and the intertwined evolution of

heterogeneous elements across multiple levels and actors. Our study investigates a programme called 'Cities of the Future', a multi-level and multi-actor six year-program aimed at fostering collaboration and learning among 13 cities in Norway, the national government and regional and industrial actors, in order to reduce greenhouse gas emissions and adapting to climate change when doing urban development. Responding seemingly to the challenges of sustainable transition applying a reflexive governance approach, we explore how the program was really performed and whether and how learning took and reflexivity enacted. The investigation was conducted mainly through a combination of a qualitative content analysis of Action Plans, agreements between parties, the website and relevant secondary documents, and a total of 13 semi-structured interviews with relevant actors in the initiative. One of the most striking findings of this investigation is the ambivalence in regard to the role that citizens were expected to play in the program. Although the importance of involving citizenry was recognized in documents and highlighted by every informant, the program did not really prioritize the engagement of citizens. Thus, the reflexivity, the re-cursive feedback did not encompass users and citizen in the programme.

Keywords: Reflexive governance, learning, sustainable cities, urban sustainable transitions, citizens

Session 10 (1): Smart Energy Demonstration Projcets: From Niche to Mainstream?

Chairs: Michael ORNETZEDER, Austrian Academy of Sciences, Vienna, Austria; Jürgen SUSCHEK-BERGER, IFZ- Inter-University Research Center for Technology, Work and Culture, Graz, Austria

Who Wants Smart Grids? Collective Actors, Competing Institutions and the Related Meso-Level Social Orders Dynamics

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The idea of smart grids as intelligent, self-managing systems, where a rich stream of real-time data is flowing in from sensors all over the grid, came up a decade ago (Amin 2005, Marris 2008). It is frequently emphasized that the development of smart grids is one of the core requirements for a sustainable energy system based on renewable energy technologies (IEA 2011, Gellings 2009). Ever since, over 450 smart grid demonstration projects have been conducted or completed in 47 countries throughout Europe (Catalin et al. 2014). The establishment of a smart grid involves multiple actors (such as energy providers, net operators, service providers and actors at the demand side) who do not always share the same interests. However, up to now, only few sociological studies have been carried out, which shed some light on the underlying social dynamics at the meso-level (examples are Neukirch 2014, Schmid et al. 2015 and 2016). Sociological analyses, which specifically take smart grid developments into consideration still remain scarce (some recent examples including smart grid developments to some extent are Bolton and Foxon 2015; Büscher and Sumpf 2015). We want to enrich this discussion by enhancing conceptual considerations with insights derived from empirical results in course of the pilot project “Energienetz Berlin Adlershof” (Energy Net Berlin Adlershof).

Our central research questions are: *Which collective actors are relevant for planning and implementation of a smart grid? How do these actors influence the development of smart grids? How can different collective actors be mobilized to participate in smart grid deployment?* Referring to field-concepts from new institutionalism in organizational theory and the theory of strategic action fields (Fligstein and McAdam 2011), we want to look at aspects of institutional change (Leblebici et al. 1991), the “situated institutions” and how the “multiple field constituents compete over the definition of issues and the form of institutions that will guide behavior” (Hoffmann 1999: 352).

Our first empirical results indicate that actors at the demand side and even the distribution net operators tend to have only little motivation and that there are relatively few actors who are really interested in establishing smart grids, apart from scientists and providers of smart grid technology. Furthermore it is getting clear that one of the greatest challenges of smart grid development is trustful cooperation of different actors in the energy system. Concerning the integration of commercial customers into smart grids (which is a special focus of the pilot project), there is some evidence that without some kind of “trust intermediaries” it is hardly

possible to motivate these organizations to allow external actors to get acquainted with their energy related processes and data. By revealing this kind of challenges on the social level we want to contribute to the smart grid discourse in a critical-constructive way and develop possible strategies for overcoming existing barriers.

Keywords: Smart Grids, Collective Actors, Fields, Institutional Change, Trust

Energy Users and the Smart Grid: Insights from Empirical and Participatory Research

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Growing shares of renewable energies in electricity portfolios require new approaches for matching energy supply and demand. Making power grids smart by smart meters, demand side management, variable rate tariffs etc. is considered key to meet the challenges triggered by the rise of renewable energy. Transforming the energy system into a smart grid has long time been discussed in the sense of technical solutions for technical problems. In recent years, social science energy research has created awareness into the genuine socio-technical nature of smart grids. In fact, the digitalization of the energy system transforms technical, economic, and societal structures, roles, business models, and processes in future power networks. The InnoSmart project analyses innovation processes for a smart grid from different perspectives: We asked energy experts within a Group Delphi exercise as well as 30 consumers within three focus groups on their evaluations, attitudes, expectations, and preferences of smart grids. We moreover designed and run three user integration processes in close cooperation with three German energy providers. Each process convened a group of users with the aim to develop concepts for new services in a smart energy system. For this purpose, a two-stage innovation workshop format was applied with a thematic focus on optimising the interplay between decentralised energy production, storage and own consumption. Combining these different approaches we find that although experts and consumers recognize the underlying rationale of smart grids, they perceive important risks regarding data protection, data security, reduced autonomy and social inequality and doubt that smart grids considerably contribute to a more efficient energy system. Acceptance and success of the future digital energy system hence strongly depend on the way these risks are addressed. However, it does not seem that all key actors of the transition to a digitalized energy system have yet fully understood this challenge. On the one hand, our research has shown that innovation processes in energy companies have so far been mainly technically driven without considering users' interests, motivations and reservations appropriately. On the other hand, it was encouraging to observe that the energy companies appreciate the intense dialogue with consumers because they get support in redefining their role and tasks as suppliers. This is all the more important since this openness helps to integrate user needs and feedback in previously technically coined innovation processes. In order to make user integration productive for transition processes such as the

German “Energiewende” and smart grids, the following conclusions can be drawn from our research. Crucial aspects for user integration are (i) acquiring users who are capable of understanding complex changes in the energy system and of anticipating future requirements while dealing with its high uncertainty, (ii) developing scenarios and narratives about future energy use, and (iii) using creativity techniques, which support users in imagining the future.

Keywords: Smart Grid, user integration, innovation, acceptance, digitalization

The Role of Absorption Chiller Demonstration Projects for a Climate Friendly, Energy Efficient Restructuration of the Refrigeration Sector: Just Technology Improvement, Socio-Technical Niche Development - or Something in Between?

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Up to now, refrigeration plays a minor role in discussions, programs and strategies towards a climate friendly, CO₂-saving transformation of energy supply. Nevertheless, around 14 percent of the German power consumption is used only for refrigeration, and a drastical increase demand is predicted for the future decades. In this context, publications predict and demand a substantial rise of thermally driven refrigeration. Expectations regarding the environmental benefits of thermally driven cooling count on saving of primary energy by using heat instead of electricity as drive energy, especially from waste heat, heat from combined heat and power generation (CHP) and renewable sources, the possibility to use free heat capacities during the summer months and hereby a considerable contribution to decrease summer pSchoiseak loads in the electricity net. Against this backdrop, extended research in numerous research and demonstration projects aims at eliminating the still existing technological barriers. In contrast there is extremely little social scientific research up to now. Background of my presentation it an ongoing research and demonstration project “field test absorption chillers for combined heating, cooling and power systems (CHPC)” at the TU Berlin. Main goals are the demonstration and monitoring of a new type of absorption chiller, developed by the Department of Mechanical and Systems Engineering of the Technische Universität Berlin (TUB). The testing and optimisation of the innovative chiller construction and system regulation in a number of field tests promises to overcome the deficiencies of and prejudices against absorption chillers. Part of the research project is a socio-technical research, carried out by the Center for Technology and Society of the TUB. Based on approaches from science and technology studies (multi-level-perspective, innovation studies), it aims at the identification of the drivers and barriers of a further, fortified market dissemination and implementation of low-temperature absorption chillers. In order to identify central actors and factors influencing the diffusion of the technology and the main framework conditions blocking the market diffusion, the analysis targets two levels of investigation: A constellation analysis focuses on the broader sectoral changes and the relevant conditions in which the implementation and diffusion of absorption refrigeration systems is carried out. Interviews with stakeholders in selected examples of the field test plants (demonstration projects) aims at the factors of influence on the micro or niche level. In my presentation I will address first results, focusing on the connection between demonstration

projects as “local experiments” (in socio-technical niches) and current developments (regime changes). It will be considered, if and in which way both levels of action contribute to larger sectoral changes. Concerning the experiment level I will ask to what extent they work as drivers of change or are just reacting on external and/or sectoral changes and/or changing competitive conditions and changing markets. The results also allow some reflections on the adequacy of the assumptions of the MLP for the case of innovations in the refrigeration sector and necessary enhancements.

Keywords: multi-level-perspective, technological innovation, refrigeration, energy efficiency, factors of influence

Niche Development in Sustainable Energy Transitions: The Case of Combined Heat and Power in the United Kingdom

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Combined heat and power (CHP) technologies represent a remarkable case in the history of technological change in the UK energy sector; despite being present in the sector for almost a century, and relatively successful in other highly developed European countries such as Denmark, Germany, Sweden or Austria, the technology has never quite managed the breakthrough to the energy generation mainstream, instead being confined to a number of application niches. This paper aims to review and analyse this development using insights from Strategic Niche Management (Kemp et al., 1998) and the multi-level perspective (Geels, 2002), following the historical creation, development and in some cases breakdown of CHP niches by investigating the presence and fulfilment of niche functions: shielding, nurturing and particularly empowerment. Following concepts developed by Smith and Raven (2012) and Verhees et al. (2013), the researcher will attempt to illustrate the various attempts of CHP actors to either adapt the technology to the current mainstream regime, or challenge it.

The findings will be presented as a case history along a timeline, based on a combination of secondary data including academic studies, governmental data and “grey” industry publications and insights into the history and present of CHP niches gained through several expert interviews and case studies undertaken by the researcher. While the main aim of the paper is to present an empirical case, the author will attempt review the typology of niches and the actions (and reactions) of niche actors in response to wider systemic changes.

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Keywords: Strategic Niche Management, Energy, History, Transitions, Niche Empowerment

Session 10 (2): Smart Energy Demonstration Projcets: From Niche to Mainstream?

Chairs: Michael ORNETZEDER, Austrian Academy of Sciences, Vienna, Austria; Jürgen SUSCHEK-BERGER, IFZ - Inter-University Research Center for Technology, Work and Culture, Graz, Austria

What Can We Learn From Smart City Pilot Projects?

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Urban innovation is of major importance for the on-going energy transition. The way we produce and consume energy in cities will have to change fundamentally in the next decades. Only recently, efforts to explore robust innovation pathways gain momentum. The number of smart city projects rapidly grows and with it the question of how to deal this diversity. This paper reports on a recently started pilot project in the Austrian city of Korneuburg. The aim of the project is to develop and implement integrated sustainable solutions in the context of social housing. It will feature latest retrofit strategies as well as construction techniques, a green mobility concept and a comprehensive participation model. And, most important, it aims to produce knowledge relevant not only for this specific local case but for sustainable innovation in the urban built environment. In the paper we discuss options for setting up a framework that supports such a broader understanding of learning. The framework will draw on existing approaches like strategic niche management (SNM), bounded socio-technical experiment (BSTE) and technology assessment (TA). Consequently, the framework aims to support knowledge production on different levels and, by the using socio-technical scenarios, link case specific outcomes more effectively to urban innovation in general.

Keywords: Smart city, pilot- and demonstration projects, evaluation, strategic niche management, technology assessment

A Structured Comparison of Two Distinct Experimental Initiatives

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Real-world laboratories, living labs, bottom-up initiatives, showcase demonstration projects and many more seem to be the most popular tools of choice to achieve the ambitious climate targets for a successful energy transition. Such exploratory activities as experimental settings of the society on a defined, manageable scale, are usually led by high expectations concerning their transformative power. Often, transdisciplinarity and heterogeneous actor networks across disciplines and sectors characterize those real-world laboratories, shedding light on the configuration and functioning of interdisciplinary collaborations within energy transition projects.

The integration process within blurred networks, a co-production of knowledge (Jasanoff 2004), can be considered innovative in the designs itself. However, at present, these demonstration initiatives tend to be single case studies that lack a systematic understanding of available design options and comparative analysis. Recognizing the plurality and diversity of existing demonstration projects, the presentation aims to contribute to the question: How can those cases be compared conceptually? It is doing so with help of two empirical cases which differ greatly in central analytic categories, in particular with respect to the financial funding and the involved actor constellation: an innovation campus and a regional initiative. Both pioneer initiatives strive to be blueprints for a future energy system in a post-fossil society, characterized by transdisciplinary and heterogeneous coordination. The innovation campus claiming to be a showcase for the future city is initially funded as an investor project driven by economic interests and supported by strong research funding. In contrast, the regional initiative started as an ideological, avant-garde endeavor and received funding at a later time, transferred the bottom-up initiative to a defined "living lab project" with organizational structures. A qualitative comparison based on empirical data gained from expert and group interviews, document analysis and participatory observation provides insights on the respective modes of collaboration in the heterogeneous constellations. The structured comparison of both projects along multiple core characteristics (e.g. physicality, future vision, the actor constellation, financing, environmental context, modes of knowledge production and the role of politics) reveals some similarities despite fundamental differences. In particular two characteristics appear to be crucial regarding modes of co-operation and the organization of innovation processes beyond sectoral or disciplinary borders: the role of a) (physical) places and b) visions. Since both projects have to cope with an uncertain future in terms of shifting regulatory frameworks and technological innovations, the gap for a shared vision seems to be performative (Borup et al. 2006). Furthermore, energy being an abstract and complex issue requires a certain physicality and visualization - the term "real world laboratory" even implies an understanding of locality. Here, a story that can be told (internal and external) functions as a boundary object (Star/Griesemer 1989) enabling heterogeneous collaboration. The presentation suggests to devote attention to these categories within future research on experimental niches.

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Keywords: experimental initiatives, collaboration, structured comparison, place, vision

Smart” Citizen’s Visions? Experiences and Views of the SmartQuarterVision KA 2030+ Project

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In the framework of the official Science Year 2015 “City of the Future”, the German Federal Ministry of Education and Research (BMBF) has initiated the City of the Future competition. Karlsruhe is one out of 51 cities having been chosen to take part in the first phase of this competition (2015-2016). In the Karlsruhe project SmartQuarterVision KA 2030+, visions for the future of two districts (Mühlburg and Knielingen) for the future 2030+ have been created based on a participative discussion process with citizens of these districts. For this aim, 7 workshops with different focus groups (school children, citizens with migrant background, citizen associations, local trade, senior citizens) as well as two big citizens' vision workshops have been realized in 2015. The paper will concentrate on the aspect “smart”. Through queries in form of questionnaires as well as in the discussions during the workshops, the participants have been asked for their knowledge on and their perception and assessment of the concept “smart” in the context of a sustainable development of their district. The answers differed quite widely: ignorance, skepticism but also hope or even enthusiasm. The definition of “smart” in the project itself is quite wide and placed in the context “smart”, e.g. resource efficient, city. We will observe, in what context and for which means, citizens see a usefulness of smart technologies and what ideas they have developed for the use of smart technologies, but also what anxieties and aspects for non-acceptance emerge. What place do smart technologies have in citizen's visions for the future of their neighborhood?

Keywords: "smart" city, citizen visions, future city, "smart" technologies, participation, mobility

STREAM: RESPONSIBLE RESEARCH AND INNOVATION STUDIES

Session 11: The Politics of Open Science

Chairs: Katja MAYER, University of Vienna, Research Platform Responsible Research and Innovation in Academic Practice, Vienna; Stefan KASBERGER, Karl Franzens University Graz, Austria

Beyond Open: Towards a Vision for Scholarly Communication

Sebastian DENNERLEIN (1); Daniel DÖRLER (2); Asura ENKHBAYAR (1); Andreas FERUS (3); Robert GUTOUNIG (4); Florian HEIGL (2); Christian KAIER (5); Peter KRAKER (1); Katharina RIECK (6); Elena SIMUKOVIC (7); Michela VIGNOLI (8); Eveline WANDL-VOGT (9)

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Over the past year, members of the Open Access Network Austria working group “Open Access and Scholarly Communication” have met to develop a visionary approach for the future of the scholarly communication system. By scholarly communication we mean the processes of producing, transforming, disseminating and preserving scientific knowledge. In the working group we aimed at taking a critical stance on the current debate which mainly centers around Open Science (including elements like Open Access), but which seems to neglect a thorough discussion of the underlying values and structures that govern scholarly communication. The result of the discussion process is a document touching on problems of the status quo of scholarly communication. It suggests new or modified principles of scholarly communication and the application of visionary principles in different scientific domains. This first outcome should be the topic of further critique and tested in an open discussion process. We foresee that an open discussion approach will help to detect possible limitations or even unforeseen blind spots and thus improve the substance of the document. With this approach we hope to raise awareness of current shortcomings in scholarly communication, and to initiate a constructive dialogue to develop a common vision of Open Science applications which support making research more palpable, re-usable, and thus more useful for society at large.

Keywords: Open Science, Open Access, Scholarly Communication

Open Clubs

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New scientific practices are emerging covering the whole range in the work of scientists and researchers: from topic selection and funding of projects to data collection, data analysis, publication, discussion and education. At every step in the research process, new information and communication technologies are available to support a new generation of researchers. Although many scientific results have been freely available for decades in public libraries in theory, they were not at all free in practice. Economists have argued that scientific knowledge is a public good and have developed influential policies on this ground including an important argument for the public funding of science. A few scholars, however, pointed out that science really is a club – and scientific knowledge is a club good. To become a member of this club requires substantial effort and costs such as training, university fees, project funding, travel costs etc. Today, the power of the internet and of search engines are the root causes for actually turning such club goods into public goods. Not only is it now possible to find relevant research results within milliseconds, it also possible to benefit from freely available tutorials, videos, software, prototypes and even infrastructure provided at very low costs and over the internet. It has become of marginal relevance for many practitioners whether research be published in high-impact journals or at a researcher's website as long as they are useful. Although policy papers seem to suggest that these new scientific practices will lead to completely open research, it is more likely that we will see the emergence of new types of clubs. Just like we have seen the traditional golf clubs broaden their ranges of members and becoming more open to the public, many scientific clubs will become more open to specific crowds. Some science clubs already strive to open all aspects of science production. Their members are to decide on the type of research, they can provide funding and review proposals and projects. Others will remain more traditional and stick to higher entrance fees for potential members. These may remain limited to certain sectors and different types of entrance fees such as industrial membership or lobbying group. Opening a club does not come without costs, trade-offs and challenges. In a largely digitally facilitated science club world, the owner of the digital tools holds the key to being found, to being quoted, to being funded and getting a job. If science is about uncovering the truth, the digital tool providers will be the mediators of that truth. Although Altmetrics may be an academic way to alleviate some negative consequences of replacing a scientific editorial board with google, the broader public is likely to stick with easy-of-use and common practice. In this work, we present results of the Open Digital Science study commissioned in 2015 by the European Commission DG Communications Networks, Content and Technology. Work included the design of future Open Digital Science scenarios.

Keywords: Open Science Digital Science Public good Club good Science and research policy

Open Access – the Better Access? Academic Publishing and its Politics

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At the heart of the Budapest Open Access Initiative, which coined the term “Open Access” (BOAI, 2002), was the vision “to make possible an unprecedented public good”, where an old tradition, publishing the fruits of research, has converged with a new technology, the internet. Therefore, no barriers other than the access to the internet itself should be imposed on any “curious mind” seeking to read or use peer-reviewed journal literature for any lawful purpose (ibid.).
 Since then, the Open Access movement has been gaining traction at a rapid pace, moving beyond the circles of its long-standing advocates and becoming a dominant topic in the publishing industry and science policy-making (Ware & Mabe, 2015). Research funders in Europe and beyond are now increasingly coupling their funding requirements to Open Access mandates and setting target values for a given year (e.g. by 2020, 80% of all research publications in Austria should be available via so-called “Green” and “Gold” Open Access routes and 100% of “Gold” Open Access by 2025) (Bauer et al., 2015). Even more, Open Access and Open Science have been set as priorities during the Dutch Presidency of the Council of the European Union in the first semester of 2016 along with calls on scientific publishers “to adapt their business models to new realities” (European Commission, 2015).
 Thus, one could get the impression that Open Access is a panacea for all ills – ranging from scientific progress to job creation to development aid. This might be also identified as the core argument behind recent efforts to disrupt the business model of subscription journals and pursue a large-scale transformation towards full Open Access (Schimmer et al, 2015).
 Hence, looking at the Open Access debates from the perspective of Science and Technology Studies (STS) gives rise to a number of questions. For instance, what understandings of science, (scientific) knowledge and society are built into the definitions of Open Access? What values, visions and ideals are promulgated in the name thereof? Who is given a voice and who is silenced? And what consequences do the politics of Open Access have for different groups?

