Book of Abstracts

18th STS Conference Graz 2019
Critical Issues in Science, Technology and Society Studies
6 - 7 May 2019

Imprint:

18th STS Conference Graz 2019, Book of Abstracts
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Editor: Getzinger, Günter, Jahrbacher, Michaela
Layout: Hammer, Caroline

www.ub.tugraz.at/Verlag

ISBN 978-3-85125-671-0
DOI 10.3217/978-3-85125-671-0

Content

Cancelled Sessions: 8, 9, 13, 15, 20, 22

Keynotes

Back to the future. Why we did, why we do and why we shall do TA

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Some think that Technology Assessment is an issue of the past – a kind of social democratic inspired planning activity pretending the future can be foreseen. Indeed, TA had been introduced to allow for better parliamentary decision making on technology – more in line with principles of the common good, not serving party interests and minimising risks or losses. TA, in its own understanding, was a source of neutral and independent expertise, following a liberal democratic ethos. In reality, foreseeing consequences turned out to be difficult, so TA (and other fields dealing with the relation between science, technology and society) got more involved in shaping technology early on, again in the interest of the many affected as opposed to that of the few in power. Participation widened the perspectives, brought in alternative viewpoints and forms of expertise. Later, TA was to reconcile the (economic) needs of innovation with that of shaping technology responsibly to omit costly technological still-births by reducing risks, securing ethical principles and, again, allowing for an equitable distribution of benefits as an instrument in innovation policy. All these functions were guided by the understanding that 'society' ought to determine the direction of innovation.
However, with the development of the internet, interfering in a rapidly developing consumer market- and innovation-driven field following an old-fashioned sense of the common good appeared to have fallen out of time. Very rapidly, societal impacts manifested that TA classically would have deemed unforeseen negative side effects, such as a wave of 'fake' news, conspiracy theories, fervent strategic communication etc. In this context, we more than ever need a voice of unbiased and non-partisan information not only to politics but to society at large. TA is one of the remaining institutions that clings to the idea of best available knowledge, (temporarily) valid facts and the principles of reason. In the end, having fallen out of time might be one of the greatest assets for the future.

Artificial intelligence - A transformative force: Facing the challenges ahead!

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Artificial Intelligence (AI) is considered to be a transformative force that is bound to alter the fabric of society. The recent major advances in machine learning are revealing AI's capacity as a general-purpose technology and push inventions in areas of mobility, healthcare, home & service robotics, education and cyber security, to name just a few. AI-enabled developments have promising capabilities to increase human well-being and to resolve, inter alia, the grand challenges associated with for instance our ageing society or climate change. At the same time, AI comes with risks and challenges associated to fundamental human rights, ethical issues and broader societal implications. I will sketch both, capabilities and risks related to AI and discuss implications from a policy perspective:
I will start my talk with providing a definition for AI systems and some conceptual clarifications relating to buzzwords like "digitalization" or "big data" found in popular literature. Economists have

classified AI systems as “prediction machines” (Agrawal et al, 2018) which have the capacity to produce precise and reliable for- and nowcasts to reduce uncertainty for decision makers. It is this capacity that makes AI a game changer that is getting economically exploited: to better deal with uncertainty, enabled through enormous amounts of various kinds of data and data processing technologies.
By taking a decision theory perspective, I will explore the role of AI technology in prediction, judgement and reasoning processes, all contributing to decision making. This analysis of an Input – Process – Output (IPO) Decision Model allows a systematization of potential challenges associated with AI systems. In more detail, I will discuss issues with (i) data quality and data governance, (ii) goal specification and goal conflicts (iii) judgement and prediction models, (iv) integration of artificial and human agents into socio-technical systems, and finally (v) broader socio-cultural implications of AI deployment. In order to provide concrete examples, I will discuss some AI applications like predictive analytic modeling, moral decision problems of autonomous vehicles, and implications for work and labor markets.

I will end my talk with a discussion of implications for further research and policy recommendations. I conclude that there is a need for ethical guidelines beyond regulatory frameworks to ensure that AI systems increase human well-being without doing harm.