Keywords: Open Access, academic publishing, science policy, the Netherlands

Paradoxes of Openness - Why we need "Real" Open Technologies for Open Science

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The proliferation of ICT has led to a situation where at least some degree of technological skill has become a precondition for social participation. The challenge of facilitating technological literacy has been addressed differently from various players, from the providers of software and hardware, the official educational system, the maker movement as well as from different open knowledge communities.

The popularity of mobile devices, ubiquitous technology and real-time communication brought forward additional challenges: "smart devices" introduced a technological structure that is more intuitive, more easy to use, but also much more closed and opaque. Jonathan Zittrain (2006) already criticised the dominance of smart devices, describing them as "tethered appliances", a way of tying end users to the manufacturers. The principle of "closedness" refers to the hardware itself, which cannot be changed or used in another way than designed, as well as to new unprecedented levels of control. This "closedness" is also present in software (distribution) systems, as information is more and more governed (data governance), raising the question of data- and software politics with increased urgency. The rise of the "app stores" and the consequent "decline of the World Wide Web" (Anderson, 2013) signals the transformation of free culture into a commercialised ecosystem.

Paradoxically, the term "open" continues its triumphant advance, together with other terms "borrowed" from the language of the maker movement which illustrate, how a commodification of (digital) culture has been unfolding steadily within the last decades. The terminology from the 'maker' and 'hacker' context is applied to a lot of different use-cases, such as the term 'hacking' appearing in novel (innovative) combinations. Also the term 'maker' itself is problematic: presented as a contemporary culture and technology-based extension of DIY culture which was globally popularized by MAKE magazine, they are using slogans such as "join the arduino revolution" (Frauenfelder, 2011) and arguing that the "third industrial revolution" started with 3D printing (Koten, 2013). Yet the attitude of the MAKERS is not as critical, or revolutionary, as their language suggests. The technologies in use are "open", but the participants do not usually assume a critical stance towards the conditions of technological production and dissemination. Maker culture is heavily criticized, such as with "critical making"), a term that describes an oppositional strategy that "uses material forms of engagement with technologies to supplement and extend critical reflection and, in doing so, to reconnect our lived experiences with technologies to social and conceptual critique." (Ratto & Ree, 2012).

I will present an overview of critique and counter-cultures to the "maker culture", which are present in Open Source communities. I will contextualise the presentation with tangible examples from the FWF-funded research project Artistic Technology Research, as well as with the EU-funded project "AXIOM" (the first Open Hardware professional digital camera), both of which I was co-coordinating at the University of Applied Arts. I will argue why we need Open Hardware and truly "open" systems to advance in Open Science, and I will underline the arguments with current research from international scholars.

Keywords: Critical Making, Open Source, Open Hardware, Open Science, Maker Culture

When Regulatory Science Meets Open Science – Implementing Open Science in GMO Risk Research

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see Poster Presentations, p. 112

Pedagogical) Ethnography as Method for Evaluating Open Science Programmes

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see Poster Presentations, p. 115

Session 12: RRI in Practice

What do I need to Know on RRI and How can I Implement it?

Chair: Margit HOFER, ZSI –Centre for Social Innovation, Vienna, Austria

RRI in University Contexts: A Methodological Approach to integrating RRI at a Technical University

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While the concept of Responsible Research and Innovation (RRI) has been widely discussed on a theoretical and policy level in the past years, only a few methodological approaches or best practices of successful RRI implementations have been presented so far. At the invitation of the rector of the Vienna University of Technology (TU Vienna), the authors addressed this gap and organised an explorative workshop for developing RRI measures for the TU Vienna. In four

sessions, a heterogeneous group of representatives from research, research funding, industry, advocacy groups, and civil society organisations discussed challenges and opportunities in RRI research settings, and identified measures and solutions for integrating RRI in universities. Based on both the experiences from this workshop and the results of an evaluation of the project, the authors developed a comprehensive workshop design for integrating RRI in university frameworks. This paper aims at presenting the workshop design as well as at pointing out methodological and contextual challenges that appear to arise especially in the context of RRI.

Keywords: RRI, responsible research, workshop design, university of technology, challenges

A politically complementary approach to the polysemy of Responsible Research and Innovation

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A politically complementary approach to the polysemy of Responsible Research and Innovation the EU seeks to become a genuine Innovation Union in 2020 striving for excellent science, a competitive industry and a better society without compromising on sustainability goals as well as ethically acceptable and socially desirable conditions. Europe thus needs to develop a normative and comprehensive governance framework for Responsible Research and Innovation (RRI). The problem at stake in RRI is that the scientific and technological progress of the 21st century offers new opportunities for enhancing various aspects of living and social interaction, especially in relation to innovative applications of information and communication technologies (ICT). The economic development builds most of its efforts on a strong innovation process able to face all the challenges coming from a globalised market. At the same time, this raises new normative issues that are often hard to identify and deal with. This matter has been demonstrated by various cases in recent R&I history, for example, the research on genetically modified organisms (GMO) or nanotechnologies, or the most recent fracking processes, where the resulting controversies had a broad resonance in society and generated economical counter-effects. Consequently, the societal challenges accompanying this kind of research cannot any more be attributed to research community only, but shall be addressed from a societal perspective. It is also true that not only the growing desire of society to be involved in decision making mechanisms is becoming more visible, but also the policy makers have become increasingly aware that the public has and must have a role in the decision making process regarding the new technologies. Again, a problem rises regarding the difficulty represented by the possibility of making different stakeholders agree on one same perspective. In fact, the contexts in which societal actors interact with each other are quite complex and the perspectives within one same social system often appear significantly different. The constraints raised by the context can be of different kinds depending on specific sector in which responsible innovation is conceived. Therefore the way in which social actors act could be different according to the specific structure of action underlying every field. However, we will try to show how these differences don't need to be conceived as mutually exclusive. Before developing the qualitative conditions we would need to settle two main basic procedural

requirements. I. The basic structure required is one that can enact and subsequently enhance a participatory approach on the problems of RRI. II. But still, the capability of departing from the same perspective and carrying on those same norms through the innovation process remains a laborious challenge that needs to be faced through a second step, that is a reflexive process able to take into account all the different factors at stake. III. A third step would be to direct the path of this reflexive participatory approach towards an ethical understanding of RRI. To better understand what this point implies we need to specify some issues. In fact, if the polysemy embedded in the term responsibility can pave the way to partial and manipulated structures of justification, it can also represent the conceptual basin able to consider all the different normative stands. What we assist nowadays in research and innovation is a tendency in focusing only one normative frame to the detriment of the others. But this trend is based on both, a conceptual mistake and a political weakness that we need to address. If on the one hand only certain kinds of normative frames are followed in R&I and used as a justification, i.e. the juridical responsibility or the economic development, on the other hand the current governance structures appear weak in providing institutional spaces for considering more complex normative relations. Thus, if the one-sided normative perspective produces counter-effects because they fail to grasp their social roots, the political management turns out to be unable to guarantee else apart the negative freedom embedded in economic and legal normative frames, ignoring the positive and social freedom that is necessary for every democratic community. The question that we then need to respond sounds: how does a governance structure has to proceed in order to develop RRI in an ethical way, one that could take into account the different normative sets embedded in responsibility? In this sense, the third point of the above mentioned list would need to be developed through the following scheme: to try and reflect first on the normative presuppositions that bind different fields of a society such as economy, right or morality (a). Then to draw the picture of a complementary approach as a necessary consequence (b), and lastly to underline the decisive role of institutional spaces in order to reach an ethical understanding of RRI (c).

Keywords: Responsibility, Responsible Research and Innovation, Freedom, Recognition, Co-constructive responsibility

Towards More Responsible Research and Innovation through the Use of the Systematic Reviews?

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Beyond possible RRI definitions, approaches and methodologies, it seems to be an intuitive understanding of the RRI concept as making science transparent and participatory for an increased social relevance. Many tools and approaches supporting various RRI dimensions have been described in literature and in practice. This paper explores the use of the systematic review (SR) methodology in bringing primary research in life sciences closer in line with the intuitive understanding of the RRI concept. The SR methodology is an approach to collect, analyse, and comparatively assess existing evidence from primary research in a highly

systematic, standardized and rigorous way to deliver answers to narrowly focused and often policy relevant questions, while reducing bias, increasing transparency and allowing for stakeholder engagement. Systematic reviews and evidence maps, the second stopping short of analysing the data gathered, providing only a chart of the available evidence, have transparency and stakeholder participation embedded in the process. Better known in the medical field where it has become a gold standard in synthesizing evidence for supporting decision-making, the methodology gained a relatively recent wider recognition through an increased use in environmental management and even social sciences. However, its use in the contested genetically modified organism's (GMO) field has been sparse. Here, the assessment of primary data on environmental or health impacts of GMOs has become particularly important for policy making but also led to controversial debates. The debates about how to assess existing evidence and what evidence to consider or not consider are, however, sometimes lacking transparency and proving difficult for stakeholders to engage due to technical and scientific complexity. Due to its methodological characteristics SR might help disentangle these debates and clarify the points of divergence. In the recently completed European Commission-funded GRACE project (GMO Risk Assessment and Communication of Evidence) SR has been a main focus. Within GRACE, systematic reviews and evidence maps have been conducted to review evidence on the health, environmental and socio-economic impacts of GM plants. Drawing on this experience, this paper explores the possible role of the SR methodology in bringing GMO risk research and assessment more in line with RRI requirements.

Keywords: systematic review, evidence, transparency, participation, genetically modified organisms

Stimulating RRI Processes – a Tool to Support Self-Reflection

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In the framework of the RRI Tools project we have developed a self-reflection tool on responsible research and innovation. It aims at addressing different stakeholder groups such as industry and business, educators, researchers, policy makers or civil society organisations by posing questions that are related to the six key dimensions identified and proclaimed by the European Commission. Further, the tool relies on so called “process requirements” as the concept of RRI itself is seen rather as a matter of processes than of measurable quantitative indicators. By definition, the self-reflection tool is not meant to be a benchmarking tool since tick-boxing does not require any reflection processes. Based on the key dimensions and process requirements, the tool stimulates reflection on RRI and supports stakeholders irrespective of their level of RRI pre-knowledge. It has the potential to help them to get deeper insights into the concept of RRI, to support them in difficult decision making processes and to receive recommend resources, such as tools or best practice examples to support the RRI implementation process. This presentation will first discuss the challenge to develop indicators to measure RRI in general and potential pitfalls of providing a quantitative RRI measuring tool. Secondly, based on the results of this discussion, the design cycles and self-reflection tool itself will be presented.

Keywords: RRI, reflection, assessment

Session 13: Impacts and Implications of integrating RRI into Economic Institutions

Chair: Thomas LONG, Wageningen University, Netherlands

The Construction of the Figure of the Sustainable Consumer. Exploring the Role of Moral and Political Philosophies

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Corporations today are realizing that they can no longer afford to ignore societal expectations around CSR. Previously trust in businesses centered on the safety and usefulness of goods, but expectations now include the manner in which those goods are produced, both in terms of labor rights and environmental impact. While corporations are busy promoting their good practice, the narrative on consumer choice is also reframed and reconstructed, assembling the “liberal” notion of the rational, utility-maximizing and private consumer with components of public citizens’ duties. In short, consumers are expected to be morally responsible when they purchase products. Dominant perspectives on the ‘sustainable consumer’ assume that consumers are socially conscious and rational individuals who express their values through consumer choice in the marketplace (for example, by boycotting or buycotting). Accordingly, a lot of research focuses on consumer motivations to consume ‘sustainably’ or ‘ethically’ (see e.g. Sassatelli 2007, Slater 1997, Stolle and Micheletti 2013). Contemporary sociological perspectives on consumption contest this narrative and break with these narrow methodological individualist approaches and utilitarian conceptualizations of people’s ethical decision making. In this view, consumption is understood as only one moment in the networks of production, distribution and marketing of items and services. Consequently there is an urge to shift the attention away from consumer behavior, towards the wider organization of infrastructures from a provisioning perspective (see Warde 2005, Shove 2003, Barnett et al. 2011, Reckwitz 2002, Heidbrink 2015). However, while these approaches primarily associate infrastructure with the provision of tangible facilities (such as agricultural land, transport systems, buildings, institutions), this paper indicates that there is another important part of the infrastructure that enables a sustainable development; namely the discursive framing that limits or liberates the rhetoric space to discuss societal issues such as “sustainability”. Within this research, therefore, the given infrastructure is conceptualized as the discursive space of sustainable values and behavior. Thus, following a constructivist approach, this paper approaches sustainable food consumption as a complex set of socially constructed discourses which are fed by various agents such as ethical trading organizations, businesses, lobby groups, cultural institutions, NGOs, government-related bodies as well as academics. Also, rather than presupposing morally concerned consumers as pre-existing categories, this paper suggests that the “sustainable consumer” is a “rhetorical figure” (see Barnett et al. 2011) which is effectively created and mobilized in current debates. Grounded in CDA (see e.g. Fairclough 1995, Fairclough 1992, Wodak 2009), the methodological approach developed and applied to this particular field is a valuable tool to investigate on market subjectivity and neoliberal governmentality in fostering narratives such as “political

consumers“, “ethical consumers“ or “citizen consumers“. It provides an insight into the dynamics of the discursive framings of “sustainable agents” and their interrelation to changing societal conditions over time.

Keywords: consumption sustainability discourse morals construction

The Role of Responsible Innovation in the Technology Assessment of Smart Farming Technologies in Europe

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Interest in smart farming technologies is being driven by the need for sustainable food security, reductions in technology costs, and market trends. Smart farming involves the use of a range of novel technologies, such as GPS, sensors, nanotechnologies, big data and software applications, to provide a level of management control that has been previously unobtainable. This increased control can enhance productivity and quality, or can be used to respond to environmental impacts and concerns such as climate change. As such, smart farming has the potential to lead to notable societal benefits, especially in agriculturally stressed regions.

The use of these technologies and techniques however raises ethical issues associated smart farming’s impact and interaction with the natural environment, livestock and society. For instance, it is expected that herd sizes in livestock farming will be able to expand. This could raise issues in terms of the instrumental use of animals and the increasing industrialisation of farming, which is inconsistent with a desire in western societies for a more humane and natural approach to agriculture.

Due to the existence of these ethical issues, technology developers who launch smart farming innovations find themselves in an important and potentially influential position. They have an important influence on the form and function of Smart Farming technologies and practices, which raises the question how they deal with the ethical issues involved. In this paper, we explore the opportunity the emerging concept of responsible innovation provides for the evaluation and management of ethical issues within smart farming technology development.

The aim of this research is to conduct a technology assessment of smart farming technologies in Europe to identify the potential desirable and undesirable consequences. In addition, 16 semi-structured interviews will be conducted with smart farming technology developers to explore how they deal with ethical questions during the innovation process, and to what extent the concept of responsible innovation can help to improve the evaluation of ethical issues in the innovation process.

The results: a) provide an overview of the ethical implications involved in smart farming practices in Europe, b) detail how technology developers deal with these issues during the innovation process, and c) show to what extent responsible innovation can improve the ability of technology developers to evaluate and manage the ethical issues involved. The results will be relevant to the developers of smart farming technologies, their users and policymakers.

Keywords: responsible innovation; smart farming; technology assessment

The Responsible Research and Innovation Canvas: A Tool for Responsible Innovation and Valorisation

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This paper discusses the development of a new tool for Responsible Research and Innovation – the Responsible Research and Innovation Canvas (or RRI Canvas). The focus of the paper is on the problems and potential for using business modelling tools to introduce responsible valorisation as an additional feature of the existing RRI framework. Valorisation here refers to the development of economically sustainable models for the application of the results of research and innovation, including commercial, public sector and social entrepreneurship applications.

Responsible Research and Innovation (RRI) has been successful in putting ethical and societal responsibility onto the agenda, particularly of the European Commission's current H2020 programme. The development of the conceptual background and practical tools for responsible research in particular has proceeded rapidly, particularly through a number of European Commission projects. However, there has arguably been rather less focus on the innovation and valorisation of research. In particular, there seems to be a gap in terms of the development of business and other valorisation models for the products of research and innovation.

The Responsible Research and Innovation Canvas is intended as a tool to address this situation. The Canvas is based on existing tools such as the Business Model Canvas, but is adapted to take account of key RRI requirements, in order to produce valorisation plans that are aligned with RRI. It therefore brings together a commercial, business modelling perspective and the social and ethical perspectives embedded in RRI.

The RRI Canvas is designed to enable project stakeholders (including project co-ordinators, partners, project-officers, and internal and external reviewers) to develop and assess valorisation models for project outcomes. The tool is designed to enable communication between different types of stakeholders whose experience of valorisation and business model development may vary widely, and thus to facilitate input from a wide range of actors. At the same time, the RRI Canvas also facilitates contributions to RRI projects by external consultants, again because it provides a clear communication tool.

The paper discusses two key aspects of the RRI Canvas: first, the results of some initial test sessions with different RRI actors will be presented. This includes test sessions with a Horizon 2020 project (SNIFFPHONE), and a research organisation (VTT Finland). Second, the possibilities for consultancy activities based on this tool will be discussed. In particular, the paper will address the practical aspects of short-term interventions in H2020 and similar projects by small consultancy agencies: is it feasible and attractive for such agencies to provide short term sessions such as training using the RRI Canvas to projects? Such activities could provide useful outside perspectives on projects and enable smaller actors to contribute in a flexible manner without becoming full project partners.

Keywords: Responsible Innovation; Valorisation; Business Modelling; Consultancy; Horizon 2020

Introducing Slow Tech into Small-Scale Businesses and Innovation Centre

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It has been pointed out that economic institutions are key to the adoption and innovation of Responsible Research and Innovation (RRI) (Schaltegger and Wagner, 2011; Scholten and van der Duin, forthcoming).

This paper addresses the very current question of applicability of RRI concepts in the Information and Communication Technology (ICT) domain. In particular, its focus is on the use of Slow Tech (a good, clean, and fair ICT) as a compass for implementing RRI in real life small-scale businesses and innovation centres.

The Slow Tech approach introduces a form of proactive computer ethics (Patrignani and Whitehouse, 2014) that can be best applied in the design of new computer-based systems. These new systems can be designed by bearing in mind the three basic elements of Slow Tech. This can be done by taking into account, first, human limits (good ICT); second the whole life-cycle of the materials, energy, and products used to create, manufacture, power, and dispose of ICT (clean ICT); and, third, the working conditions of employees throughout the entire, globally extended ICT supply chain (fair ICT).

The main difference between the Slow Tech and the recently developed RRI approaches resides in the concept of limits. While, most RRI research concentrates on the forecasting efforts that need to be made to enable researchers to anticipate the impacts of their scientific and technological activities, Slow Tech is built on a more holistic approach. It includes a fundamental critique of the previously unquestioned assumption that ICT will continue to operate exponentially faster, be financially cheaper, and experience no limits (Patrignani and Whitehouse, 2015). This holism includes a stakeholder analysis.

Perhaps the main challenge of applying Slow Tech in real life companies is due to the complexity and global span of the ICT stakeholders network. Its wide variety of stakeholders include: universities, computer engineers, and computer scientists; computer professionals' associations; ICT companies (such as chip manufacturing companies, hardware, software, and telecommunications companies); cloud computing providers; ICT users; electricity providers; environmental advocacy organisations and e-waste destination countries; policy-makers; future generations, and the planet itself. These stakeholders clearly work in a large number of fields, and are located throughout the entire globe.

A complete Slow Tech method – in similarity with RRI – should identify all these stakeholders; engage with them; reflect with them along all the relevant dimensions of innovation; incorporate emerging considerations in the research and innovation process; anticipate the social, environmental, and ethical impacts of the initiative underway; and, finally, adjust the direction of the process in response to stakeholders' feedback. Thus, Slow Tech and RRI needs to become closed-loop dynamic processes able to change directions when needed. It is this complexity that challenges the applicability of Slow Tech and RRI in real commercial enterprises.

Despite this difficulty, some good examples of small-scale businesses that are successfully incorporating Slow Tech ideas are emerging in the business context. There are distinct

advantages and disadvantages that can be observed in their experiences (Patrignani and Whitehouse, 2015b). These efforts and their further investigation are, nevertheless, fundamental in creating sustainable value for society and for the planet as well as future generations of children.

This paper will undertake a description of Slow Tech and the application methods it uses, as well as addressing their strong and weak points. We will then describe the results of a small-scale survey undertaken through a number of informal interviews with representatives of institutions in the ICT domain that include real life small-scale businesses, innovation centres, research centres, and makers' communities. We will conclude by identifying potential directions for future work on Slow Tech. We identify (below) the keywords and the potential structure of the paper.

- 1) Introduction
- 2) Slow Tech and RRI
- 3) Slow Tech in a business context
- 4) Results from the interviews
- 5) Conclusions and further directions.

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Keywords: Slow Tech, Responsible Research and Innovation, Business Environment, ICT Sustainability

Session 14: STS for Policy Makers – Exchanging Views between STS Research and Policy

Chair: Franc Mali, University of Ljubljana, Faculty of Sciences, Slovenia

Addressing ‘Grand Challenges’: Implications for Research and Innovation Governance

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Today ‘Grand Challenges’ has become one of the key concepts in research and innovation policy emphasizing that research and innovation has to address major social and economic problems in the fields of energy, health and environment. Strategies and funding schemes to address ‘Grand Challenges’ in research and innovation has been launched by national governments, international organizations, private foundations, scientific societies, and universities. Some well-known examples include the Grand Challenges in Health initiative launched by the Gates Foundation in 2003, the 2009 Lund declaration calling for European research policy to focus on Grand Challenges of our time, and the EU Horizon 2020 program setting societal challenges as one of the three priorities along with excellent science and industrial leadership.

This paper analyses the implication of ‘Grand Challenges’ concept for research and innovation governance. What governance arrangements have been developed to support research and innovation addressing Grand Challenges? Which actors and institutions are involved? How research and innovation addressing Grand Challenges are funded and evaluated? Does the focus on Grand Challenges lead to major changes in established research and innovation governance? To answer these questions, the paper reviews the existing initiatives to support research and innovation addressing ‘Grand Challenges’ launched during the last 12 years by national governments (US, Canada, Netherlands), international organizations (OECD, EU), private sector (Gates Foundation), scientific societies (National Academy of Engineering, Royal Society), and universities and research institutes (University College London, Princeton University, Research Center Jülich). In particular, EU research and innovation policy initiatives for tackling Grand Challenges (Joint Technology Initiatives, Joint Programming Initiatives, European Innovation Partnerships, and Knowledge and Innovation Communities) are analyzed. Emerging research and innovation governance arrangements addressing Grand Challenges typically have several common features: in order to address real-world problems, they aim to bring together heterogeneous actors in inter- and transdisciplinary collaborations. However, there are also important differences in terms of the scope of initiatives (from local to global), actors involved (e.g., if and how business and civil society are involved), and policy prescriptions (topics to be addressed and targets to be reached). There are also a number of open questions including how to address cross-border challenges (beyond EU initiatives) and how to evaluate these initiatives which often have very broad social and economic aims.

Keywords: ‘Grand Challenges’, research and innovation governance, EU research and innovation policy

Exploring the possibility of Combining STS with the Social Construction and Policy Design Framework in a Specific Instance of Risk Governance: Donor Deferral of MSM in the European Union's Blood Economy

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This paper aims to make a theoretical contribution by combining two strains of social theory that have hitherto been developed separately. More specifically, it argues that in policy areas where scientific uncertainty is present, it is fruitful to combine STS with the Social Construction and Policy Design (SCPD) framework, a political science perspective that is mostly used in policy studies. To clarify this argument, the paper focuses on a specific instance of risk governance – the donor deferral policies of Men who have Sex with Men in the regulation of the EU blood supply. This is an interesting case given that in Europe, considerable variation in the content and legitimation of these policies exists, even though all EU Member States are subject to the same EU Blood Directive. Using this particular case, we will explore the complementarity of both theoretical approaches. First, by relying on knowledge from STS, and more specifically the writings of Gieryn (1983) and of Jasanoff (1987, 1993, 1998, 2003, 2010), we aim to explore multiple perspectives on the preponderance of scientific argumentation in the governance of risk regarding the safety of the EU blood supply. STS approaches, however, may be criticized for not elaborating enough on specific policy outcomes. The SCPD framework (Schneider & Ingram, 1993; Schneider & Sidney, 2009) serves to fill this gap by accounting for the political consequences of a scientization of blood supply risk policies. The SCPD framework, in turn, benefits from the contribution of STS, because it has been criticized for a lack of clarity regarding the origin of social constructions in the policy field. Through a systematic review of literature on MSM donor deferral, STS in risk governance and articles using the SCPD framework, two constructions of the MSM donor deferral policy were found to be present in academic discussions. The technoscientific construction, first, was largely patient-centered, drew on quantitative risk assessment methodologies, emphasized the precautionary principle in policymaking, and was mostly dominant in governance bodies. The second construction was an ethico-political construction. This construction was more donor-centered, drew on citizenship studies and rights perspectives, commonly referred to anti-discrimination aims and was mostly dominant within MSM- and LGBT-advocacy groups and supporters. This research allows future students of risk governance and policy making, focusing on the EU blood supply, to study policy making and change as the interplay of such constructions.

Keywords: MSM donor deferral policy, risk governance, European Union, Science and Technology Studies, Social Construction and Policy Design

The Role of Ethics of Science and Technology in RRI Anticipatory Governance

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Responsible Research and Innovation (RRI) is generally accepted in (expert) public as European Commission's R&D policy discourse that has been developed over the past few years. Under the name of RRI have been launched also various R&DI policy initiatives and activities in most of EU-Member States. Notwithstanding, RRI is still quite young and unconsolidated theoretical and practical concept. In that sense, there exist neither an authoritative definition nor a consensus on how to interpret various dimensions of RRI. According to various experts dealing with this visionary and promise-oriented European Commission's R&DI policy discourse, RRI is characterized by four basic dimensions, i.e. anticipation, inclusion, reflexivity, responsiveness (Owen et al., 2012; Stiloge et al., 2013; Kuhlmann and Rip, 2014). In the case of first dimension, there is need to set up systematic R&DI policy discourse aimed at increasing resilience in ethics of science and technology, while revealing new opportunities for the progress of the new emerging sciences and technologies in present in future time. In my paper, the discussion will be focused on the following central topic: how to approach to ethics of science and technology in small S&T and R&D policy community (as it is Slovenia) to be no more perceived as a constraints for the anticipatory governance of the new emerging sciences and technologies? Namely, RRI can function as cross-cutting concept in the visionary and promise-oriented EU and national R&DI policy discourses, if it is strongly oriented to »right impacts« of S&T progress (Von Schomberg, 2013). In new EU-Member States, there is still a lack of the theoretical and practical framework to perform this new kind of ethics of science and technology (Mali et al., 2013; Coenen, 2010). These EU-Member States have, among others, less developed academic culture, less developed institutional tradition of ethical expert advice, the lack of experience with deliberative initiatives, etc. In the broad RRI context, the issues of ethics of science and technology are usually divided into three subtopics: research integrity and good research practice (scientific misconducts, such as plagiarisms, frauds, etc.), societal relevance and ethical acceptability of S&T outcomes and research ethics for the protection of the objects of research. In empirical part of paper will be presented all three subtopics. The focus in this (empirical) part will be the situation in Slovenia. In the paper will be used some empirical results obtained during my participation in two EU 7FP projects, i.e. "Ethics in Public Policy-Making: the Case of Human Enhancement" and "Synthetic Biology – Engaging with New and Emerging Science and Technology in Responsible Governance of the Science and Society Relationship.

Keywords: responsible research and innovation, anticipatory governance, ethics of science and technology, new emerging technologies, small communities

Session 15: Responsible Research and Innovation: Making the Collective Aspect explicit

Chair: Sandra KARNER, IFZ - Inter-University Research Center for Technology, Work and Culture, Graz, Austria

Text Simplification in RRI

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Responsible Research and Innovation (RRI) entails doing science, information and communication with society and for society carrying out an involvement of society during the process of research and innovation. Our interests converge towards the development of interfaces based on language for modern day information technologies applications for modifying or finding information, issuing commands, or present output results in a way easy to understand. In this proposal, we focus on natural language processing, in particular in the text simplification process to transform a text into a similar text that is easier to read. To do this, one has to identify what causes difficulties to readers and define different transformations, mainly aimed at syntactic and lexical constructions that can be applied to the original text to generate a simplified version. The way of writing or presenting information can exclude many people, especially those who have problems to read and write or to understand. There are different factors as for example limited cultural education, people have cognitive problems or another disability, people with social problems or people whose mother tongue is not the official language of their adoption country which can cause problems. In particular, there are specific groups like deaf people, autistic people, elderly or people with language disorders such as aphasia or dyslexia, who have problems when they access information. In order to make information accessible to all people, we must keep in mind the diversity of the people who will access it. Our proposed work on automatic simplification of numerical expressions, is a computational implementation based on a generic model of the process. We present the theoretical bases for text simplification along with a generic model, and show the experimental identification of simplification strategies on numerical expressions to decide what kind of changes need to be implemented for our automatic approaches. We have developed and implemented two systems to simplify numerical expressions in English and Spanish that follow the generic model and used the simplification strategies identified in the experimental studies. For both systems an evaluation with experts has been carried out.

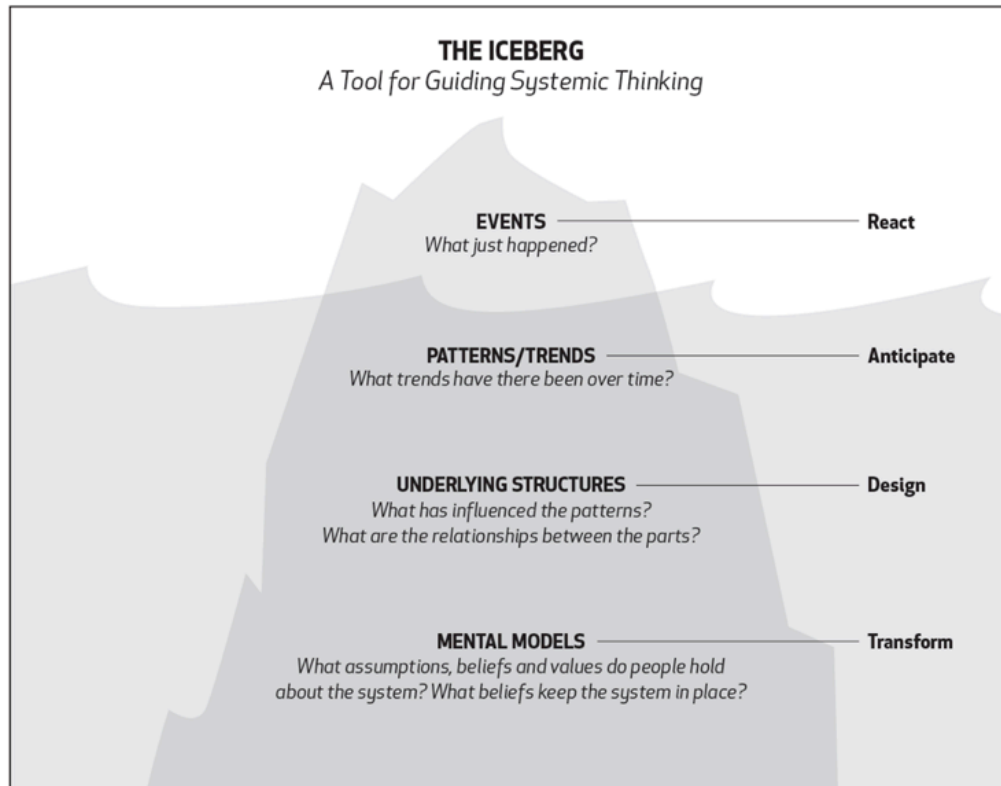
Keywords: text simplification, adaptation, language, numerical expressions

Fostering a Transition towards Responsible Research and Innovation – Reflecting on the Hidden Part of the Iceberg

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The Iceberg model



Systems thinking is a transdisciplinary framework for seeing interrelationships rather than things, for seeing patterns of change rather than static snapshots, for being aware of how our mental models shape our belief systems. One systems thinking model that is helpful for understanding global issues is the iceberg model. (<http://www.nwei.org/resources/iceberg/> consulted on 30-03-2016).

The Iceberg model consists of several levels. The mental model level is the 'hidden part of the iceberg'. It consists of the know-how, paradigms, 'attitudes, beliefs, morals, expectations and values that allow structures to continue functioning as they are. These are the beliefs that we often learn subconsciously from our society or family and are likely to be unaware of' (<http://www.nwei.org/resources/iceberg/>, consulted on 30-03-2016). With respect to the R&I system, the mental model refers to attitudes, beliefs, morals, expectations and values that influence the framing of science, innovation and sustainability. Benessia and Funtowicz point to paradoxical intrinsic loops in this approach. We argue that awareness of these intrinsic paradoxes is a precondition to allow for a transformation of current R&I systems into co-RRI systems.

Keywords: RRI, Function, purpose and paradoxes of research and innovation systems, optimisation and substitution, evidence and objectivity, sustainability and resilience

A Rocky Road to co-RRI: Barriers for Collective Efforts to Pursue RRI

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Responsible Research and Innovation (RRI) has become a key concept under the EU's Framework Programme for research and Innovation Horizon 2020, and it is gradually finding its way into national research and innovation programmes. However, the conceptualisation of RRI is still under development, it may concern the process as well as its outcomes and its practical implementation may take various forms. Within a recently started European project (FoTRRIS - Fostering a Transition towards Responsible Research and Innovation Systems: <http://fotrris-h2020.eu>), we focus on the idea that RRI builds on collaborative multi-actor processes, where a variety of relevant actors work together in order to better target R&I activities at pressing societal challenges. At its best such co-operations involve transparent, inclusive and reflexive processes of problem definitions, analysis, and co-constructed visions of potential solutions encompassing a broad range of options making societal values such as empowerment, social justice and sustainability explicit, or anticipating potential impacts.

In practice the partnership between academic researchers and non-research actors may vary in form and intensity across different research activities or within a single project life cycle. Generally speaking, this contrasts with the traditional model of academic research, particularly in terms of who holds the authority to exercise agency. Within the current frame for R&I such collaborative efforts face a multitude of barriers, which makes it difficult to incorporate RRI practices broadly in research routines. The presentation will discuss the barriers identified through a literature review, which we consider most relevant to be anticipated when setting up RRI experiments within the FoTRRIS project.

Keywords: RRI, collaborative research, barriers, research and innovation systems

RRI in Action: Academic Collaborative Practices

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Responsible Research and Innovation entails doing science and innovation with society and for society, including the involvement of societal actors 'very upstream' in the processes of research and innovation to align their outcomes with the values of society. At the heart of these dynamic and iterative collaborations between science and society lies the aim to take care of the future by creating ethically acceptable, desirable, and sustainable products. And although the debate

on the exact conceptualization of responsible research and innovation is still very lively, by now some key characteristics can be distinguished: open up, include, reflect, and act! Within the European FP7 RRI Tools project we have been working on a framework that entails these characteristics. We formulated four clusters that focus on research and innovation processes, namely 1) diversity and inclusion, 2) openness and transparency, 3) anticipation and reflection, and 4) responsiveness and adaptive change. It is important to stress that creating RRI processes is not a guarantee for ethically acceptable, desirable, and sustainable outcomes, but it will surely provide good conditions.

The most important question to ask now is: how to bring RRI into practice? The RRI Tools project has undertaken two steps to come closer to an answer to this question. First, we developed a „thinking tool“, which is a list of questions that can be used to reflect on RRI principles within your (research) team or organization. And second, we gathered inspiring practices in Europe that could showcase these principles in action.

In this presentation we highlight the Academic Collaborative Centres (ACCs) in the Netherlands – an inspiring practice when it comes to collaborative research – which we investigated to optimize and test our thinking tool. Academic collaborative centers are long-term partnerships between one or more (local) healthcare services, universities, and (local) governments. The program, funded by the Netherlands organization for health research and development (ZonMW) since 2005, aims at bridging the worlds of the academia and practice, thereby fostering evidence-based working on the one hand and needs-oriented research on the other. The main purpose of an ACC is to improve knowledge generation and transfer between practitioners, policymakers, researchers, the education sector, and the client and, as such, improve healthcare services.

We used our „thinking tool“ as a discussion-maker in the ACCs – Transformation Youth that started this January. While optimizing our „thinking tool“, the questions helped coordination teams to reflect on processes going on now and their aspirations for the coming years, while looking forward and thinking of what the effects of their actions now could be. Furthermore, we could analyze how a decade of experience in organizing collaborations resulted in practices that find solutions to real-felt societal needs by co-construction knowledge and visions. To conclude, although RRI literature mainly speaks of the importance of responsible processes and outcomes, the ACCs highlight that people in those processes and the conditions in which such processes take place are essential and require further investigation.

Keywords: Multi-stakeholder collaboration RRI criteria Needs-oriented research

Knowledge integration in a co-operative research effort on Sustainable Food Systems

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An important aspect of co-operative efforts in research refers to the way in which knowledge is being treated and integrated - based upon an acknowledgement of the equal status of different kinds of knowledge. The goal of knowledge integration is to produce knowledge which goes beyond the narrow designation of being called 'scientific' and embraces different kinds of knowledge, represented by different actors participating in the research process. This also includes the issue of acknowledging the crucial role played by cultural values, sectoral interests and political and economic power in the shaping of knowledge, the 'framing of knowledge'. Taking this into account in the research design has an important impact on the framing of the knowledge production and the associated process. Such a perspective on framing the knowledge production process has been described as 'trans-disciplinary integration concept' (cf. Klein, 2004; Loibl, 2005; Pohl & Hirsch Hadorn, 2006; Bergmann et al., 2008), which we used as a methodological framework for knowledge integration in the context of co-operative research project on sustainable food systems. The concept epistemologically emphasises the integration of knowledge from several disciplines and from non-academic fields by transcending and integrating disciplinary paradigms and the realm of practice that the research is related to. The outcome is an integrated knowledge, a kind of hybrid knowledge, which is the result of 'making sense together'. The paper we will reflect on how knowledge integration can be achieved within co-operative research activity by outlining the role of differentiation and reflection as a basis for integration, and key aspects influencing the integration processes in practice. Our arguments will refer to the process design and to communicative action in the context of information exchange, and negotiation and decision making processes. The presentation will be based on experiences gained through an experimental FP 7 project called 'FAAN – Facilitating Alternative Agro-Food Networks: a Stakeholders' Perspective on Research Needs'. The aim of this project was to investigate alternative agro-food initiatives in order to identify policies and other factors influencing their development and to test and evaluate the co-operative research process.

Keywords: co-operative research, knowledge integration, trans-disciplinary research design,

STREAM: NUTRITION, HEALTH AND BIOMEDICINE

Session 16 (1): Health Controversies and Public Engagement

Chair: Anna DURNOVÁ, University of Vienna, Austria

Conceptualizing the Genetics Clinic of the Future: A Multi-Level Engagement Process

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Along with a rising importance of DNA sequencing in current health research and diagnosis, methods have been developed that allow an accelerated analysis of increasingly extensive samples, which makes it possible to sequence the whole human genome in about eight days. This development, called whole genome sequencing (WGS), has far-reaching consequences for present health care systems and practices, such as the development of new professions and changes in the diagnosis process. But it also raises numerous societal and ethical issues, from the handling of huge amounts of data produced over a shift of responsibility to the individual in decision-making to questions of distributive justice and the access for less advantaged and vulnerable groups, to name just a few.

In the EU-project “A Stepping Stone Approach towards the Genetics Clinic of the Future” (GCOF) 12 partners from 10 European countries and various fields (genetic research, medical genetics, bioinformatics, public health care, future studies, patient organisations, political science and ethics) collaborate, to develop socially robust and embedded strategies to integrate WGS in future clinical health practices. In this framework a particular focus is laid on gathering models and tools to involve both, a spectrum of societal groups (e.g. support groups, senior citizens, doctors, immigrant communities, young people) and professional communities in a process of mutual learning. Therefore a multi-level engagement process has been conceptualized, where all kinds of expertise are valued and integrated in further project activities. Continuity in citizen participation is reached through so called “ambassadors”. These representatives of specific societal groups are collectively selected at the end of first homogeneous group discussions and remain and act together with the other project partners in the subsequent development of the GCOF. In a two-way flow of communication, ambassadors bring the expectations, ideas and concerns of their social context into the GCOF project and discuss the GCOF concept among their peers and private networks. The latter might anchor the topic in a long-term and sustainable way also in non-professional communities.

This paper presents an overview of the project activities so far and discusses what such an approach could add to the governance and integration of novel and controversial technologies in the health care system. Based on an analysis of the major issues of 6-8 homogeneous

discussion groups with different societal communities, a focus will be laid on their ideas and expectations concerning deliberation in the GCOF.