The peripherical challenge. Territorial justice and new forms of mobility

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While it is commonplace to consider that the fight against or elimination of social inequalities is part of economic and social policies, architects and urban planners also have a major responsibility for the intensification of inequalities and any policy aimed at eliminating or combating injustice must start from a territorial perspective.
While the gap between the richest and poorest members of society continues to widen, a widening gap between prosperous and relegated territories has become physically apparent. For more than half a century, the discipline of urban planning has been operating on the basis of a paradigm of growth dependence. Its strategies have been based on market-oriented urban development and have sought to provide benefits to the community through market profits. However, the redistribution mechanisms have failed or eroded over time, leaving us in a state of territorial injustice. Middle- and low-income households, for example, are evicted from cities to peripheral areas through real estate speculation. Most of them live in peripheral municipalities with very few public facilities and far from the labour market. The difficulties of daily life in these areas, including housing and mobility costs, are among other factors responsible for the rise of protests in Europe. Yet our disciplines of urbanism and urban planning continue to express themselves with the same mantra: "50% of the world's population lives in cities... "as if the socio-spatial realities of the remaining 50% were not to be studied.
The ambition to improve the quality of life of the entire population must include territories outside cities, peripheral areas and more particularly those that are relegated and in radical transformation. The Peripherical challenge, invites to consider the other 50% of the population who do not live in cities and proposes to address the themes of relegation and spatial justice through the prism of mobility.
Mobility is a key term when talking about territorial justice in a peripheral environment, because beyond its physical characteristics, it implies "access to opportunities" on the labour market, in

education and health services, in cultural facilities, etc. However, unlike the urban environment, mobility in peripheral areas is characterised by limited options for public transport or walking destinations and is therefore less sustainable, both socially and ecologically. Especially in the peripheral areas of developed countries, mobility is highly dependent on the ownership of a private car. Without access by car, access to opportunities is also very limited.

That is why it is high time to develop new forms of mobility. Some pioneering territories are taking up the challenge of adapting other mobility models in their quest for a better quality of life and finding ways to finance them, such as the province of Drenthe in the Netherlands. Mobility in this case is not only about crossing space and moving people from A to B. It is also about making services accessible without physically making a trip. Forms of mobility that provide “access to opportunities” for all are a way to recognize and draw on the strengths of the network and foster peripheral development …

STREAM: Digitalizsation of society

Session 1: Technical standardisation and STS

Chair: MIONE, Anne[1], RIILLO, Cesare[2], DE VRIES, Henk[3], MIJATOVIC, Ivana[4], JAKOBS, Kai[5], MEYER, Niclas[6]

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Standards for social media archiving and the politics of research data

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The digitalization of society is an object of research in various disciplines; and it has also become a catalyst for new scientific approaches and methods. The 'digital traces' that emerge in all areas of life promise to provide insights into individual behaviour and social change and have begun to play an important role as research 'data'. More and more researchers from numerous disciplines are using data gathered from social media platforms to study various phenomena and contexts.
And indeed, research results based on the analysis of social media data are currently attracting much public attention and are influencing current political debates (e.g. about "fake news" or the anipulation of voters by social bots). It is therefore all the more important that research results are verifiable – and it is with this argument as well as with the idea of alleviating inequalities in access (with some researchers, particularly if they are 'embedded' in social media companies able to tap large amounts of varied data and the simultaneous emergence of 'data-poor' researchers) that social media data sharing is gaining attention. Data sharing allows other researchers to check or verify study results. Publicly funded data archives and other repositories are being put forward (e.g. Bruns & AoIR 2018) because they are already offering solutions for sharing social media data for research purposes. They possess the required experiences and structures for a role as a 'trusted third party' for data holding companies and academia. They are publicly funded, have acquired data management competencies and privacy-aware sharing practices, and have developed various standards and solutions for making data accessible, searchable, findable and citable. The question is then, whether and how such standards and (best) practices, developed for research data that is survey- or interview-based, should and can be extended and adapted to also comprise social media data and other internet data. This question is of essential importance for the vision of archives as trusted third parties. Respective standards cover indexes and thesauri, ways of documenting, storing, and generally handling data, and – more fundamentally – specific ways to ensure methodologically sound sampling, ethically reflective and privacy conscious relationships with study