Keywords: Public Engagement, Mutual Learning, Whole Genome Sequencing, Genetics

Public Engagement as Sharing of Knowledge: the Case of Citizen-Expert Panels on Biobanks

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Engaging publics in technoscientific innovation has been framed as crucial by scholars and policy makers in recent decades as research in the field of emerging technologies, e.g. genetically modified food or nanotechnology, pointed out. Building on these studies and in relation to increasing efforts for public engagement in debates on health care initiatives, our paper explores this participative turn in the field of biobanking. Biobanks are storage infrastructures that provide access to collections of biological samples of human body substances like tissue, blood or other body fluids, as well as DNA-samples, which are essential for medical research. For research purposes, these data are associated with clinical and personalised data. Different ethical, legal, and social issues (ELSI) are currently discussed by scholars around the globe - particularly because biobanks increasingly aim to link-up data and information across political borders.

The European biobanking community is growing together whereas the reasonable exchange with publics is still debated. In our paper, we elaborate on how the relationship between "experts" and "publics" is organised, especially in terms of policy discourses on biobanking. In doing so, we refer to qualitative data gathered in citizen-expert-panels (CEPs) within the Austrian BBMRI.at (Biobanking and Biomolecular Resources Research Infrastructure) project, which is part of the European biobanking research infrastructure (BBMRI-ERIC). CEPs bring together legal and scientific experts from the field of biobanking with members of the Austrian public in a two-way format. We argue, that specialized knowledge of a specific field brought in by experts and local knowledge on societal contexts and embeddedness provided by citizens, can be conceptualized as "sharing of knowledge". The CEPs setting hence supports negotiating diverging understandings, interests, and perspectives. Based on this engagement process, we are going to reveal how understandings of "appropriate" research with biospecimens and personalised data, and issues on informed consent are negotiated, and enacted in these settings.

Keywords: Biobanking, public engagement, knowledge, qualitative methodology, citizen-expert-panels

Studying Bioeconomy and Biopolitics of Japan: Techno Governance in Field of the Biomedical Engineering Sector

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This paper focusses on the issue of techno-governance in the field of biomedical engineering in Japan, which is hallmarked by several contradictions. Medical technologies are one of the leading markets for high-end products and cutting-edge technologies. Hospitals and clinics experience a dramatic change of digitalisation, technical automation and algorithmising concerning their institutional organisation, working environment, daily practices in diagnosing and treatment as well as production of medical knowledge. Surprisingly, several authors report on a critical “medical device lag” (delayed access to advanced technology/treatment) and a “medical device gap” (limited access to medical devices) in Japan (e.g. Altenstetter 2014). Therefore, the paper raises the question on how far the institutional context and the specific focus of the Japanese technology policy contributes to this situation. Recently, the Japanese government has launched the national strategy “Innovation 25” and the Comprehensive STI Strategy in 2013. They integrate biomedical engineering as one focus area to achieve a “healthy and active ageing society as a top-runner in the world” through (a) “substitution and compensation for physical and organ function”, (b) “reinforcing industrial competitiveness in the areas of pharmaceuticals and medical devices”, (c) “developing future health care” and (d) “developing BMI [brain machine interface] and devices for medical care and nursing at home”. However, the overall focus on robotics and pharmaceutical in contrast to medical devices is overwhelming. What I like to do in this paper is to present my preliminary thoughts on the diffusion of medical devices in Japan from an bioeconomy/biopolitics and STS perspective (Science & Technology Studies). Thus, particularly, the term of techno-governance needs to be theoretically specified and reflected in the Japanese context. This allows to draw conclusion on the overall framework of the biopolitics and bioeconomy of Japan, which will be enhanced by studying socio-cultural implications and underlying values/assumptions from an STS perspective.

Keywords: Japan, bioeconomy, biopolitics, biomedical engineering, techno-governance, public health system, innovation

How to Normalize a Controversy. The Xenotransplantation Debate at the Turn of the Millennium

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Xenotransplantation is the transplantation of cells, tissues, or organs from one species to another. In the 1990s and early 2000s xenotransplantation research, in particular whole organ transplantation, received considerable worldwide attention from policy makers and the media. This interest was partly driven by forecasts which assessed the widespread clinical use of xenotransplantation imminent and its business volume enormous. Researchers from universities

and industry raised great hopes that widespread clinical xenotransplantation would be about to happen. Xenotransplantation was perceived of as a possible means, alongside artificial organs and stem cell research, of solving the problem presented by the shortage of implantable organs, cells and tissues that existed in many countries. Its advocates argued that, if viable, xenotransplantation could contribute to saving human lives. However, for that to happen, numerous scientific obstacles would have to be tackled. However, the uncertainty (and concern) about possible infections from animals to humans, the hazard of potential epidemics and pandemics (think about similar cases such as Ebola, SARS, HIV/AIDS, and avian flu) and the incapability to deliver as promised short-term results stopped this enthusiasm in policy circles and public perception and made place for a more skeptical assessment. Xenotransplantation disappeared to a great extent from both the general public's and policy makers' radar. Nevertheless, xenotransplantation research continued in many countries until today. In summary, xenotransplantation never disappeared as a research field and the topic might reappear in public perception and discussion in the near future, when first clinical trials start. Xenotransplantation involves not only risks but also a number of ethical problems concerning animal welfare issues, informed consent, privacy, fundamental human rights. Surprisingly, in contrast to the early 2000s these issues are little publicly debated today because a general political consensus was created among elite actors at the turn of the millennium that xenotransplantation in principle would be a justified objective. Thus in order to understand the current absence of a controversy about xenotransplantation it is necessary to look into the debate of the late 1990s and early 2000s. Important milestones in this respect were recommendations from expert bodies from the Council of Europe, the European Commission, the OECD, the UNO, the Pontifical Academia for Life, and the British Nuffield Commission. This paper will provide an overview on this past controversy and will address the following question: (1) Which decision did the respective bodies take? (2) How were these decisions made? What were the actual procedures? (3) Who was involved in the decision making process in what way? (4) How was the discussion framed? Which issues were debated and which were not? (5) In what way was the public involved? (5) What was the impact of these bodies? (6) What can we learn from that about the dynamics of health controversies?

Keywords: health controversies, Xenotranplantation, ethics in medicine, expert commissions, public involvement

Session 16 (2): Health Controversies and Public Engagement

Chair: Erich Griessler, Institute for Advanced Studies, Vienna, Austria

Reproductive Ethics: Non-normative Bodies and Assisted Reproductive and Genetic Technologies (ARGTs)

Doris LEIBETSEDER

UC-Berkeley: Scholar in Residence, IAS-STs, Institute for Advanced Studies on Science, Technology and Society, Graz, Austria

This presentation gives an overview of my project, which deals in the first part with an applied ethics of reproductive challenges for transgender and intersex people, and people with disabilities using ARGTs. In the second part, on a meta-ethical level, I create an allied ethics, bringing common issues concerning biological reproduction of non-normative bodies in transgender studies, feminism, queer theory, gender and dis/ability studies together.

My aim is to include non-pathologizing and non-normative transgender, intersex and critical disability issues in a queer feminist, transgender and dis/abled ethical agenda. My main question is: what possibilities of intra-actions (Barad's mutually transformative interplays) concerning biological reproduction exist for transgender, intersex and dis/abled people and feminists?

Keywords: Assisted Reproductive Technologies, Transgender, Intersex, Dis/ability, Ethics

Re-re-revisiting Homeopathy: Additional Circumstances for Public Debate and Discourses on Regulation

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As health controversies go the controversy on homeopathy is of long standing. In its long history - homeopathy has been invented in 1796 - it's been studied by various scientific institutions and governmental actors in different countries featuring a variety of interests, intentions and perspectives, resulting in heterogeneous yet very consistent findings. While scientific evidence is piling, this scientific evidence has barely any impact on public discourse or issues of regulation. Homeopathy remains as popular as ever becoming increasingly politically regulated and being widely accepted by medical practitioners and the general public. Simultaneously we can witness scientific perspectives on homeopathy being labelled "theoretical", "a sign of scientific ignorance" or "an opinion solely of orthodox medicine". This paper will focus on a series of issues that can easily be overlooked when studying homeopathy solely from a natural scientific perspective. These issues, which generally don't make their way into public debate, are key to getting a basic understanding of the socio-medical entity "homeopathy" as well as the

weak impact of scientific evidence on public discourse and regulation. These issues will further reveal the far more general non-scientific issues unnoticeably underlying public debate on homeopathy. The paper will start with a short introduction into homeopathy and the dominant scientific perspectives on homeopathy followed by a brief historical overview of the scientific studies done to get a grip on homeopathy as well as their most noteworthy findings. Thereby the focus will be set on those findings which are generally not of interest to the natural scientific mode of inquiry, yet would be of particular interest to public debate. Subsequently a series of easily accessible non-scientific facts are presented and additional anecdotal evidence introduced. An overview on a recent British debate on homeopathy will be given with a focus on its origins and distinctive features. Finally, some views frequently found in public debate or natural scientific discourse and therein generally accepted for fact will be analysed from perspectives of philosophy of science and STS. Some thought will be given to a reconstruction of homeopathy from the perspective of laboratory Constructivism. The paper will conclude by presenting a series of circumstances that could potentially significantly enhance public debate and discourse on issues of regulation in matters of homeopathy.

Keywords: homeopathy, multidisciplinary scientific perspectives, non-scientific perspectives, applying laboratory Constructivism

Public Engagement concerning Health Problems of Energy Poor Households

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Households at risk of energy poverty are not able to keep their dwelling adequately warm. Consequences are among others health problems. For the most part cold dwellings means moisture damage and mold causing susceptibility to infection, respiratory diseases, asthma, rheumatism, arthrosis, arthritis, migraine or headache, other chronically disease, and depression and anxiety state of inhabitants as well. Besides the precarious situation and the harm of the affected people, these means costs for the public social and health system. There are some efforts in supporting energy poor households in saving energy costs by more efficient fridges or energy saving lamps. But it is evident that such measures cannot solve the affected households' central issue, that is to say the poor condition and energy inefficiency of the buildings. The research projekt „RedEn!“, financed by the Austrian Climate and Energy Fund, investigates the financial feasibility of the implementation of considerable refurbishments under the aggravated conditions of the strained financial situation of households at risk of energy poverty. On the basis of an analysis of the living conditions of households at risk of energy poverty and a detailed socio-economic evaluation in different research areas in Vienna and Lower Austria, cost efficient refurbishment packages for selected pilot buildings are developed and a realistic estimate of cost-benefit impact for specific households is carried out. Existing and feasible alternative financial models and funding instruments, as well as the regulatory framework are analysed. On this basis financial concepts, including present supply-side as well as demand-side public

subsidies, are provided. The project shows, that the problems of households at risk of energy poverty regarding the necessary building refurbishments cannot be solved without public engagement. The project is financed by the Austrian Climate and Energy Fund. The project partners are e7 Energie Markt Analyse GmbH, ksoe (Katholische Sozialakademie Österreichs) and Danube University Krems.

Keywords: energy poverty, health problems, financial concepts, building refurbishment, public engagement

Session 17: STS Perspectives on Food and Nutrition: Materialities, Knowledge and Power

Chair: Martin Winter, RWTH, Germany

STS-Perspectives on Eating and Nutrition: Materialities of Food and Bodies

Tanja PAULITZ, Martin WINTER

RWTH Aachen, Germany

Eating can be regarded as the social process of incorporating materiality into materiality. Usually highly processed foodstuffs are incorporated into the body and to some extent become a part of it. Foods do not only have material qualities, but also symbolic significance. Production and consumption of food is part of broad social discourses regarding what to eat: health, body norms, and sustainability are widely discussed. This indicates that social production of materialities – technologically produced foodstuffs and bodies – and related knowledge cannot be regarded as separated from social power relations.

Science and Technology Studies offer several approaches to the question of how power relations are established, reproduced, or undermined in the productions of food-related materialities and knowledge. In our introduction we sketch the contours of a perspective conceiving nutrition as sociosomatic practices of “embodying”. In this view, we focus on nutrition as interdependent aspects of bodies in society on the one hand and of the materialisation of society in bodies on the other hand. Bodies and society appear in this perspective in their mutual constitution. Thus we undermine the opposition of nature and culture. This approach draws the attention to the social forming of (gendered) bodies through body technologies, i.e. incorporating socially manufactured and normed food products that can be seen as social artefacts.

Keywords: Food Nutrition

Prevalence of Nutritional Supplement Use and Risk Perception among Recreational Athletes

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The impact of nutritional supplement consumption on human health and sport performance has been studied for decades in the scientific fields of nutrition and chemistry. However, to assess the overall impact of food supplement on sport performance, a multidisciplinary approach is necessary. Dietary supplement consumption can lead to negative and also to positive health effects. There has been an exponential growth over recent years in the consumption of supplements, which has been especially marketed among sportspeople. Millions of individuals

worldwide now practice regular exercise to prevent disease and enhance their quality of life or to improve their physical condition for participation in sports activities. Dietary supplements are widely used at all levels of sport, the desire for achieving quick results has made the use of such substances very attractive, food supplements are gaining increasing relevance in everyday life. However, at the same time consumers have become familiar with the experts' worry that the same supplements may cause health problems. Many supplements are promoted, with no sound scientific foundation, for enhancing performance and muscle mass as part of normal training. The information collected shows that leisure time exercisers are systematically using performance enhancement substances, and perceive this behaviour as quite prevalent among other exercisers, supplement use seems to be 'normalized' within fitness setting. The characteristics of recreational athletes who use dietary supplements have not been well described. It is extremely important to provide and disseminate accurate information on these products in the sporting environment. Unless preventive action is taken to control the ingredients of nutritional supplements, and accordingly inform potential consumers about safe use issues, dietary supplementation may subtly undermine public health and counter the health benefits of physical activity and healthy diet. Subsequent work will focus on the development of an integrative model, which try to explain a wide range of health-risk and substance use behaviours by distinguishing between ultimate, distal, and proximal predictors of behaviour.

Keywords: food supplement, risk perception, recreational athletes

Social Cost of Foodborne Diseases in the Light of True Incidents: A Methodological Approach

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Gyula KASZA, National Food Chain Safety Office, Budapest, Hungary

see Poster Presentations, p. 113

Session 18: Research as Development? Science and Technology Studies in Low-Income Settings

Chairs: Nora ENGEL, Maastricht University, Netherlands, Salla SARIOLA, University of Oxford, United Kingdom / University of Turku, Finland

Research as Personal Development: A Case Study from TB Vaccine Trials in Semi-Rural South Africa

Justin DIXON

Durham University, United Kingdom

Clinical trials on new vaccines remain a high priority on the global TB research agenda given the devastating impact TB is having in the developing world and the continuing proliferation of drug resistant strains of the disease. The South African Tuberculosis Vaccines Initiative (SATVI) has been conducting vaccine trials in the Western Cape for 15 years, acting under the self-professed mandate to contribute to the 'greater good' of a new vaccine that will radically strengthen efforts at the primary healthcare level to combat TB.

Yet, with little success in proving the efficacy of a new vaccine, this paper explores ethnographically the impact that SATVI has had on the local primary healthcare landscape through the ground-level conduct of its trials. I will show that many people in the area participated in SATVI's trials not for the 'greater good' of a new vaccine, but rather: (1) to check their health in a more accessible, confidential, and competent environment than available in their local clinics, and (2) to have their health - and indirectly, lifestyle choices - continually monitored and regulated through routine diagnostics, particularly blood screenings.

In both these instances, it seems that SATVI's trials have been taken as an opportunity for people to "take responsibility for their health". This is a saying almost omnipresent in the public health sector since post-1994 neoliberal reforms, but routinely undermined by the structural conditions - e.g. poverty, huge disease burden, and under-resourced clinics - that constrain its enactment. This paper therefore contributes to our understanding of how the abstract biomedical futures written into clinical trial protocols are appropriated by more 'local' hopes for better. But equally, it shows how research thrives by filling voids left by, and even bypassing, state healthcare delivery.

Keywords: TB Vaccine Trials; South Africa; development; primary healthcare

Developing point of care tests for global health

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Point of care (POC) tests promise to bring more diagnostic precision at a lower cost, and with lower maintenance and user skills in settings that do not have timely access to laboratory based testing. They promise to produce data and monitor diseases more easily and to empower patients and healthcare workers with better supported treatment decisions. This new technology is presented as a way to overcome challenges that did not allow former technologies (lab based testing) to function fully. The paper uses conceptual tools such as sociotechnical imaginaries and civic epistemologies related to the STS idiom of co-production. It examines how past/prevailing imaginaries related to the role of technology for development, such as magic silver bullets, technology driven development, appropriate technology or empowerment, common among some development and innovation studies scholars, politicians and economists, structure new socio-technical visions around POC testing. How do such sociotechnical imaginaries interact with research and design practices and established ways of valuing, assessing and integrating expert knowledge (what has been termed civic epistemologies) of global health institutions and actors? The analysis draws on ongoing fieldwork among global health actors (diagnostic manufacturers, donors, members of civil society, industry consultants, international organisations, and researchers) involved in diagnostic development for tuberculosis and HIV.

Keywords: innovation, diagnostics, tuberculosis & HIV

Biofinance: Risk, Debt and the Futures of PrEP in Global Perspective

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The world's leading anthropology and STS scholars agree that the emergence of novel social forms, commonly understood as biocapital, impact local and transnational development projects. However, all current analyses limit their understanding of this impact by focusing on the cultural logics of capitalist production, or industrial biocapital. Such analysis reduces the complexity of global health interventions and bioeconomies to an idiom of biocapitalist production. While these studies offer much needed theorizations of the imbrication of biomedicine and capital, they also occlude new forms of risk and debt produced by the circulatory cultural logics of a form of biocapital I refer to as biofinance. This species of financial capital is produced and unfolds in relation to industrial biocapital. Unlike traditional clinical trials, which are social forms tied to national and/or racial regimes of biofinancial wealth, global clinical trials produce calculations of abstract risk that circulate globally. Thus, they create the conditions for the circulation of biofinancial capital while simultaneously efface new forms of

debt and the concrete risks faced by trial participants as well as future patients. Similar to anthropological analyses of financial capital, biofinancial capital works to encompass other cultures through the circulation of Euro-American social forms, such as gender, sexuality and personhood. A case in point is the use of the MSM (men who have sex with men) epidemiological category to produce calculations of abstract biomedical risk globally. This paper reinterprets existing scholarship on biocapital by ethnographically exploring the circulatory culture of biofinance as black gay South African men and other MSM have articulated it to me in the context of the global PrEP clinical trial. Based on more than three years of field research on ethnicity and biomedicalized sexualities in South Africa, this paper will examine a number of unforeseen developments of biodevelopment projects that clinical trials represent. This includes 1) the uneven contours of the financialization of global health; 2) new forms of risk (abstract, concrete, and surplus); and 3) the reversal and subsequent effacement of the north-south debt relation whereby the enjoyment of surplus health in the north creates effaced debts to those in the south who are subsidizing northern surpluses with southern risk surfeits.

Keywords: Biofinance; Debt; Risk; Sexuality; Value

Research as Development?

Salla SARIOLA

University of Oxford, United Kingdom/University of Turku, Finland

This talk explores the tangled relationship between biomedical research and development, with particular view on Sri Lanka. It is based on our on-going book project concentrating on the cross-overs between research as systematic knowledge creation and innovation, and development as the orchestration of economic, material and human resources to achieve economic growth, improvements in well-being, sustainability and a range of other objectives. The loci of our interest are the international collaborations, and particularly clinical trials, which bring together researchers across differentials of power and resources.

Focusing on three controversies, this talk will explore the conceptual changes ushered in by clinical trials and their bioethical regulation. Our analysis shows how problematic the introduction of new research cultures is locally: people disagree about the shape and kind of research cultures and the values embedded in the different notions of bioethics, leading to individual and institutional conflicts and compartmentalised regulatory structures.

Keywords: clinical trials, international collaboration, controversy, bioethics

STREAM: INFORMATION AND COMMUNICATION TECHNOLOGIES, SURVEILLANCE AND SOCIETY

Session 20 (1): The Role of Webvideos in Science and Research Communication

Chairs: Joachim ALLGAIER, Institute for Science, Technology and Society Studies, AAU Klagenfurt, Austria; Andrea GEIPEL, Munich Center for Technology in Society, Technical University of Munich, Germany

Representations of Assisted Reproductive Technologies on YouTube

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For today, the Internet has become a significant platform for health communication and patient education, and as a result of the emergence of Web 1.0 and Web 2.0 sources, laypeople have more options to get medical information than ever before. Free access to information potentially helps people to make informed and shared decisions about their healthcare and medical treatment, and this phenomenon potentially affects the doctor- patient relationship as well.

Webvideos are becoming important platforms for science and research communication in the field of medicine. Educational webvideos are used as training sources by healthcare professionals and students, and many of these videos provide theoretical knowledge and practical skills. YouTube as the most popular video sharing site provides easy- to- access audiovisual medical information for its users about diseases, screenings, examinations, and treatments or even surgeries. YouTube as a source of medical information has been studied from various perspectives. For instance, personal experiences of webvideo creators and public responses to medical videos have been analysed. Former studies also have examined the content of YouTube medical videos in order to explore the coverage and representation of childbirth, treatments and diseases such as epilepsy, kidney stone, cancer or Human Papilloma Virus among others. All in all, beyond the benefits of online webvideos on laypeople's and patient education, scholars tend to focus on the quality and adequacy of these contents as well as the purposes and credibility of the video producers.

After a thematic and methodological review of these studies, my paper focuses on the representation of assisted reproductive technologies (ART) on YouTube. A comparative overview of the ART- related YouTube videos will be presented, and by considering total viewership and ratings, a qualitative content analysis of the most popular videos will be given. Being an umbrella term, ART includes several technologies, thus the analysis discusses what

kind of reproductive technologies are presented in the videos and to what extent. Sources of the videos (e.g. institutional, commercial, amateur actors) and their target audiences (e.g. general public, potential patients) will be analysed, just as the visual and textual elements of the videos, such as narration, language, and the usage of medical terms. The paper will explore the depicted spaces and participants of the videos. ARTs require a collaborative work of different professionals, and from the perspective of Science and Technology Studies (STS), it is worth exploring what kinds of experts are present in these videos beyond doctors. The presence and standpoints of non-professionals, such as former or current patients will be analysed too. Furthermore, the analysis turns attention to the framing of ARTs and explores whether ethical dilemmas of ARTs are presented or not.

The last part of the paper compares Hungarian ART- related webvideos with the formerly presented ones. The analysis of these videos is an extension of my previous research that examined the online platforms of Hungarian medical institutions including websites, Wikipedia and Facebook pages.

Keywords: STS, YouTube, Web 2.0 and medicine, patient education assisted reproductive technology

Engaging Short Films on Earth Science for Mainstream Audiences

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Earth Observatory of Singapore

“The Ratu River Expedition,” our recent short science film about earthquakes in Nepal, received over 79,000 Facebook Likes during a one-week outreach campaign for a Nepali-speaking audience. These numbers are feasible by crafting movies that combine storytelling, information and entertainment, and also by reaching out to regional audiences with social media. We have been developing and producing outreach and communication videos for several years now that present practical science research to mainstream audiences. These films, called Knowledge Capsules, seek to bring viewers closer to issues of Earth science and natural hazards. Our unique format is the result of an interdisciplinary development and production process. It includes a combination of interviews, visualizations of scientific research, and documentation of fieldwork. The films encapsulate research insights about volcanoes, tsunamis, and climate change in Southeast Asia. These short films are actively distributed free-of-charge and all are available online. The paper provides an overview of the motivations, process and accomplished results. Our approach for producing the Knowledge Capsules includes: an engaging mix of information and a fresh delivery style, a style suitable for a primary audience of non-scientists, a simple but experientially rich production style, diagrams and animations based on the scientists’ visuals, and a running time between five and twenty minutes. <http://raturiver.com>

Keywords: Earth science, Knowledge Capsules, natural hazards, short science films, storytelling, social media, outreach and communication videos, mainstream audiences, interdisciplinary development and production process, visualization, documentation of fieldwork

On some Communicative Potentials of an Animated Webvideo as a Vehicle for Communicating Science to lay Audiences

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Research into consumers' decision-making when it comes to buying organic food shows that one of the primary reasons why consumers do not buy more organic foods is lack of information (e.g., Zanolini/Naspetti 2002; Duffy/Fearne/Healing 2005; Barnes/Vergunst/Topp 2009; Bodini/Richter/Felder 2009). Due to the mundane yet highly consequential fact that, in the industrialized part of the world, "producers and consumers no longer know each other" (Bellows et al. 2008) food communication is, quite simply, inescapable (Bodini/Richter/Felder 2009). Congenially, Zanolini and Naspetti express the need "to devise a better communication strategy" (2002), with a view to "informing consumers about the extra quality inherent in organic food" (Duffy/Fearne/Healing 2005). And it is exactly this call for 'better' ways in which to communicate domain-specific knowledge of organic foods to lay people, which has led the research project "Multicriteria assessment and communication of effects of organic food systems" (MultiTrust 2012) to develop and make public an animated film aiming at presenting a novel way of communicating about the quality attributes of organic foods. Whereas the film as such does not present a tool ready to be employed in the service of science communication, it does envision a communication platform which we may utilize when aiming specifically at engaging and involving lay audiences. A way which – ideally – allows lay audiences to build up decision-making competences as well as – in the process of doing so – to construct domain-specific knowledge. With a point of departure in the above presentation, the research agenda of this paper can be summarized as follows: To present and to analyze the animated film "MultiTrust" (2013) with a view to critically evaluating its potential in meeting the requirements for "better" organic food communications (as called for above). In order to do so, I will begin by situating my approach, disciplinarily within the general framework of science communication (Kastberg 2015). I will then proceed to describe how visual components of expert-lay communication are typically dealt with, i.e., as static and text-bound visuals (e.g. Ballstaedt 1995). Due to the fact that the empirical object of study of this paper is an animated film, I am compelled to enrich this framework; I do so by turning to a presentation of a model of analysis informed by social semiotics (e.g. Kress and van Leeuwen 1996/2003) and multimodality. The paper goes on to present an analysis of the animated film "MultiTrust" (primarily based on Baldry/Thibault 2006, Iedema 2001 and Kress and van Leeuwen 1996/2003) and ends with a critical discussion and evaluation of the communicative potential of the animated film as a means to communicate scientific knowledge across knowledge asymmetries (Kastberg 2011) to lay audience.

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Keywords: Science communication, communicative potential, knowledge asymmetries, webvideos, expert lay communication

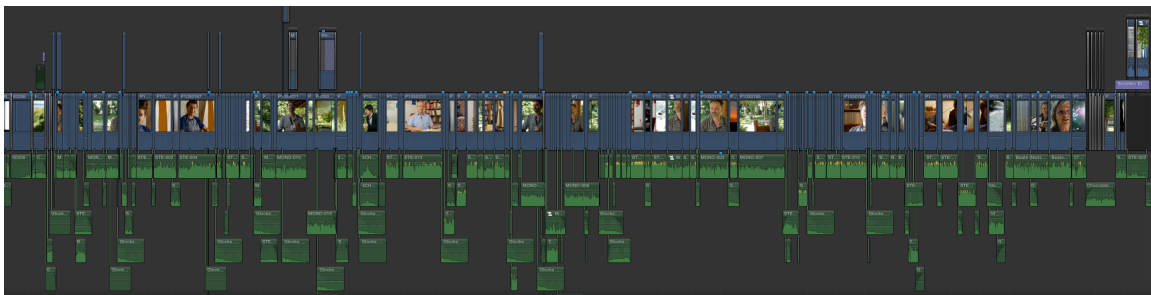
Session 20 (2): The Role of Webvideos in Science and Research Communication

Chairs: Joachim ALLGAIER, Institute for Science, Technology and Society Studies, AAU Klagenfurt, Austria; Andrea GEIPEL, Munich Center for Technology in Society, Technical University of Munich, Germany

Experience report: Nietzsche's One Way Ticket to Webvideo?

Mersolis SCHÖNE, Joel SZONN

University of Vienna, Austria



The film – its elements and layers in the timeline.

The underlying filmed-interview project addressed the ways of reception of Nietzsche's "Human, All Too Human: A Book for Free Spirits" – presented and discussed at the Nietzsche-Lektüretage 2015 (Nietzsche-Colloquium Berlin) and at the Forum Junger Nietzscheforschung (Kolleg Friedrich Nietzsche der Klassik Stiftung Weimar) – and subsequently evolved into a continuing project of research and communication on the topic of "reading Nietzsche" with interviews in New York City, Cambridge, Vienna, Weimar, Paris etc.

More generally, the project asks: What are the conditions of thought and insight, and how could they be subject to research and be presented?

On this background - a movie as a medium and product of research - the idea of a blog emerged where the continued filming can be provided and constitute a scientific platform; An online blog on which videos, pictures, texts and speeches are periodically provided for individual discovery. As participants were interested in the thoughts and performances of others, significant interest became evident in a platform for communication bringing together the disciplines and social groups/discourses.

We will speak in the form of an experience report about our (1) decision to film and the difference in regard to usual work, (2) why our film concept changed fundamentally, and (3) why we now aim for a web-video-project – and (4) what all these decisions have to do with Friedrich Nietzsche and the contemporary Nietzsche research. It is also possible to show a few snippets from the film project during the presentation or the full version later and discuss it.

Keywords: research documentation, scientific standards/criteria in film, art based philosophy, film as research/philosophy, Nietzsche research, transdisciplinary communication, research and peripatetic

The Online Video as a Tool to Communicate Science. Characteristics and Classification Proposal

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Disseminators and journalists working in science communication face some distinctive features typical of this specialized area. Some of the major handicaps, if not the greatest, are the difficulty in transferring concepts conveyed by experts to the people, to make the knowledge understandable and to meet the time and space requirements inherent to the journalistic format. In this sense, the Internet, and in particular the online video, play an essential role because of the advantages they offer to communicators regarding dissemination, participation, creativity and multimedia.

The present paper analyzes the online video as an effective tool to communicate science. The study focuses on analyzing its technical parameters, broadcast channels, intrinsic peculiarities to the digital format and the advantages the online video offers when compared to television documentaries. The paper proposes a typology of online video formats that allows its classification and study. The methodology includes 14 expert interviews, whose content has been vital to establish the basic characteristics of this format.

Results show that the online video is a useful tool to disseminate scientific content to the general public in a short and concise way. The video's ability to capture the audience's attention and its clarity and concise language are key to making it enjoyable, though not necessarily entertaining. In the analysis of online videos of scientific content, it is also important to pay attention to the distribution channel, where YouTube acquires a major role. Moreover, users often get involved in the publication of contents, and this, according to some of the experts interviewed, can become an issue when addressing controversial scientific issues.

Keywords: online, video, science, communication, webvideo

Using On-line Video Science Communication to its Full Potential. Comparative nterview-based Analysis of Five Major UK YouTube Channels

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Through interviews with the people in charge of five major UK-based YouTube science communication channels, we explore how these are used to various degrees with respect to their full potential. Whilst in some instances the channels are considered as a supplementary platform for other media formats, like print or TV, there are clear indications and examples of how Webvideos can and do provide a qualitative leap regarding audio-visual science communication, through the possibility of creating a participatory community of viewers and

followers, and allowing to establish a real dialogue with the audiences, as well as to experiment with different formats and styles.

The study also suggests that despite the reputation of on-line media of being very flexible and low in resource requirements ("anyone with a webcam in their bedroom"), running a on-line science communication channel to its full potential is not a trivial matter, and requires a substantial amount of dedication and person-hours, as well as a thorough understanding of the possibilities and challenges that are opened up by this format.

The channels included in this study are those run by the journals Nature and New Scientist, the Royal Institution, BBC Earth, and the freelancer Brady Haran.

Keywords: Webvideos, science and the media, on-line science communication, YouTube

Session 21: Assistive Technologies and Transhumanism viewed from a Multidisciplinary and STS Perspective

Chair: Isabel ZORN, TH Köln, University of Applied Sciences, Institute for Media Education, Germany

Introduction to Assistive Technologies as a Field for Transhumanism Studies and Science and Technology Studies

Isabel ZORN,

TH Köln, University of Applied Sciences, Institute for Media Education, Germany

The short paper will outline the scientific discourse on assistive technologies in various disciplines. Assistive technologies are designed for compensation and empowerment of disabled people. While in the Ambient Assisted Living discourse (AAL) mainly technologies for seniors are in focus, they are as well used for education, therapy and participation of younger adults and even small children. The paper outlines the type of discourse in development (mostly technical fields), in care and rehabilitation, and in education. These perspectives focus on development and application of technologies in a social context. However, such technologies are also subject of an evolving discourse in STS and transhumanism studies, where more critical views on balances of interests such as allowing for more freedom by exercising more control or perspectives on regulating and forming behaviors by applying certain technologies are being developed. STS perspectives with a focus on issues of ethics, control, responsibility, or determination by (false) presumptions as well as perspectives on socio-technical aspects of human interaction with technology hold a potential to explore in a more critical and thus comprehensive way the role of technologies in daily lives of people who are seen as needing help or compensation. Potentials and challenges of ubiquitous computing technologies applied in everyday life actions will be derived.

Keywords: assistive technologies, inclusive education, transhumanism, AAL

Assistive Technology and shading the Maps of Responsibility

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Although STS, as a field, has done a great deal to deconstruct the boundary between innovation and use by calling attention to the invisible work and inventiveness of users (Star, 1991, Suchman 1994) this division seems to remain to be entrenched both within innovation and commercial practices. My presentation focuses on degrees of difference in when and how this boundary is enacted (or not) in consumer and Assistive Technologies. My vehicle to circumnavigate this problem is the notion of the script, as introduced by Akrich. I set out with highlighting the ambiguity in Akrich's original definition: "(scripts) define a framework of action together with the actors and the space in which they are supposed to act." (emphasis added)(1992, p. 208). This ambiguity, I argue, allows both a descriptive and normative, or even prescriptive reading of the concept. Initially, the first, descriptive reading of 'script' played a productive role in actor-network theory as a metaphor to help understand technological devices in relational terms; and subsequently received convincing criticism (Suchman, 2007, 2012). A second, alternative reading, however, poses scripting as a normative intervention that creates maps of responsibilities by reifying otherwise contingent relations of use; technical objects produce particular geographies of responsibilities by distributing 'causes'. As Akrich notes "The choices made by designers take the form of decisions about what should be delegated to whom or what," (1992, p.207). By driving a wedge between use and development, scripts as maps of responsibility redistribute (invisible) work and limit legal liability and enable circulating technology as commodities. Finally, I ask, what happens, if the user cannot be made (fully) responsible if the connection between developers and users cannot be severed? The case of assistive technology presents not only an alternative framework of responsibility, work, and dis/connecting, but also exposes the material-semiotic relations that render users into responsible subjects. As a conclusion, I propose the argument that although becoming a user is often formulated, especially in the case of consumer products, in terms of choice, comfort and freedom; the case of assistive technologies makes it visible that the status of user entails becoming invested with a certain set of responsibilities.

Keywords: user, assistive technology, responsibility, commodification, subjectification

Facilitating Innovation for Deaf User Experience: A holistic Perspective

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Designing information and communication technologies (ICT) for people who have inherently different experiences and abilities, as the designers involved in the process, is a highly challenging task. This paper considers the challenges of interaction design when targeting prelingually deaf signers, i.e. individuals who became deaf before language acquisition and who prefer to use a sign language for communication.

These challenges are mainly related to the following two aspects. Firstly, lifelong social, cultural and linguistic experiences of signing deaf individuals are only indirectly accessible to hearing designers. Therefore, approaches like empathic design that shown to be powerful in other areas of human practice appear to be limited in this case. Secondly, the majority of hearing designers lack substantial knowledge and understanding (and some of them even awareness) about the multifaceted experience of signing deaf people.

Although recent research in HCI on the topic of including the needs of deaf users in design solutions provides some valuable results, it mostly focuses on the inability of signing deaf users to hear, or their weak literacy skills. Thus, questions related to social, cultural and linguistic aspects in the use of technology by this user group remain largely unconsidered, letting alone the gains for the overall society that may arise from a more holistic research.

This paper sets out the necessity to drop the currently still predominant view on designing for signing deaf people that is focused on deficiencies, in favour of considering gains. Therefore, this paper investigates appropriation phenomena of ICT by signing deaf users in terms of the third wave in HCI that has been initiated by such researchers as Paul Dourish. With other words, interaction between ICT and the users is considered as a dynamic phenomenon that is composed of elements of human experience. This investigation is conducted within three truly existing co-design and development projects in which signing deaf users are involved as experts in their experience as active participants in the creative process. A number of lessons learned from these co-design projects are discussed in this paper and their relationship to the particular linguistic, cultural and individual experience of the signing deaf users is discussed.

Keywords: Linguistic Experience, Deaf Culture, Embodiment, Conceptualisation, Co-Design

Scenarios of Using Gaze Control: Issues of Interference and Differentiation

Maxine SABOROWSKI,

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Lisa sits in her wheelchair. Her communication aid with gaze control is mounted on the chair. Her mother switches the device on and asks "Is everything alright?" Lisa looks at the screen, selects a cell, and the voice output articulates: "Yes, it works." Lisa starts to check her emails. Her mother leaves the room, and the little sister runs in: "Good morning!" She jumps on Lisa's lap and touches the screen to start a game. Lisa grumbles. Their mother comes back: "Sarah, I told you already: don't touch Lisa's computer!!"

For people with severe motor impairment, gaze control is a method to control a computer. This assistive technology allows them to use a voice-output system, write emails or texts, listen to music, use environment control (for windows, blinds ...) etc. A computer with gaze control is rather complex and the helpers play an important role in making it work: they mount it, switch it on, install updates, fix it if something does not work, and so on.

The aim of this paper is to look at the scenarios inscribed into gaze control applications and at the ways how users and helpers in real life create new scenarios. According to Akrich and Latour, designers set out a script when they develop a device. Users can act this out or inscribe

new scenarios by tinkering, creating, making something up.

Through the method of participant observation, we gained insight into the everyday practices of people who use gaze control, their relatives, therapists, teachers etc. One overall result of the observations was that the designers of gaze control have a vision of a competent user with technically qualified assistants at his/her side, which is not always the case in real life. Besides that, some of inventions that the users and their helpers developed over the time are very interesting. These inventions mostly explore the issue of the device not differentiating between users. For example, one person should use the device, another one is not allowed to do that. Whose task is it to say yes and no? A non-speaking person with severe motor impairment depends on helpers who say "No!" to siblings and roommates who like to play with the device. A second example is a piece of plastic that makes a difference between user and helpers because their ability to articulate their hands is different: Lisa has sometimes hit a button on the side of the device with her hand and unintentionally entered the settings. A therapist constructed a strip made of plastic to attach to the side of the device so that only his agile finger can touch the button.

One conclusion we like to propose is that gaze control as an assistive device for individuals is still not very suitable for day-to-day use. Currently, developers try to create new scenarios for gaze control, with therapists using it for diagnosis or pupils playing educational games at school. With this approach, developers try to adapt the device for use in very specific situations rather than covering the complexity of everyday life.

Keywords: assistive technology, script, gaze control, design

Session 22: Digital Transformation and Cultural Turn

Chair: Daniel HOUBEN, RWTH Aachen University, Germany

Towards Understanding the Duality of Datafication and Culture in Current Society

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Datafication by now has invaded every sphere of the social and, hence, poses a challenge to conventional sociological reasoning. Media and cultural studies have pointed out the implications of digital forms of communication as well as knowledge production, consumption, and distribution mostly with respect to social media. Building on these insights, we argue for a more radical approach that understands an increasing number of societal and by that cultural processes as being data driven and, thus, analyzes our current society as a 'data society'. We will argue for such a perspective by making a threefold argument:

(1) We point at the imperative necessity for STS to develop theoretical perspectives and practical methods to meet the uprising challenges posed by datafication and digitalization of

society at large. Although big data is currently paid considerable attention, it is mostly treated as a rather isolated phenomenon with discussions being limited to narrow issues such as privacy. However, data based social processes not only have become ubiquitous but their (re)production, utilization, and relevance have reached novel qualities which render society and cultural production deeply changed. Therefore, societal, cultural and political reasoning urgently needs to confront itself with this data society.

(2) In order to demonstrate this, we will reconstruct processes of algorithmization and their relevance to society at large. Drawing, among others, on system theoretical approaches, we develop an analytical framework to understand the new forms of data communication and their data traces, identified by media studies, as manifesting interpenetrating qualities to all kinds of social systems.

(3) Finally, we will subsume the former arguments into a heuristics which allows for addressing the duality of datafication and culture. A proper understanding of our current society cannot be obtained without considering the interdependence of cultural forms and their digital bases, or vice versa, the cultural bases of digital forms of communications. Hence, the duality of datafication and culture should be at the heart of further development not only in science and technology studies, but in social sciences in general.

Eventually, this perspective enables us to formulate a research agenda that meets current societal developments.