participants, and ways in which research projects are required to share research data (e.g. required by funders). The standards in questions hence pertain to three fundamental pillars of research best practice, namely (sound) methodology, ethics, and validity (often through replication). It is thus not surprising that they are contested. Not only are there different ideas about what constitutes 'good' research in social media companies and in researchers – this also varies greatly across disciplines and even within specific fields. In this contribution I draw on experiences when archiving Twitter data in publicly funded data archive for the social sciences and on an ethnographic study of social media researchers. I show where existing standards are being adapted, questioned and contested, especially due to social media data's heterogeneity, flexibility and general messiness. I also explore the various efforts by different parties (companies, repositories, universities, research groups and individual researchers) to set standards in social media research as a contested space.
Keywords: Standards, social media archiving, contested spaces

Towards new standards for trustworthy ICT. A European values perspective

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With Information and Communication Technology (ICT) becoming more prevalent and penetrating every aspect of our life, it is a precondition to timely develop and set standards that will serve as guidance regarding its design and use and at the same time will address the challenges that this technology brings with itself. In order to truly reap the benefits of ICT, we need both infrastructure and businesses that are trustworthy and that respect and reflect European values.
This contribution has the aim to present a framework based on European values that could be used for the development of such standards. The framework is the result of an interdisciplinary work in progress of three projects: TRUESSEC.eu ("TRUst-Enhancing certified Solutions for Security and protection of Citizens' rights in digital Europe"), CyberSecInStyria ("Normative, sociological and legal foundations of cybersecurity in Styrian companies") and VERDI ("Trustworthiness and certification in digitization using the example of systems for assisted and autonomous driving"). In the spirit of European values, within the TRUESSEC.eu project we developed a multidisciplinary Criteria Catalogue that consists of a set of requirements (also termed criteria and indicators) that could contribute towards building trustworthy ICT infrastructure. At the forefront of the Criteria Catalogue we placed privacy and security as the most mature certification and standardization domains. These were also accompanied by other less mature domains or domains that are still in inception such as autonomy, transparency, anti-discrimination. The work we produced within TRUESSEC.eu we will apply to two follow-up projects CyberSecInStyria and VERDI where we are doing proof of concept. This contribution will focus on the project CyberSecInStyria.
The aim of CyberSecInStyria is to provide support to SMEs in Styria in their efforts to deal with pressing cybersecurity challenges. For that purpose, we are working on the adaptation of the TRUESSEC.eu Criteria Catalogue to the cybersecurity needs and demands of Styrian SMEs. This adaptation is based particularly on an intensive cooperation between two disciplines – philosophy and sociology and is supported by a legal expertise. Based on the normative and empirical analysis that we will carry out within the project as well thanks to the close cooperation with the research company evolaris next level GmbH and with the Cyber-Security-Hotline of the Chambers of Commerce of Styria, Carinthia, Burgenland, Vorarlberg, Upper Austria and Tyrol, we expect to provide not only a better understanding of cyber security and of the societal and ethical challenges

that come with it, but more importantly to develop criteria for the assessment of possible alternative solutions to the cyber security problems identified within the analysis carried out in the project.
Apart from the criteria and the Criteria Catalogue we will also provide a set of regulatory recommendations. All this could be further used to enrich the development of standards in the domain of cyber security and beyond.
Keywords: Digitalization, trustworthy ICT, European values

Artificial intelligence and bias

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While societies expect positive changes due to the advancements in technological development, there are also grey areas where there is a lack of social, ethical, or legal norms for technologies which are already in use or which are foreseen to be introduced in the nearest future. Whether or not, and under what circumstances the emerging social norms can or must be applied equally to the conduct of human and technological agencies requires thorough investigation prior to the introduction of services, which fully or in part are performed by technologies.
One of the emerging technology- -agency--based services is the so- -called RoboLaw, under which artificial intelligence (AI) is expected to take over simple and sophisticated judicial tasks, which currently are being executed by human agents.
In the context of the discussion on AI and RoboLaw, two definitions of the word bias are directly relevant: that of 1) prejudice for or against one person or a group, and 2) a systematic distortion of a statistical result due to a factor not allowed for in its derivation. Two modalities of bias - intentional and unintentional – have to be considered in judicial system, where intelligent technologies are at service. The unintentional bias is likely to be considered a fault, and hence must have little tolerance threshold. There also must be tools and methods in place for identification of the unintentional bias and the corrective action. To date, both the concept of the tolerance threshold level and the methods and tools for identifying and correcting the bias in AI- -based computations remain “grey zones” where there are more questions than answers available.
Keywords: computing paradigm, control, unintentional bias, intentional bias, rule-based governance

Knowledge transfer in telecommunications domain in the EU: ETSI’s role in being a beacon

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Standards enable transformation of disparate efforts in research, development and innovation into coherent set of functional outputs, primarily through codifying knowledge into technical standards and/or specifications. Standards achieve this by functioning as ‘the bridge between the technical domain and the economic, social and regulatory framework’. Standard-setting activities undertaken by standards development organizations, therefore, has the potential to serve as an efficient and effective means of facilitating interactions between multiple actors for the realization of knowledge transfer.

Within the European Union, the European Standardization System (ESS) seeks to enable the transfer of innovative technologies into commercially viable product and solution offerings. It is increasingly evident that in the telecommunications domain, continual scientific research and technological innovation in emerging and foundational technologies such as quantum encryption, systems-on-chip (SoC), and next generation wireless technologies is indispensable as it promises beneficial impacts for the society and its stability.
The 'Digital Agenda for Europe' has emphasised the role of standards in fostering innovation and achieving interoperability. Against this backdrop, this contribution seeks to shed light on the role and measures deployed by the European Telecommunications Standards Institute (ETSI), a European Standards Organisation (ESO), in pursuit of optimally leveraging results of publicly supported research and corporate endeavours and facilitating ideas to reach markets, and enabling market uptake and adoption. One such example of ETSI's initiatives in building capacities to absorb knowledge, and fostering diffusion of know- how and knowledge transfer is that of the 'Industry Specification Group' (ISG). ISGs are a type of committee with considerable autonomy and acknowledged as swift in developing pre-standardization specifications in response to industrial interest (examples include that of specifications on Identity Management, fog computing, and communication based on quantum cryptography). This study will rely on desk research tracking the structuring of such similar initiatives, workings and responses of the various stakeholders, and the outcomes of such standard setting activities towards recursive knowledge transfer.
Keywords: Knowledge transfer, standardization, telecommunications, technology, research & development, stakeholders

James Elliott and the power battle in developing harmonised European standards

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On 17 October 2016, the European Court of Justice (ECJ) handed down a landmark decision in Case C- -613/14, James Elliott Construction Ltd v. Irish Asphalt Limited concerning a dispute about the quality of building material. The relevant product was governed by the Construction Products Directive part of the "New Approach" (NA) a regulatory approach deploying private technical standards within a public law regulatory framework.
Products covered by a NA Directive conforming to the relevant EU harmonised standard (HS) are presumed to comply with 'essential requirements' (health and safety and other fundamental requirements). HS's elaborating the essential requirements are drafted by the European Standardisation Organisations (ESO's) upon the request of the EU Commission. The references of HS's are officially published by the EU. In James Elliott, the ECJ decided that the relevant HS forms a part of EU law thereby claiming to have jurisdiction to decide about the legality and interpretation of HS's under - -at least one - - NA Directive.
The NA looks like a balancing act between on the one hand exploiting the advantages of co-regulation/ self regulation but on the other upholding the possibility of judicial review of drafting and interpretation of HS's. A vital argument for the Curt was that the development of the relevant HS was strictly governed by the essential requirements, and was "initiated, managed and monitored by the Commission, and its legal effects are subject to prior publication by the Commission of its references (….)."
The ECJ decision fueled the debate about the room for maneuver between the (de facto) delegation of public rulemaking to private ESO's and the (claimed) voluntary/self- -regulatory nature of

standards, including the life expectancy of the New Approach. The ECJ case law is likely to put further pressure on the flexibility of the New Approach (increased litigation risk, more scrutiny by the EU, longer publication times).
In the debate, so far less attention was given an underlying key question: was the Court actually right in interpreting the (practice of the) NA in this way? In his recent doctoral thesis (Setting the Stage for Innovation: Balancing Diverse Interests Through Standardisation, Erasmus Univerisity Rotterdam 2019), Wiegmann gives an interesting insight in the power struggle between CEN and the EU Commission in developing a harmonized standard in the field of micro Combined Heat and Power (mCHP) technology. Is the Commission in charge or do the ESO's ultimately decide about the content of a HS? How could that be read in the light of James Elliott?
Other key questions include that into the potential impact of James Elliott on the governance structure for European standardization set (including Regulation 10125/2012 and the Joint Initiative on Standardisation), and the impact of increased judicial review on the lingering debate on the legitimacy of using private standards in EU rule making.
Keywords: Standardisation, EU, regulation, European Court of Justice, New Approach