Keywords: datafication culture data society duality

Reorganizing Industries: Consequences of Industry Efforts to Implement the Internet of Things

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At the moment, also traditional industries undergo large scale transformations due to the opportunities and challenges presented by digitization. Specifically, new ways of combining the immaterial and the material - especially software with physical products and their production - have the potential to bring about a long lasting change in existing forms of industrial organization. The phenomena I am currently observing signify a new quality of the technologization of society, which stems from the interplay between digitization and the organization of industries. The research project has started in October 2015. For the full paper I will be able to deliver first results of the empirical research as well as their theoretical implications. This paper aims to investigate the reorganization of the material drawing on three current examples of digital technologization. Each of these three examples represents a central aspect of the innovation process: research and development, production, and the usage of specific products. As the first example open innovation focuses on the research and development phase of new products and services. Current attempts at giving hardware development properties formerly associated only with software development, are particularly relevant to this case. The second example, the German initiative "Industrie 4.0", mainly aims at the production phase. Its primary focus is on the digital interconnectedness of products, the machines used to manufacture them and the customers. The third example, hybrid product-

service-systems, addresses the merging of the material and the immaterial drawing on the example of the combination of physical products with associated services. These transformations have significant consequences for organizations. Organizations spheres of control shift and change. I argue that digitization leads to an increase of inter-organizational links and connections: Users are integrated through crowdsourcing and open innovation projects; production is coordinated along the whole supply chain; manufactures and suppliers of manufacturing equipment have permanent access to machines, even years after they have been sold; and also products continue to communicate with their manufacturer during their whole life span. This paper scrutinizes the consequences these changes in the permeability of the organization's boundaries have. Two things seem to be apparent already: On the one hand, the increased permeability allows the organization to extend its sphere of control. New and different actors get into the reach of an organization or stay connected to an organization for a longer period of time. On the other hand, organizations become more sensitive to the actions of these very actors. From the perspective of the organization exerting control over these actors is difficult since they do not become formal members of the organization – most of them do not even enter into any contractual relationship with it. Extending the organization's sphere of control to include new participants also implies an increased sensitivity of the organization to actors formerly external to the innovation process. Their action may at any point take on its own momentum and not confirm to the organization's original intentions. From the organization's point of view such deviant behavior can affect the innovation process in both positive and negative ways. Opening its boundaries may offer the organization the opportunity to access innovative potential not otherwise available but at the same time poses the danger of losing control over organizational activities. This way the specific socio-materialities of digital technologies will transform the governance of industrial organizations, their power relations as well as their autonomy. This paper draws on concept from institutional theory in the tradition of John Meyer and Walter Powell, strategic organization analysis in the sense of Michel Crozier and Erhard Friedberg and the organization theory by Simon and March. This combination of theories allows to analyze the internal and external structures and relations of firms, the shift in power in these relations and the consequences of these shifts for the level of industries and fields. The full paper will present empirical findings and their theoretical implications.

Keywords: Internet of things Digital industries Industrie 4.0 Power

Virtual Experimentation Using the Dose- Response Simulator as Resource for Teaching Biology

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The present work is an innovative strategy for education, which consists in the implementation of a virtual investigation project. The laboratory practices are fundamental for an effective teaching in science. But in most Latin-American universities especially in biology courses, some laboratory practices and many practical experiments are prohibited because they have a high cost. There are few digital resources that can simulate a biology science lab. Some European and American universities have been developed simulators as an alternative for the prohibition

problem. In México, these types of developments are rare. This work presents the analysis of the experience of using the Dose-response simulator ver. 1.0. The simulator has been developed in our virtual-lab, its objective is to explore the usability and the learning level achieved for the students. The exploratory research was performed in the “scientific method I” student group in the biology school. The accomplished work corresponds to a virtual investigation structured and guided for a specialist teacher that used a semi-closed methodology. The learning process includes some student’s activities like: request information, classify, summarize and make relations in scientific papers. The data results generated by the simulator were analyzed and evaluated in order to draw a scientific paper according with the actualized Bloom’s taxonomy. The results indicated that the students achieved a significant learning in each level. In conclusion, the simulators are a didactic alternative for the teaching science in its different forms, either formal or informal education in virtual environments.

Keywords: simulator, education, virtual

Session 23: Surveillance and Security Technologies as Objectson Investigation for the Studies of Science, Technology and Society

Chairs: Simon EGBERT, Bettina PAUL, University of Hamburg, Germany

Nomen est Omen: Body Scanner, Nude-o-scope, Security Scanner

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These labels refer to the “same” technology and each of them bears implications as to what the technology “really” or “truly” does. “Body scanner” highlights the fact that the body is being scanned. More technical labels like “backscatter X ray” or “millimetre scanners” specify the mode of operation, i.e. the type of radiation a particular scanner uses. The radiation permeates any clothing but is reflected by the human skin, and the scanner displays an image showing every object concealed underneath the clothing. Moreover, the image shows the naked body. In this line, “nude-o-scope” denounces the scan as a humiliating, voyeuristic and transgressive procedure. By contrast, “security scanner”, the official EU label, is supposed to draw one’s attention to the alleged purpose of improving security. The EU also requires manufacturers to develop and implement software in order to replace the image of the nude body with an abstract avatar. The US government uses the label “Advanced Imaging Technology”, regarding the scan merely as a technological procedure. My paper will present a meta-critical and interpretative approach to study a controversial technology. Rather than treating the technology as an independent factor, it seeks to shed light onto the various ways in which technology is embedded and interwoven in societal frameworks. The different labels reflect different viewpoints: different issues are at stake for different actors. According to the programme “Social Construction of Technology” (SCOT), technologies are always linked to actors. Understanding a

technology therefore requires understanding how it is related to different actors and how these actors are related to one another. One has to bear in mind that actors have unequal capacities to shape the terrain of a controversy. The rise and fall of the label “nude-o-scope” is a good example for the marginal influence public outrage has on basic political mechanisms. The legal discussions in the US as well as the political discussions in the EU take the need for new security measures and new security technologies for granted. Mitigating the debate concerning the “nude-o-scope” by promoting new software and new official labels does not mean that governments attach a high value to privacy issues. Rather it demonstrates the capacity of governments to shape and channel controversies and consequently ensure the acceptance and development/implementation of particular technologies. Hence, the systematic adoption of the labels “security scanner” and “advanced imaging technology” at airports results from an institutional process. I will argue that this process is mainly driven by a new political interest in security and by various economic interests of airports as well as manufacturers.

Keywords: airport security, social construction of technology, body scanner, regulation

Private Security going Public: The Case of the "Rede Comunitária de Segurança" in São Paulo, Brazil

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Despite falling rates in the past fifteen years, São Paulo is still a hotbed for violent crime such as armed assault, “blitz” kidnappings or holdup murder – especially in those neighborhoods epitomizing the stark contrast between rich and poor which still defines Brazilian society at large. Morumbi, an extensive district in the city’s southern zone, represents a particularly outstanding example insofar as it is defined by upper-middle-class condominiums interspersed with various favelas serving as “safe havens” for criminals who make a living by raiding the neighborhood’s more affluent inhabitants.

As a counter-measure, a local neighborhood association developed an innovative security scheme aimed at bridging the gap between public and private security actors by making extensive use of surveillance and communications technology. Namely, various private security cameras installed to prevent burglaries shall be used in order to prevent as well as persecute crimes committed in the public spaces adjacent to the condominiums; the images are being shared with the police in real time via internet. In turn, all participating condominiums are granted a skype connection with the local police department which effectively means that the official chain of command (an emergency to the call-center which registers all the pertinent information and only then alerts the battalion in charge) can be “cut short”. The persons in charge for monitoring the CCTV images as well as for calling the police are the condominiums’ concierges, who thus acquire a whole new auxiliary role in terms of neighborhood policing. Besides, there are intentions to integrate this local, “grassroots” public-private surveillance scheme within a more “professional” context, i.e. Detecta, a new big data policing tool co-developed by IBM and the NYPD which is currently being implemented by the São Paulo police forces.

In my presentation, I would like to point out how a range of comparatively recent technologies (digital CCTV cameras, HD recorders, broadband internet) first made conceivable and then became “enrolled” in a security assemblage in which the differences of public and private, local and global as well as human and non-human gradually lose their evidence. I would put a particular emphasis upon the problematic interface between an increasingly sophisticated technical infrastructure on the one hand and the concierges as a relatively low-qualified workforce on the other. My intuition is that these “translations” between human and non-human actors always bear a potential for unanticipated, non-linear or “emergent” events which, in the given context, are undesirable because they would (supposedly) increase the neighborhood’s vulnerability to street crime. At the same time, I deem it likely that the system as a whole strongly depends upon a certain ethics of trial and error precisely because it was conceived of by “security laymen” and is still in plain development. In my presentation, I would try to show how both requirements (predictability and improvisation) converge and, at times, clash in the concierges’ daily routines of monitoring the environment and interacting with the police. To this end, I would present some preliminary results of my ethnographic research.

Keywords: Big Data, Brazil, Community Policing, Surveillance, Violent Crime

Making Surveillance Smart. The Smartboxing of Sociomaterial Assemblages of Surveillance

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This paper argues that surveillance is currently being reframed as an endeavour of smart technology through the deployment of technological artefacts that are enacted and positioned as smart or intelligent. Attention is increasingly being focused exclusively on the respective smart technology (re)presented as a comprehensive technological fix. Two discursive strategies help smart technology achieve credibility as a convenient tool for fixing diverse problems of security, mobility etc. First, it is positioned as a particularly suitable and most of all sophisticated form of surveillance. This is mostly achieved through rhetorical claims rather than by really providing evidence e.g. by means of full operational evaluations (cf. Introna & Nissenbaum 2009: 22). Second, by emphasising stories of innovation and technophile advancement, entities of smart technology and their communication as such are thought to be used to turn attention away from the adverse connotations of surveillance and its far-reaching implications.

What is missing in these stories is the observation that implementing smart surveillance technologies successfully affords an extensive and thorough adaptation of existing environments and practices (e.g. through standardization) as well as the coordination with human beings such as operators or police forces. This indicates the close entanglement of technologies, objects, artefacts, practices, and human actors with spatial configurations. A concept from Science and Technology Studies that puts these arrangements on centre stage is the notion of sociomaterial assemblages. The figure of the assemblage used here points to the “bringing together of things, both material and semiotic, into configurations that are more and less durable but always contingent on their on-going enactment as a unity” (Suchman 2008:

150). It “helps to keep associations between humans and nonhumans as our basic unit of analysis.” (ibid.: 156)

As reasonable as the concept of sociomaterial assemblages might be, more often than not it is the case that sociomaterial assemblages are treated as a unity represented solely by a shiny technological artefact. This phenomenon can be analysed as a process of smartboxing. Smartboxing is both a continuation and co-process of blackboxing (Latour 1999: 304), and can be considered as the way sociomaterial assemblages and the scientific and technical practices that go along with them are made invisible while simultaneously being labelled and treated as ready-made smart or intelligent entities. In this process of smartboxing, the focus is exclusively on the smart technological exterior and its successful outputs while never referring to what makes a specific entity smart, or how and in what way this supposed smartness is dependent on relationships with other actors in the sociomaterial assemblages they are necessarily part of.

The notion of smartboxing is introduced by referring to two empirical examples: first, an analysis of the media coverage and representation of the so-called ‘Toll Sticker Monitoring Checks’ (“automatische Vignettenkontrolle”) on Austrian motor- and expressways, and second, data concerning a system of automated fall detection collected in ethnographic field work in a computer vision laboratory.

Keywords: Smartboxing, Sociomaterial Assemblages, Surveillance Technology

From End-to-End to Total Control. Technological Dramas and NSA Counter-Artifacts to the Internet

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This paper uses Pfaffenberger’s (1992) concept of socio-technical dramas to analyze surveillance programs of the National Security Agency leaked by Whistleblower Edward Snowden. Pfaffenberger argues, that technological artifacts not just have a material function, but are force projections that unfold in a discourse of statements and counterstatements, which he calls technological dramas. Pfaffenberger assumes a hybrid position that understands technologies as both social and material. The politics of artifacts unfold both in material design and social discourse. By adding Lessig’s (2006) notion that code is law, it follows that norms and values can become embedded in artifacts, and that these norms manifest themselves in usage. The TCP/IP protocol is a piece of code that codifies certain values that were upheld by academic developers in the context of the US Advanced Research Projects Agency (ARPA). Protocol functions such as packet-switching, dynamic routing and the end-to-end principle reflect the idea of distributed or decentralized control of the norm that no single entity should control the Internet’s dataflow. The Internet also reflects norms of openness (both in the construction process as well as in applications) as well as limited anonymity, resulting in the popular cartoon from 1993: “On the Internet, nobody knows you are a dog”. This basic anonymity as a result of TCP/IP can be described as “the bane of intelligence agencies” (Harris 2014). In Pfaffenberger’s terms, intelligence agencies are impact constituencies that perceive the original Internet as negative for their own operation: packet-switching complicates

wiretapping. They therefore aim at technological reconstitution and adjustment of TCP/IP to restore power. During the 1990s, NSA began to design their own technological systems (like Trailblazer) that aimed to counteract the design principles of TCP/IP and to circumvent the Internet's basic anonymity. NSA programs can be seen as counter-artifacts to mediate the negative effects produced by TCP/IP. They also are means to establish power and control over world wide digital communication. The NSA's warrantless surveillance program can be perceived as such a counter-artifact, that includes technical design (programs) and socio-legal elements such as certain legislation (like the Patriot Act) that supports its operation. This new socio-technical system also reflects a whole new set of norms: total information control and awareness, and is parasitic in nature. It sits on top of the physical infrastructure of the Internet and extracts data without giving something back. It clearly shows the politics of artifacts (Winner 1983).

Literature: Harris, S. (2014). @War: The Rise of the Military-Internet Complex (Reprint ed.). Eamon Dolan/Mariner Books. Lessig, L. (2006). Code: And Other Laws of Cyberspace, Version 2.0. Basic Books. Pfaffenberger, B. (1992). Technological Dramas. *Science, Technology & Human Values*, 17(3), 282-312. Winner, L. (1980). Do artifacts have politics. *Daedalus*, 109(1), 121-136.

Keywords: ARPA, NSA, surveillance, counter-artifact, socio-technical system

Session 24: Living in Surveillance Societies: When Trust (or Dis-Trust) Draws Collectives, Spaces and Future

Chair: Katharina PAUL, University of Vienna, Department of Political Science, Austria

“Smart Borders” as Sociotechnical Practice: Exploring the Issue of Acceptability

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Border control has been one those realms which eagerly absorb novel technologies in order to be able to handle the effects of economic globalization (the increased flows of people and goods across the borders) and at the same time to respond to the changed security situation from the last two decades (by efficiently identifying and deterring threats). Often neglected by the social sciences, only recently has the border been acquiring serious analytical attention since it has been turning into a space where a lot of social tensions and political conflicts reveal their nature. It has turned into a central category when we discuss asylum and refugee policies, economic migration, inter-cultural clashes, terrorism, international crime, the future of the EU,

etc.

Additionally, with the heavy reliance on various security and surveillance technologies and the ongoing automation of the border control process, a whole new set of problems are emerging. The latter are usually being articulated in the language of fundamental human rights. For instance, how biometrics and big data relate to issues such as privacy, dignity, fair treatment, non-discrimination, respect for cultural differences, etc.? Or, how can we guarantee that the employed scanning or identification technologies are safe and harmless for the travellers? In any case, the technologization of the border control process (“smartization”) is perceived as the proper approach in finding the right balance between two imperatives: speedy border crossings and quality risk management of threats while respecting the human rights of those subjected to border checks.

The presentation will aim at demonstrating the need to open up the analytical space for considering the increasing role of security and surveillance technologies in the context of the political push for “smart borders” beyond the dominant themes of economic expediency and security provision. It will argue the significance of exploring the acceptability (and not only the acceptance) of those technologies by 1/ questioning their meaning; and 2/ exploring the societal visions for the future they implicitly anticipate and promote. Thus, we will have the chance to examine more deeply the sociotechnical nature of “smart borders” and touch upon issues such as how it is involved in: reproducing social inequalities and the dynamics of capitalism; advancing novel forms of biopolitics and the management of large masses of bodies; embedding automation deeper and deeper in human practices so that mathematically-based models replace human judgement and decision-making; organizing and advancing non-obvious but still effective mechanisms for exclusion (through algorithms for denied access) and so on.

Keywords: smart borders, automation, biometrics, acceptability

Publics at risk and risky publics: National immunization programs and their infrastructures

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National immunization programs are cornerstones of contemporary public health policy. At the same time, state-sponsored mass vaccination programs against infectious diseases have frequently triggered political conflicts. These conflicts typically feature contextually contingent discourses of individual versus collective risks, of private versus public responsibility, of parental control versus governmental authority, and last but not least scientific uncertainty and clinical effectiveness. For policy makers, national immunization programs rely on the construction of publics being “at risk”, and particular material infrastructures. These infrastructures include the collection of epidemiological data, future projections of “herd immunity” and “disease eradication”, as well as vaccination registers that document vaccine uptake. In this paper, we argue that infrastructures are not only central tools in constructing publics at risk, but also maintaining the notion of a vulnerable public. In other words, infrastructures to protect the public-at-risk simultaneously embody what we term “risky publics”, i.e. publics, or sub-

communities, that deviate in the form of non-compliance with national immunization programs. In this paper, we document the different ways in which “publics at risk” and “risky publics” are documented, captured, and embodied in vaccination registers. Empirically, we provide early findings regarding vaccination registers in Austria and the Netherlands. In Austria, we find a wide array of registers that are managed by federal states, rather than a centrally coordinating body. Local practices are transformed into national data, methodological and inter-professional variation in complying with the national immunization program are concealed, while regional differences are highlighted. We conceptualize these effects as “convenient uncertainties”. In the Netherlands, a centrally managed software, Praeventis, is used to document every single vaccination administration and its location. This allows the central coordinating institution, the National Institute of Public Health and the Environment (RIVM) to document and visualize the compliance of both medical professionals and citizens. This paper argues that vaccination registers as infrastructures, first, order state-society relations, and, second, reproduce and embody notions of compliance and deviance. In doing so, this paper seeks to provide a deconstructive double-reading of these infrastructures and to ultimately contribute to a constructive and reflexive debate on public health policies and the subjects they produce.

Keywords: immunisation policy, vaccination registers, risk, public health, data, monitoring, Austria, Netherlands

Aerial Surveillance as Means of Securing Sovereignty on Sea

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Progress in aerial surveillance technologies has offered new possibilities to control areas and shifted policies of surveillance dramatically. Satellites and more recently Unmanned Aerial Vehicles (UAVs), more commonly known as drones, have led to a substantial increase in surveillance, especially of conflict and crisis areas, but also of urban and peaceful regions. Socio-technical implications of aerial surveillance are numerous, as the development of conflict as well as stable areas can be tracked. Aerial surveillance however can also be used to control movements in disputed areas to recognize possible threats to national sovereignty and society. This paper will examine how aerial surveillance has changed the governance of disputes with the example of maritime sovereignty disputes in terms of economic sovereignty. As case study, the South China Sea will be investigated. In this conflict, disputes around sea areas evolve as the South China Sea is a resource-rich region, rights to extract those are however point of conflict.

Seas, especially high seas, are exemplary for areas where aerial surveillance assumes an important role in controlling and monitoring. As states are handed the opportunity to claim certain spaces of these seas, so called Exclusive Economic Zones (EEZs) for economic advantages, such as resource extraction, control of these areas is becoming a factor. In addition, the claims of areas and spaces suffer from ill-defined sovereignty which results in a higher need of surveillance from a state's perspective. Surveillance in such areas influences a variety of other issues – not only shall it guarantee the sovereignty of the EEZ, but it also

monitors and therefore can protect economic activities, such as resource extraction and trade routes. While satellites possess the ability to monitor more area at the same time and can be used to detect for example movements of warships or traffic on trade routes, the flexibility of UAVs adds another dimension of surveillance, the surveillance of smaller, more specific spaces. The influence of aerial surveillance on various aspects, in this case economically render it possible to investigate these technologies as Large Technological Systems (LTSs). LTSs can be defined as large infrastructures that support the functioning of a variety of other technical systems. Surveillance as LTS offers two perspectives, especially in the context with sea conflicts. First, aerial surveillance systems represent a more international, global form of LTSs, therefore adding a global governance perspective, as described by Mayer/Acuto (2015). Second, LTSs in this context should be interpreted as security systems in order to guarantee particularly economic security.

One of the areas where aerial surveillance of sea areas has become increasingly important is the dispute in the South China Sea. Expansive ambitions by China as well as interfering claims of EEZs have caused a situation of threatened sovereignty on sea, therefore threatening economic ambitions of states. Satellites and UAVs assume an important role in this regard, although not all states that are involved in the dispute have satellite capabilities.

Keywords: surveillance, satellites, UAVs, security, South China Sea

Session 25: From Countercultural to Commercial — Social Change and Sustainability in Making and Design

Chair: Yana BOEVA, Science and Technology Studies, York University,
Toronto, Canada

Maker Cultures and US Public Libraries: Possibilities for and Tensions within Critical Engagement

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Using interviews and observations, this proposed presentation will use a feminist lens to critically engage the tensions at hand in the nascent space of library makerspaces and fablabs. As technological landscapes shift, so too do the expectations of and bases for technological literacy and accessibility – especially for those striving to enact a ‘democratization’ of technology. Geared towards information dissemination and issues of accessibility, the US public library system is deeply entrenched in such shifts, and many state or city-run branches have begun to engage and propagate ‘makerspace’ and ‘fablab’ programming. Some initiatives are geared more towards tool-sharing and skills, while others are mobile, dispersed, and focused on craft cultures and critical thinking. These library makerspace groups are often geared toward accessibility of resources and basic skills, serving various disenfranchised populations who may not otherwise have access to digital tools or education. Librarians in this sector hope to demystify, understand, fix and engage emerging technology in coordination and collaboration with their patrons. Yet, the most prescient underlying needs, being a strong basis of alternative education, critical pedagogy and critical engagement of these new technologies, is often left by the wayside due to strapped resources and an overworked staff. There is a reflective mindset and hope to enact deeper criticality as programming progresses, but concessions that librarians may only be able to introduce the basics of new technology toward sparking conversations and creative play.

The concern to enact productive and alternative educational initiatives ties into the library system’s primary goals in terms of education, information access, and possibilities for creative empowerment. At the same time, librarians are quick to critique the techno-utopic ‘maker’ cultures they are engaging, acknowledging the performative ‘empowerment’ idiom and questionable/marketable labelling of ‘maker’ for practices long enacted by some of the disenfranchised populations that they serve. Some librarians see it as a trend, others as a necessary transformation in keeping with technological change and in helping the communities they serve to fairly access technology associated with such shifts. This proposed research further queries: what might the rethinking of educational practices and engaging feminist critiques of technology further bring to these publicly funded spaces?

This presentation is based on initial research and analyses for dissertation research geared to enact critical pedagogy and feminist critiques of maker and hacker cultures, particularly skill-sharing practices.

Keywords: critical design, feminism, critical pedagogy, public engagement, makerspaces

Between Open-Source and Commerce: Micropolitics of Authorship and Originality in a Knitting Community

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DIY communities are celebrated for they democratize design through empowering users and help display creativity and express personal identity; and they are often presented as a counterpoint to mainstream patterns of production and consumption (Atkinson, 2006; Edwards, 2006). However, the pro-user and anti-commercial aspect of DIY tends to be overplayed. Knitting, a DIY activity which has at its core the free circulation and building upon of existing knitting patterns, is an example in which we can witness everyday social interactions between DIYers that may help qualify DIY's open and counter-commercial image. To understand this better, we have conducted a three-month ethnographic study at a knitting community in Ankara. The community gathers in a space that is reserved for this purpose in a shop, governed by the shop owners and two knitting tutors, where women knitters come together to knit, to practice, and to exchange ideas and critiques. In this special setting, the micropolitics that surround the authorship and originality of knitted artefacts become particularly visible. Conflicts arise between and among tutors and knitters over the circulation of knitting patterns, as participants claim ownership and authorship on the patterns, as well as their own interpretations of and improvements over the patterns, against those who try to decode and reproduce those. The aim of this paper is to demonstrate how an uncritical view of DIY as thoroughly democratic and transparent conceals the practices of value attribution around the patterns and know-how at the level of actual practice, and highlight the need to constantly watch out for gravitations from open-source sharing towards commercial ownership, from the collective towards the hierarchical, so that we can underline practices that strengthen the activist, countercultural potential of DIY.

Keywords: Open-Source, DIY, Knitting, Authorship, Originality

Opening the Walled Gardens of Design with Participatory Maker Technology

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The evolution of design practice and design research from a user-centred approach to open co-designing, in particular in technology-informed areas, is challenging the roles of the designer and the user. Embracing users and their expertise is central to the methods of well-tried participatory design and recent open design. Yet, in practice these methodologies with some exceptions maintain the position that designer and user are essentially different. However, the (re-)emergence of participatory forms of practice and technologies such as electronic fabrication, additive manufacturing, rapid prototyping, and maker/DIY culture, as "boundary objects" (Star & Griesemer, 1989) blurs the lines of design's social structures. The boundaries

between professional and amateur, or more specifically between designer and user, are being dismantled with the potential to transform design practice and its consumption. Despite these promises, the material practice of users, who create, modify, or appropriate physical objects, often lacks recognition as design from a professional designer's perspective. Describing existing projects involving participatory maker technologies and open attributes in design practice, I will present a critical, STS-informed analysis of what it means to remove distinctions between designer and user. In addition, I will draw on preliminary interviews and practice observation with amateur makers, product designers, and researchers to exemplify how users' practices reconfigure the work of designers with respect to their authority and how this is perceived.

Keywords: professional design, making, participation, user

Perspectives of Craft in the Context of Design

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By supplementing handicraft work with design (Rosenberger Thesen, 2010) and through an adaptation of methods and theoretical approaches out of the field, design research appears as often problematic for craftsmen due to the different conditions at work, e.g. batch production, short value chains, locality, or customer contact. Nonetheless, there are possible forms of knowledge transfer: (i) Craft is benefitting from design via e.g. design research, DIT (do-it-together), fablabs, or prototyping. (ii) Design is benefitting from craft via e.g. DIY (do-it-yourself), manual competencies, or ecologies of attention. The persona of the product designer, in my opinion, is socially constructed to a higher extent based on STS-informed design studies (Akrich, 1992; Verbeek, 2005; Latour, 2009; Moebius/Prinz, 2012; Yaneva, 2013, Julier, 2013). Thus, designing becomes more and more linked to immaterial work (Hardt/Negri, 2002). At the same time, it appears that craft is re-establishing itself socially via immaterial work. Personal services are yielding a potential of 'new craft,' as the material world limits offshoring or as Blinder argues: "You can't hammer a nail over the internet." (2006) Against this background of labour, design processes include controversies and the formation of alliances.

Significant changes of design and manual work seem to be the result of interactive value creation processes through co-design, co-production, or co-consumption. Shared economy, prosuming, local exchange systems, or community work proclaimed by the craft or Maker culture are reinforcing this trend. Fabbing, for example, is defining manual competencies of design in the field of art and craft, rather than in advanced engineering (Gershenfeld, 2005). Hence, this results in a socially-oriented characteristic of designerly work, personified by the 'bricoleur', 'entredonneur,' or tinkerer for solving wicked problems (Rittel, 1967). This creative class of entrepreneurs are producing social services and capital, which can not be owned and can result in a new understanding of creativity (Gauntlett, 2011). Such changes raise questions on the pricing of social services and on the establishment of these forms of labour in university courses.

The paper examines how current approaches in design studies are being applied to advance the position of craft in the context of design. The key issue represented here is the

incompatibility between 'designerly ways of knowing' (Schön, 1992; Cross, 2007) and 'manual competencies' (Crawford, 2009). Considering studies in craft research (Ax, 1997; Sennett, 2008; Anderson, 2012; Crawford, 2015) and drawing on ideas from my own teaching experience at the technical college 'New Design University', St. Pölten, I will question the position, if 'new craft' could enhance the establishment of true cost design (Lasn, 2000; Thackara, 2005). Moreover, I will deepen the question whether STS by informing design research could enhance this tendency of effecting craft through design.

Keywords: Design Research, Craft Studies, Design Education, Material Culture

Session 26 (1): Robotics and Society

Chairs: Arne MAIBAUM, TU Berlin, Andreas BISCHOF, TU Chemnitz,
Germany

“At Least There is Something Human in You...”[1] – The Provocation of Social Robots for Modern Societies

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Social robots could be seen as a threat to modern societies for different reasons. From a genuine sociological point of view, the most obvious reason is at the same time the less discussed: Being an entity that qualifies as social actor is a privilege attributed to human beings only (Dirk Baecker). As a matter of fact, most sociological theories do agree with this observation that was explicitly made first and foremost within the scope of functionalistic theories (e.g. Talcott Parsons, Niklas Luhmann). Modern societies have to reduce complexity wherever they can to be able to cope with the dramatically increased complexity (characterizing modernity). Besides the development of different strategies to do so (e.g. generalized media of interaction) the reduction of entities that are hold accountable to be proper social actors is one fundamental instrument to maintain the dynamic of agency as high as possible.

The threat of social robots to modern societies is reflected in the most evident fashion by movies and series. Mainstream movies and series are one of the best socio-psychological seismographic instruments to measure the provocations and challenges as well as worries and nightmares of societies. I would even go so far as to claim that movies and series assumed the function of myths and legends. They provide explanations, orientations, points of reference as well as a safe space to reflect the anxieties and fears of the time. In my talk I will discuss several movies in regard to social robots to work out a few crucial issues related to the challenges for modern societies.

What are the threats that could be stated in regard to social robots? I argue that most of the major discomforts could be related to the fear of losing control over social reality in two ways: Firstly, literally losing control over the shaping of societies' structure and functions. As mentioned above, to ascribe the capability to shape social reality and the accountability for the actual condition only to humans is a premise of modern societies. The second reason is related fundamentally to how humans perceive reality and built their identity. From a sociological constructivist point of view, reality is ultimately the outcome of interaction. The reaction of the entity I'm interacting with is giving a meaning to my actions as well as to the objects I perceive as meaningful. As a matter of fact, from this point of view even the mind is an effect of the history of interactions with the environment (George Herbert Mead). These quite intricate theories about the constitution of reality and identity could lead to the plain assumption that the prospect of interacting with a robot in everyday life situations is a deeply disturbing and frightening thought. Why? Because it implicates that humans are relying - among others - on machines to establish social relevant reality (definitions and meaningfulness of symbols, objects, etc.) as well as to relate to their very own identity.

Keywords: Social Robots, Modernity, Social Actors, Identity

Using Sociological Role Theory for Investigating What We Know so far About the Introduction of Socially Intelligent Robots in Human Work Settings

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In my contribution I want to test and extend two related conceptual proposals for the sociology of technology by empirically looking at what we know by now about the field of Social Robotics. The first proposal (originally developed by Ingo Schulz-Schaeffer 2015) is to ground the notion of socio-technical innovation in sociological role theory. The basic consideration for this proposal is to view either human actors or technical artefacts as occupying interrelated positions in a constellation – roles. Innovations change these relations by introduction either new artefacts or imagined new forms of use or imagined new users. Successful innovation, then, requires its heterogeneous components to become mutually adapted to each other in a new way, resulting in a sufficiently consistent and coherent behavior of the constellation of positions as a whole (see Meister/ Schulz-Schaeffer 2015 for a first outline of this proposal). The second proposal makes use of another feature of social roles. In social life, they are generalized beyond the individual case (we know what a doctor, a nurse or a patient is), which – in socio-technical constellations – allows to ground perception and action in typical ascriptions to artefact's functionality in relation to generalized expectations about intended user behavior. It seems likely to empirically test and extend these two conceptual proposals by looking at the field of Social Robotics because within this field itself case studies and summarizing articles are addressing the following two questions (see Meister 2014): • First, what do we know by now empirically about the effects of introducing “socially intelligent” robots in given work setting, e.g. on the shop floor or the nursing home?

How does this introduction change the lifeworld and the work settings? Also, in Social Robotics there is an interest in investigating the typical patterns of the deviations from these imagined functionalities and behaviors in socio-technical practice, that is: an interest in the practices that emerge if robots are deployed beyond the lab. • And second, can sociological role theory serve as a conceptual tool to overcome the problem of the complexity of the single cases in Social Robotics, both on the side of designing the robot itself (it has to smoothly interact in a highly complex environment: everyday human settings) and on the side of human use behavior. The interest in role theory in Social Robotics is not at last formulated as a methodological problem: How is a generalization of the numerous case studies possible beyond the idiosyncrasies of the single cases observed? Framing these questions with the two sociological proposals sketched above seems to me worthwhile not only as an empirical case for sociologically conceptualizing socio-technical innovations, but also as a contribution to the field of Social robotics itself: In spite of asking about the replacement of human labor and skill by “intelligent” machines (the old AI-Question), the focus is then on how the constellations as a whole constellation are changed by the introduction of new role players (robots) – and on how the old role players (humans with their division of work and their hierarchies) adapt to the new constellation – or drastically change the engineer’s imagination of the role of the robot.

Literature: Meister, Martin, 2014: When is a Robot really Social? An Outline of the Robot Sociologicus. In: *Sti-Studies* 10 (1), 85-106 <<http://www.sti-studies.de/ojs/index.php/sti/article/view/145>> (24.01.2014). Schulz-Schaeffer, Ingo, 2014: The Position Fields of Technology. A Role-Theoretical Approach to Socio-Technical Networks, Manuscript Meister, Martin and Ingo Schulz-Schaeffer, 2015: Investigating and designing social robots from a role-theoretical perspective: Response to “Social interaction with robots—three questions”. In: Gesa Lindemann/ Hironori Matsuzaki and Ilona Straub (eds.), *Going beyond the laboratory - reconsidering the ELS implications of autonomous robots*. Special Issue *AI and Society*: 1-5.

Keywords: Social Robotics Sociological Role Theory

Users in the Focus: Creating Service Robots for and with People

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In the last approximately 20 to 30 years the quickly growing research area of Human-Robot Interaction (HRI) evolved. As the term suggests, the main focus is on the interplay between a human and a robotic agent, where the interaction can be verbal and non-verbal (Dautenhahn, 2007). There exists no official and commonly agreed on definition of HRI, as there are many different ways in which humans can interact with a robot (e.g. communication via speech, gestures or symbols). Fong et al (2001) defined HRI the following: “Human-robot interaction (HRI) can be defined as the study of humans, robots, and the ways they influence each other”. Therefore, Human-Robot Interaction research is clearly a multidisciplinary subject originating from the idea to combine robotics with humanities to “understand and shape the interactions between one or more humans and one or more robots” (Goodrich & Schultz, 2007). Already in

1992, Kidd argued that robotic system development needs a human factors perspective (Kidd, 1992): “there is, therefore, no logic in developing and using technologies such as robotic systems in a way that attempts to replicate the skills of the people who will have to use the system, if this leads to unsatisfactory work. Moreover, the human-centered philosophy offers the potential of a better way in which to introduce new technologies. It can also avoid creating the need for skills that do not exist.” However, researchers coming from into HRI either from a robot-centered or human-centred perspective, be they master students, PhD students or even senior researchers from another field, are rarely aware of the full range of methods that can contribute to a knowledge gain on the complexity of how humans interact with robotic systems. The purpose of this paper is a collection, description, and discussion of relevant human-centered approaches for HRI research. It should guide researchers to potential approaches and give indications where to read up in detail on specific methods. The paper will cover the following topics: (1) an introduction to HRI as an interdisciplinary research field, (2) theory development, (3) evaluation criteria: usability, user experience, and social acceptance, (3) requirement analysis and interaction scenario development, (4) user studies and controlled experiments, (5) expert evaluation techniques, (6) self-reporting techniques (questionnaires, interviews, and focus groups), (7) implicit measurements: physiological measures and association measures, (8) studying robots “in the wild” and the challenges of field trials and long-term studies. The paper closes with a discussion how the research field applies existing methods to new research problems and what is considered as valuable HRI research.

Keywords: Human-Robot Interaction, interdisciplinary research, human-centered approach, methodology

Session 26 (2): Robotics and Society

Chairs: Arne MAIBAUM, Andreas BISCHOF, TU Berlin, Andreas BISCHOF,
TU Chemnitz, Germany

The Autonomy-Safety-Paradox of Service Robotics in Europe and Japan – A Comparative Analysis

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Service and personal care robots are starting to cross the threshold into the wilderness of everyday life, where they are supposed to interact with inexperienced lay users in a changing environment. In order to function as intended, robots must become independent entities that monitor themselves and improve their own behaviours based on learning outcomes in practice. This poses contradictory challenges to robotics, which we call the “autonomy-safety-paradox” (ASP). The integration of robot applications into society requires the reconciliation of two conflicting aspects: increasing machine autonomy and ensuring safety in end-use. As the level of robot autonomy grows, the risk of accidents will increase, and it will become more and more difficult to identify who is responsible for any damage incurred. Emphasizing safety, however, impairs the autonomous functioning of the robot. This problem implies the need for a broadened concept of product safety.

Our comparative analysis of the debates on regulations shows that the institutional framing of the ASP as well as concrete solutions to this problem differ between Europe and Japan in two respects: (1) the understanding of robot agency and (2) the concept of “appropriate” user-robot interaction.

In Europe, the debate over regulations in service robotics is characterized by a focus on the robot as an individual entity. This approach leads to serious concerns about the ever-increasing degree of machine autonomy and its profound impact on ethico-legal institutions. This has resulted in a comprehensive approach to the ASP, which, for example, gave rise to the idea of introducing collective responsibility as a way to deal with the unpredictability of robot behaviour. In Japan, the ASP is addressed in a different way. Here robot manufacturers are assumed to face a high level of litigation risk – in the sense that unlike cars, there is no one at the wheel to whom responsibility can be ascribed in the case of an accident. The solution to this problem is to obscure the idea of the autonomy of a technological entity. Instead of seeing the robot as an individual entity, a strong emphasis is placed on safe implementation of relational structures, which are derived from interhuman relationships. Therefore efforts are made to establish standards for appropriate robot use on the basis of a behavioural control of the human-machine interaction. This leads to an almost complete dissolution of the ASP. Robots are demonstrated to be foolproof machines, which is why a deviation from standardized scenarios of use would legitimate responsibility ascription to the user.

Keywords: service robotics, autonomy, robot agency, responsibility ascription, reflexive institutionalization

Rise of Disaster Robotics in South Korea

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The “rise of the robots” is a frequent headline that captures the increasing enthusiasm for and investment in robotics research and development. Not all kinds of robots, however, are rising at the same level or pace. Support for a specific kind of robot varies across national boundaries and over time. Robots are, like any other technology, a product of technopolitical history and culture of a society. The sudden rise of disaster robotics in South Korea as a socially useful field of research is one such example.

In contrast to the United States and Japan where catastrophic events in 1995--Oklahoma bombing and Kobe earthquake--facilitated disaster robotics research, South Korea entered the field in earnest only a couple of years ago. A series of terrible accidents such as the Mauna Resort building collapse and the Sewol ferry sinking in 2014 shocked the nation, revealing the helpless state of its disaster response and rescue system. In the midst of the government's hectic review of and proposal for its disaster and safety policy, the idea of disaster robots began to receive favorable attention. Robots are expected, if given enough funding and effort, to acquire capacities for reconnaissance, search, and rescue for people in emergency situations. The hopes for the robotic savior became much higher when the Hubo—a humanoid robot developed by researchers at a South Korean university, KAIST—won the DARPA Robotics Challenge in 2015 by completing multiple tasks at a simulated disaster site. At the most vulnerable human moments in extreme environments, it is hoped, the robots will come to our rescue.

This paper asks how it becomes possible to frame robots as an effective and necessary measure to cope with large-scale accidents and disasters in South Korea. Overshadowed by the promise of surviving future disasters with the help of robots is the basic question of whether robots are the appropriate solution to the problem of disaster response. This paper will first point out that disaster robotics in South Korea may be proceeding with a limited understanding of the fundamental uncertainty and contingency of modern disasters and accidents. Disaster search and rescue is arguably one of the most unpredictable and indefinable operations, but robotics researchers tend to see it as a set of pre-defined, albeit difficult, tasks to be executed one by one, as exemplified in the DARPA competition. Despite the increasing use of the term “disaster robot,” robots and disasters in South Korea still belong to two separate domains with incongruent worldviews. Given this mismatch between the two, this paper will suggest that the idea of disaster robots serves as an attractive stopgap measure—both technical and rhetorical—for the problem of large accidents and disasters in South Korea, which has complex structural causes that have accumulated over the past decades of hectic economic development.

Keywords: Disaster robotics, Disaster robot, Rescue robot, South Korea

The Genealogy of Robots in Everyday Worlds and its Implications for Social Robotics

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The idea of an imminent „rise of the robots“ is typical for robotics research and development not just in the recent years. By reconstructing a genealogy of robotics I want to show, how robotics is culturally and epistemologically shaped as problem solving discipline.