Session 2: The politics of algorithmic governance. data subjects and social ordering in the digital age

Chair: EYERT, Florian[1], IRGMAIER, Florian[2], REHAK, Rainer[1]

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Identity without agency? How algorithmic authorities strain autonomy and informational self-determination

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Digital technologies have been altering governance modalities in multiple respects. Stimulated by paradigms linked to big data and so-called artificial intelligence (AI), i.e., to digitize maximum areas of every-day-life, also societal processes become incrementally digitized and automated. A consequence of this trend is that individual identities increasingly transform into networked identities and are more and more exposed to algorithmic power. Based on (semi-automated) large-scale data gathering, various public and private entities exploit information about individuals by creating so called identity graphs to gain deep insights into individual behavior. Individuals are tracked in offline as well as online spaces which are linked to create accurate (cross-media) identity models of individual customers (Oracle 2016). As will be shown, there is an enormous market for trading and monetizing identity information. Not just the usual suspects among large tech-companies (e.g. Google et al.) benefit from these practices; there are several other globally acting companies like, for example, Oracle, Axciom, LexisNexis or Palantir Technologies that conduct profiling activities extensively. In line with the close relationship between big data and surveillance (Lyon 2014), some of these actors also have relations to security and intelligence community and thus together function as a "surveillant assemblage" (Haggerty/Ericson 2000). The governance

modalities of these interwoven actors are based on a complex mix of economic and security objectives aiming at governing through identification. Therefore, I speak of an economization and securitization of digital identification which reinforce institutional power at the cost of informational self-determination, individual privacy and thus, agency (Strauß 2019). This paper explores how these practices function and what kind of actors benefit from them for what purposes. These and similar forms of algorithmic governance reinforce demand to govern them and better regulate data markets. The General Data Protection Regulation (GDPR) is promising in many respects to regulate privacy-affecting activities. But does it provide sufficient options to reduce extensive profiling or do we need a broader discussion about how to limit identification practices? This and related questions will be discussed in the paper.

Keywords: Algorithmic power, privacy, autonomy, identity graph, digital identification

Creating postulated consumers? On the use of data analytics for consumer insight in organisations

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The plethora of theoretical academic literature on big data analytics (BDAs) – both on the main stream as well as the critical side – paint a rather one-dimensional picture of its application in actual settings. The narratives either revolve around the endless possibilities and benefits of using such technology (on the use of BDA in marketing see e.g. Erevelles et al., 2016; Hofacker et al., 2016; Matz and Netzer, 2017). Or it focuses on the potential negative consequences for individuals or society at large resulting through using these technologies in different settings (popular examples on the general use of BDA include boyd and Crawford, 2012; van Dijck, 2014; while Pridmore and Zwick, 2011; Zwick and Denegri Knott, 2009 have specifically looked at marketing). However, only few papers so far have actually looked empirically at the how such technologies are implemented and applied and what their effects are once implemented – within the organisation as well as externally (see e.g. Coletta & Kitchin 2017; Evans & Kitchin, 2018; or in marketing see Pridmore and Hämäläinen, 2017; Quinn et al., 2016).

In line with this approach to empirically researching BDAs applications, this research looks at the effects BDAs can have in organisations when applied for consumer and market insight. The foundation of this research is nonetheless a critical approach, focused on the epistemological implications of BDAs usage. As boyd and Crawford (2012) or van Dijck (2014) argue, BDAs are often deployed research with the perception of being an objective and infallible technology for uncovering knowledge, which in marketing translates to consumer behaviour and preferences. Especially comparing with traditional methods like surveys or interviews, BDAs are depicted as more reliable for creating consumer insight and knowledge. This assumption often goes hand in hand with a belief in the supremacy of (digital) data. The use of BDAs in organisations however requires a collaboration of an array of teams, all with their own expertise and practices. Knowledge is never produced in vacuo but co-produced (Jasanoff, 2004), many factors are involved in how information is gained through BDAs, which subsequently influences the usage of this knowledge.

In this early-stage research, I aim at looking at how BDAs influence the co-production of knowledge in marketing settings in organisations. The many questions revolve around whether information resulting from big data technologies actually tends to being perceived as a more reliable and superior source of knowledge? And if so, what consequences does this have on how consumers are perceived? Is the knowledge still being perceived as approximations – imagined segmentations? Or do the conceptualisations of consumers instead become postulations, incontestable due to being

established as ‘data-doubles’ (Haggerty & Ericson, 2000) through big data analysis.
Do these practices tend to neglect the subjectivity involved in BDAs, such as the necessity for data manipulation, data interpretation and the possibilities of errors? And finally, what are then the potential consequences for the consumers, do they intensify practices of social sorting of consumers
Keywords: Big data analytics, dataism, consumer targeting, marketing, co-production of knowledge

Shifting social control mechanisms: from the normative to a dominance of the cognitive

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This talk takes a theory of society perspective on the ongoing digital transformation of society. In current diagnoses of society it is indisputable that the use of digital data collection and analysis technologies will have an influence on people’s lives and may even change the entire structure of society (Becker 2007, Mason 2015/2016, Zuboff 2018). The proposed contribution takes up this time-diagnostic perspective, and relates it to a contradictory insight from the theory of social differentiation.
The contradictory finding: On the one hand, modern, horizontally differentiated society is characterized by a preference for cognitive, i.e. learning-oriented forms of social control, whereas normative forms tend to lose significance (Luhmann 1971/2005: 68ff). On the other hand, there is also
the finding that Western modern societies themselves are based on strong normative foundations that are centered around the institution of the human individual, equal in freedom and dignity (Luhmann 1965, Joas, Lindemann 2018). If the first assumption is correct, one would expect that the development of automated prognosis and control technology would merely reinforce an existing socio-technical tendency. According to this understanding, dramatic crisis scenarios would be inaccurate. If the second finding is correct, the automated generation of estimates and predictions based on digital traces of behaviour could have the potential to fundamentally change societal structures. The implementation of these technologies strengthens the dominance of cognitive prognostic social control and undermines the normative foundations of modern society.
These contradictory findings have a basis in a double understanding of individuality, which characterizes modern horizontal sociation. Horizontal differentiation and the institution of the human
being, equal in freedom and dignity, secure each other, as Luhmann puts in his analysis of fundamental rights. To safeguard the relationship of mutual precondition between horizontal differentiation and the institution of the individual, requires a balance between the knowledge about individuals in different contexts and the protection of the individual from an excess of knowledge about it (cf. Pohle 2012). This means, for example, that the knowledge of an organisation about an employee should not include the knowledge about this person in relation to his or her overall economic behaviour. Or: The knowledge that is generated about an individual in the context of consumer behaviour should not be used to forecast family behaviour.
The talk unfolds the idea of the individual as an institutional condition of horizontal differentiation. Based on this insight, the talk investigates whether the development of the new platform technologies and their possibilities of data storage, collection and evaluation have to be identified a) as a threat to the structures of horizontal differentiation or b) as a confirmation of these structures. Herewith, the talk provides an in-depth-discussion of the tension in the understanding

of the ongoing digital transformation of society: have we to understand these developments as the fulfillment of existing tendencies or as a fundamental threat to the normative structures of modern societies.

Keywords: Horizontal differentiation, institution of fundamental rights, digital transformation of society, legitimacy of algorithmic governance

Diversifying the concept of control society: Decolonial, queer-feminist and disability studies perspectives on a digitized society

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To date, an almost insurmountable number of contributions in social studies of science have examined new forms of surveillance and algorithmic governance. First and foremost, empirical studies have produced fine grained pictures of the digitized society: Concepts like the digital Orlando, iCrip or eDiaspora have further developed the Deleuzian ideas of control society and data double.