The construction of robots is firstly fueled by and aiming at applications and scenarios to be realized in the future. This is not only characteristic for the recent boom in robotics funding. It starts way before the technical assembly, with the fictional origin of robots and is continued through the history of the discipline.

Secondly the development of robots is characterized by the promise of all-around benefit. The vision of an everyday world inhabited by robots works as a regulative ideal of research and development. By so-called grand challenges robotic research is oriented towards national economic aims of governance and popular imaginaries of robots. These powerful symbolic and financial resources are mobilized to create regulatory power within the heterogeneous fields of robotics research.

Both findings point to an epistemological specificity of computer science research: The potential capability of the tool becomes so overemphasized, that all aspects of the application and social fit become pure „context“. This subjection to its tools has been prominently criticized within computer science, e.g. by Dijkstra and Brooks.

The inheritance of robotics includes fictional scenarios, solution-related promises on national economic scale and the epistemological schism of computer science. This has effects for the increasingly social situations of use robotics are aiming at. Robots are addressed as universal tools and robotics as the discipline to adapt the applications to the tools. Thereby users and situations of use become formalized parts of the solution process instead of part of the process. Robotics research that is not reflecting this genealogy is on the risk to reduce the social to the scope of its technical tools.

Keywords: social robotics, genealogy, epistemology, fiction, computer science

POSTER PRESENTATIONS

Blood and Magic: The Hidden Costs of Apple's Rise to the Top

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Apple's one billion active users around the world epitomize corporate success in a global context, but that success is only possible due to people like us: consumers. This is possible, in large part, because consumer goods play important social and cultural roles in our lives. What we buy is not just practically useful to us—it is socially and culturally useful too. We take pride in shopping and congratulate others for big-ticket purchases like homes and cars because we frame the ability to do as a sign of success. Our holidays, social occasions, and celebrations are marked by the importance of giving and receiving gifts, and of consuming food and drink together. We demonstrate love, care, and appreciation through these practices. We express our identities, our politics, and even our ethics through what we buy. Consumption and consumer goods are central to who we are, what we do, where we go, and the relationships we forge.

But, there are significant drawbacks to this way of life. To produce all the goods we consume, a complex system of extraction and mining, cultivation, harvesting, processing, assembly, packaging, packing, and shipping spans the globe. This system is rife with exploitation, mostly hidden from our view by geographic distance and the complexity and opaqueness of global supply chains. Powerful branding and advertising obscure the real human costs like child labor, slavery, dangerous work conditions, and poverty wages. Hidden also are environmental impacts like air, ground, and water contamination, the depletion of natural resources, and global warming. The economic price is borne by the majority of us, while “austerity” reigns, and corporations and their leaders grow ever richer.

My book, *Blood and Magic*, provides a compelling account of how the powerful branding that surrounds consumer goods enchants us, and what we fail to see because of this. This book tells us not just about the Apple brand and our love affair with the company's products, it reveals important and timely information about ourselves, our relationship to consumer goods, and the system that brings them to us.

Part I is composed of original sociological research into the evolution of Apple's advertising campaigns and brand, ethnographic observations in Apple Stores, and interviews and focus groups with Apple consumers. Together this research reveals the dynamics of Apple's unmatched appeal.

Part II is an exposé of the hidden costs of Apple's rise to the top. Its chapters draw from published reports by and interviews with academics, independent researchers, journalists, members of NGOs, and activists. This research takes us beneath Apple's slick veneer to the dirty underbelly of human rights abuses, labor law violations, ecological devastation, public health epidemics, and communities in turmoil.

With this poster, which provides an overview of my book, I will engage visitors in conversation

not just about Apple, but about the larger issues that surround this particular case. These include the emotional bonds we forge with consumer goods; the influence of branding and marketing on our desires, identities, values, and politics; the consequences of corporate power; and how we can push back on that power to make our global economy more equitable and sustainable.

Keywords: Apple, consumer electronics, sustainability, ethics, global supply chains

Advanced Assistive Technology in Professional Life. Implications of Interdisciplinary Sociotechnical Research in Textile Engineering

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Currently, one of Germany's most frequently discussed topics among industry practitioners and engineering academics is Industrie 4.0 or industry 4.0 ("I4.0"). This predominantly German-coined term—and its corresponding engineering science and innovation policy debate—is comparable to global scale concepts like advanced manufacturing, integrated industry, or smart industry/smart manufacturing. Regarding its vast range of possible applications, Cyber-Physical Systems (CPS) and Internet of Things (IoT) are praised for having "the potential to dwarf the 20th century IT revolution" [Lee, 2008, p. 1]. In this context, I4.0 serves as the major vision to achieve structural adaptation and self-optimization relying on model-based decisions, artificial intelligence and (machine) learning abilities, vertical and horizontal communication, as well as human-machine interaction in conjunction with advanced assistive technologies. Considering such advanced assistive technologies, there are several technical systems for support and assistance helping people in different situations in everyday and professional life (Ambient Assisted Living and Ambient Assisted Working, AAL or AAW, respectively). Within the context of professional life, we consider assistance systems to be intelligent technical aids, which support humans by, for example, supporting their productivity and by preserving their physical-cognitive health (Weidner & Karafillidis, 2015).

Currently, the ubiquity of advanced digital (manufacturing) technologies and accompanying advanced assistive systems has comprehensive implications for work practices and the ability to see, know and control organizational processes (Hirsch-Kreinsen, 2014; Pfeifer & Suphan, 2015). Considering this, we have to direct our social scientists' attention to this area of predominantly engineering and computer science research, because:

- the rise of such digital manufacturing technology and data is expected to shape work practices and organization, management and governance arrangements; and, hence,
- discussions (of the socio-materiality) of such digital technology are interrelated with issues of power, autonomy and transparency in management processes in organizations.

Some studies already deal with recommendations concerning the strategic orientation design and implementation of I4.0 from the engineering science perspective (e.g. cf. Kagermann, Wahlster, & Helbig, 2013; Lichtblau et al., 2015). However—besides Hirsch-Kreinsen (2014),

Pfeifer & Suphan (2015) and Weidner & Karafillidis (2015)—little attention has yet been paid to the consequences of I4.0 and accompanying assistance systems from a specifically sociological perspective pointing at organizational and individual consequences.

Against this background, our contribution sheds light on the obvious clash between promises—proposed by different stakeholders' interests—and uncertainties concerning the strategic orientation as well as design and implementation of assistive systems. It examines classification and example cases of (prototypical) implementation of assistance systems in the textile industry and concludes with first insights of our newly established SozioTex research group. SozioTex (Sociotechnical Systems in the Textile Industry) is an interdisciplinary young scholars research group (prae- and post-doc level) at the Institute of Textile Technology at RWTH Aachen University, funded by the German Federal Ministry of Education and Research (Gloy, Lemm, Hansen-Ampah, Saggiomo, Löhner, & Kerpen, 2015) which links the idea of using assistance systems to textile engineering.

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Keywords: smart industry, assistive systems, design, implementation, stakeholders

Co-creation for Responsible Innovation in Smart Farming Innovation Practices

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Responsible research and innovation involves integrating the dimensions of anticipation, inclusion, reflexivity and responsiveness into the innovation process (Owen et al 2013). It is required to ensure that innovations help to solve societal problems, and especially 'grand

challenges', such as climate change. While basic and applied research is often conducted within public institutions, it is profit driven actors within the private sector who develop innovations and diffuse them into society. This raises the question as to the applicability of responsible innovation dimensions to the context of private sector innovation (Blok & Lemmens, 2015). Previous research indicates difficulties in managing the goals, expectations and values of different stakeholders, issues of asymmetric information, and tensions between commercial interests and those of responsibility (Blok et al. 2015).

Innovators in the private sector however do have experience with activities that overlap with the dimensions of responsible innovations and associated practices (such as stakeholder engagement etc.). One example is co-creation, a process where users and customers are integrated into the design and innovation process in order to enhance value creation. Co-creation involves making interaction between the firm and customers the locus of value creation and innovation, involving principles and activities such as dialogue, access, risk assessment and transparency.

As such co-creation as a value creation and innovation strategy may represent an opportunity to integrate responsible innovation dimensions into private sector innovation contexts, helping to minimise and avoid negative effects of innovations and situations where innovations fail to solve societal problems. On the other hand, whilst overlaps exist, it is possible also that co-creation is limited in relation to responsible innovation, in the way that co-creation only reacts to what is demanded by customers, and may not integrate more indirect or long-term issues.

In this article, we explore the integration of co-creation and responsible innovation dimensions, both theoretically and empirically. To do this we draw on the concepts of co-creation and responsible innovation, building a framework for responsible innovation in the private sector. We then explore this model empirically with data collected from climate smart agriculture (CSA) innovation providers who have undertaken co-creation value creation or innovation strategies. Semi-structured interviews are used to collect this data.

CSA technological innovations offer an interesting context due to their potential to contribute to the solving of societal challenges, such as climate change or the need to feed a growing world population. However, they may also raise ethical issues as these technologies interact with the natural environment, livestock and society. This article will a) provide an integrated model of co-creation and responsible innovation, b) provide a detailed exploration of how co-creation contributes to different dimensions of responsible innovation and c) inform responsible innovation strategies. The results will have implications for the developers of smart farming technologies, the users of these technologies as well as policymakers.

Keywords: responsible innovation, climate smart agriculture, co-creation

Motivation in E-Learning: The Application of Gamify Theories in a Semen Analysis Virtual Lab Development (WHO Methodology)

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This work is a research about the development to a virtual lab for semen analysis. The virtual lab has the objective to teach the experimental methodology for semen analysis in professional

education. This theme is indispensable for universities studies in biology and medicine but the high costs and the limited number of samples, that are complicate to obtained, make difficult the accomplishment the practice. Virtual labs are an alternative to the real experimentation in cases like this and permit the constant repetition to the practice. However, the student evaluation results were problematic because the educational model and the student's necessities are changing. It was learned that the real or virtual lab practices need an instructional accomplishment. The instructional design based in the gamify theories provides the methodology to development a virtual lab adapted to the new student profile. The gamify is the adaptation of a game dynamics into an others knowledge areas, in this case the game dynamics have been arrangement for the learning skills in the virtual lab development.

Keywords: virtual lab, gamify, simulator, education

Learning Processes in PACS Routinisation: Findings from UK Hospitals

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This paper compares and contrasts changes in hospital practices during the integration of Picture Archiving Communications Systems (PACS) in two hospitals in South East England. PACS is a healthcare sector-wide information communication system for digital radiographic data and is often used to represent important aspects of a technological regime shift from X-rays to digitally based diagnostic imaging. Technological regimes such as X-ray and information communication technologies (ICTs) are characterised by co-evolutionary processes of change in systems, artefacts and knowledge accumulation processes. Several studies have examined the routinisation of PACS in hospitals from the perspective of interpretations, perceptions and attitudes of doctors and patients. A large body of literature has also analysed change processes involving ICTs at the organisational, group and individual levels from an innovation perspective. The interactions between human values and hospital routinisation processes in this technological area have however been less explored. In this paper, the relationships between values and learning are analysed using the example of changing work practices based on over 40 face-to-face interviews with radiologists, nurses, medical physicists, and radiology managers in two hospitals in the South East region of England.

The first case traces the transition from paper-based imaging to PACS in a medium-sized general hospital located in a town. It explains how institutionalisation aspects of the PACS regime were enabled by managerial organisation of gradual step-wise restrictions of artefact and systems choice and knowledge exchange conditions for unlearning. Changes occurred in structured repetitive problem-solving with the inclusion of clinical specialists with diverse skills, incremental feedback and feedforward processes with managed directionality towards system change (for example, involving rule changes, changes in actor inclusion and exclusion via restrictions in task involvement and access to patient information). Guiding values were managerial efficiency and rule adherence to goals informed by the healthcare regulatory authority and contracted firm. The second case presents PACS integration in a large urban teaching hospital. It shows different individual dominant values and motivations, learning

conditions, and outcomes from the previous case and reflects two distinct learning phases. The first phase shows unmanaged and unplanned processes of knowledge accumulation, and the gradual emergence of learning and service structures across professional groups and hospital-wide integration. The second phase shows an external imposition of managerial and structural norms in conflict with intra-hospital guiding values, subsequent resistance, emergence of parallel learning structures, and signs of beginning gradual convergence between internal and external norms. Based on the case study, the paper discusses the implications of the findings on the interactions between human values and learning for theories of technical change. The paper also suggests some implications for health technology policy.

Keywords: technological learning, hospitals, values, PACS

When Regulatory Science Meets Open Science – Implementing Open Science in GMO Risk Research

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Against the backdrop of a longstanding controversy about animal feeding trials with GM food/feed in GMO risk assessment the EC funded FP7 project GRACE set out to test designs for animal feeding studies and other type of laboratory studies, develop further guidance for conducting and analysing these studies and advise the European Commission on the value of these studies for GMO risk assessment. Over a period of 3 ½ years a number of toxicity rat feeding studies and a variety of alternative laboratory studies not requiring animals were conducted. Right from the start the research process was opened up to stakeholder and public scrutiny and engagement. Following broadly circulated announcements, interested stakeholders were involved in two key steps of the research process – 1) the planning and 2) the interpretation of animal feeding and other laboratory studies. Draft research plans, draft interpretations of results, draft conclusions and recommendations, and raw data were subjected to stakeholder and public review. Workshop discussions were comprehensively documented and some 700 stakeholder comments received in writing were answered by project scientists – all of which are documented in detail and available for further scrutiny at the project website. Participants were also consulted for their experiences with the process. Experiences gathered in the course of implementing this open science approach suggest that open science can facilitate dialogues on controversial topics but also revealed limitations and challenges of open science. The contribution will explain the context and the open science approach taken and will further elaborate on the gains, limitations and challenges of open science in the controversial field of the GMO risk research.

Keywords: GMO, risk research, implementing open science, regulatory science

From Science PR to Corporate Science Communication: Within the CSR Context of Japanese Manufactures

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This research aims to clarify how and why the modern manufacturing companies, called “professional organizations” by Tofflar (1970) and Mintzberg (1974), have been changing their communication strategies with the public within the context of transition from the science PR to the new trend of corporate “science” communication. In Japan science PR by private companies emerged and evolved with rapid economic growth since 1950’s. As same as the other advanced countries, science PR activities in Japan followed the communication model of one way/asymmetry (Grunig and Hunt, 1984), delivering news sources to the press, publishing science PR magazines for opinion leaders and general public and advertising and branding their scientific corporate images through mass media as well as their high tech products and services. However such activities especially targeted to general public started to decline since 1990’s because of maturity of industrial science, while alternative science communication activities such as hands-on science programs for kids and school students voluntarily conducted by industrial researchers and engineers started to emerge and diffuse in the 2000’s. Besides, stakeholder dialogues, direct conversations and discussions with small group of citizens, also started to be promoted under the pressure of corporate disclosure of risk information. We conduct a survey and also observatory fieldworks including interviews to key persons for a few representative cases, including Shimadzu Corporation which produced a Nobel prize winner in 2002. As a result the study tried to redefine the new trend of science communication by industries not only as voluntary actions by individuals but also as corporate “science” communication. We analyze and figure a transition model from the science PR to the corporate “science” communication from the viewpoint of multi-stakeholder CSR related to new social requirement of reflective and responsible research. Our model argues that the corporate “science” communication should be a touchstone to enhance attitudes of professional organizations to build a new RRI sphere toward post-industrial society.

Keywords: CSR, corporate science communication, stakeholder dialogue, professional organization, pro bono public

Social Cost of Foodborne Diseases in the Light of True Incidents: A Methodological Approach

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Foodborne diseases cause important economic problems worldwide. However, in order to know the economic burden of a disease, the true incidence, the outcomes and component costs incurred due to health damages should be identified. In the last decades, researchers have been working to develop methodologies that will allow the quantification of the true incidence that most often differs from recorded number of cases to a great extent. In practice, the true

incidence of a certain disease is calculated by using an illness and country specific multiplier factor. As proved by numerous international studies, reported illnesses are only a fraction of the true incidents but show a great level of standard deviation (FSA, 2011). In a WHO report, the registered number of foodborne diseases even in developed countries is estimated to be 10 to 30% of the true incidence, which is referred to as 'the tip of the iceberg' (Stréterné et al. 2008). According to other international researches, in some cases - for example the salmonellosis and campylobacteriosis - a multiplier of 7.1 and 12 should be used (Havelaar et al., 2012, Pires, 2014). In Hungary, an estimation based on patient survey indicate that registered number of gastrointestinal cases should be corrected with a multiplier of 125-200 (Krisztalovics & Kasza 2007). As a vast amount of social resources are being spent annually to prevent health damages and handle outcomes, governments require appropriate methods and information to prioritize resource allocation. However, estimating the economic burden associated with selected diseases is an extremely complex task, requiring the identification of all direct and indirect costs. Considering the results of some significant international works (Hoffmann & Anekwe 2013, Polinder et al. 2012), it is evident that there is a lack of standardization in cost calculation in the literature, which limits the comparability of the results. The purpose of our study is to present the most reliable methods used for estimating the true incidence of food-borne illnesses and to measure the costs suffered by the society due to health damages.

Keywords: Foodborne diseases, economic burden, true incidents

Creating Together: Improving the Quality of Life with Participatory Design

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The support of people with physical impairment within their everyday life as well as the interaction within their environment has a major practical and social importance. The development of suitable orthosis and daily living aids with the integration concerning the individual needs of physically impaired people requires a narrow cooperation between users, occupational therapists and engineers.

Participatory design perceives technology development, in this research medicine technology, as a complex assignment that needs a close collaboration between all stakeholders: specialists, physiotherapists, occupational therapists, engineers and users.

The focus in this research field is the investigation that essentially takes into consideration the desires and needs of people with disabilities with the use of Participatory Design methodology (questionnaire, group discussions and workshops). Potential users can introduce improvement suggestions for their own substitute and contribute thus to the design and manufacturing process. Recognising the link between technological development (and process) and the integration of its users the panel addresses the questions of how new technological methods and developments can improve with the use of participatory design by involving all relevant stakeholders.

In this research, gender is considered a key factor during technological processes when

undertaking Participatory Design. Gender will be investigated as a performative act, which is performed or enacted by a set of social meanings and expressions of the body. Gender differences become thus variables that must be investigated in methodically structured procedures. Multiple differences of people are reflected in the study such as age, nationality, cultural and class-specific origin, education and particularly different dimensions of physical, social and intellectual ability.

Given this background, the strategy for technological research and development processes in this area considers not only gender, but also diversity as constitutive elements. Therefore, how to explore the desires and needs of people with disabilities as users and potential users is the focus of the research and development project and of the paper.

Keywords: Participatory Design, Technology Research Methodology, Gender and Diversity Studies, Interdependence, Disability Studies

(Pedagogical) Ethnography as Method for Evaluating Open Science Programmes

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Despite good future prospects of technical professions, there is still a lack of specialised personnel in scientific and technical fields. Even though the labour market is demanding experts in natural sciences and technology sectors, young people rarely make job and educational choices that fall in these fields. On the contrary, numbers of students in these fields are decreasing. Young people name unattractive and abstract science classes and the lack of application-oriented lessons as reasons for their apparent disinterest in these topics. Additionally to the lack of interest from young people, science, innovation and technology and professions in these fields are still connected with (gender) stereotypes and the presentation of topics akin is often abstract, intransparent and unapproachable, not only for youth, but also for people who are not familiarized with these subjects.

In my paper I would like to exemplify three different kinds of programmes that can be seen as examples of Open Science. Two Austrian extracurricular educational programmes targeted at young people: the first one is a complimentary project for girls from the age of 10, trying to impart technological and natural science contents by combining art and technology and/or science. The second programme is offering children from 10 to 12 the possibility to learn how to programme their own computer game in open workshops. The third example will be a large science festival in Vienna, which is promoting „science to touch and play“ to a broader audience and shows to the general public what and how science is done in Vienna.

All projects have been evaluated based on an approach seeking to democratise education by using a multi-method-mix containing (pedagogical) ethnography, combined with participant observation, focus groups, interviews and document analysis. Besides presenting the main findings of the evaluation, the method of (pedagogical) ethnography should be given a major attention as tool for evaluating programmes of that kind. From the results, one of the most prominent findings is that it is not only hard to reach young people (and especially girls), but in

general people from educationally disadvantaged groups of the population. Furthermore, the goals of Open Science programmes like the investigated are often too ambitious and broad, so they are getting lost in following (too) many goals than to have a clear focus on small(er) challenges.

In terms of the required open format it would be interesting, after presenting the major findings, to discuss the results and the method of ethnography for Open Science movements with the audience.

Keywords: Open Science programmes, education research, science and technology education, equality policies, evaluation methods