They fathom the complexity of living in a digital society that offers both subversive appropriation and normalizing possibilities of subjugation. Decolonial studies on the use of smartphones by fugitives underline that digital infrastructures do not only create new supressive border regimes, but are also essential for survival, even fundamentally changing global migration itself (Borkert et al., Latonera and Kift). In Disability Studies, the figure of the iCrip points out that instead of focusing on the social problems surrounding digitalization, solely new pathologizations for users of digital media emerge with the help of metaphors hostile to the disabled (Ng). Finally Xenofeminists- and Glitchfeminists take digital racism and heterosexism into account, but also connect digital media with a different imagination of gender futures or even a comprehensive questioning of the hegemony of the physical (Laboria Cuboniks, Nakurama, Russel).

However, we follow Nick Couldry and Ulises A. Mejias in their critique that a more encompassing theoretical approach to such disparate processes is still missing. The aim of our theoretical paper is a twofold: first, to give a critical overview of ‘diversity approaches’ to digitiziation and thereby to diversify the concept of control society, data double and algorithics governance. Second, we would like to critically examine the limits of such approaches. We argue that they in turn tend to idealize digitzation – as the potentials of individual appropriation alsways take place in relation to an appropriation through capital.

Keywords: Control society, xenofeminism, data colonialism, decolonial, disability studies, gender

Transparency of algorithmic decision-making: Will trade secrets, copyrights, and patents related to machine learning crush the right to explanation?

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Modern day surveillance pervades all areas of life. The data assembled are used in particular for predictive practices: by means of machine learning (ML) algorithms are created that aim to predict some future behaviour of the persons under surveillance. The outcomes produced play an important role in finance, insurance, security, police and the like when ‘’best decisions’’ have to be taken.

A call for such ''predictive practices'' to be up to professional standards is growing: algorithms in use are to be ''certified''. A complete audit would ask critical questions concerning the datasets in use (such as: do subjects carry correct labels, are training data free of bias), the modelling (such as: have overfitting and class imbalances been avoided), and the actual decision-making based on the developed model. For such questions to be answered, preferably all data sets, ML-techniques, and algorithms involved have to be opened up for external inspection. What is the likelihood that such audits are installed any time soon? Apart from the thorny institutional issue to which organisation the auditing is to be entrusted, I want to elaborate in this article two obstacles that thwart its effective realization – obstacles that are becoming ever larger and work in unison to keep the algorithmic process a black box.

Intellectual property. A first obstacle is the proprietary attitude of most companies involved in ML. For competitive reasons they want to shield their ''inventions'' from preying eyes. Apart from secrecy clauses for their employees, many companies rely on applying for patents. The field of ML is chock full of patent applications. From 2005 onwards, patenting activity has been sharply on the increase. Every year now about 3000 applications are filed (US figures). Copyright protection is relied upon as well. IBM scientists are researching how they can protect deep neural network models from theft, by inserting watermarks into them. Originally, watermarks have been inserted into databases; now, this watermarking is being extended to the ML-models themselves. This anti-theft feature can be used to sue companies when they try to sell algorithmic software packages based on a (copied) deep learning algorithm.

Interpretability. In addition to this hurdle, the ML-methods themselves often have an important deficit: their outcomes are hardly interpretable. Roughly, moving from linear regression and decision trees to random forests and neural networks, interpretability gradually vanishes. As a consequence, even if auditors are given full access to the whole ML process, auditing can only vouch for the accuracy of algorithms in use, not for their interpretability.

Note that only 2 options for saving explainability seem to be available. One option is to recover interpretability afterwards. Additional tests are applied on the algorithms produced. As regards classifiers and support vector machines, for example, these focus on laying bare the contributions of specific variables to the final algorithmic outcome. The other option is to work only with models that are interpretable by design. Say one selects only a handful of causally related variables, to be modelled with a one-sided decision tree. The big challenge with this option is, of course, whether adequate performance can be achieved in the process nevertheless.

Keywords: Algorithms, interpretability, machine learning, patenting, surveillance

The governance of machine learning algorithms: Political and ethical challenges in the field of civil security technology

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Civil security technologies increasingly rely on Machine Learning tools, where algorithms are “trained” for particular purposes using large amounts of data (e.g. “smart border”-systems, image recognition in the context of “smart” surveillance). The use of Machine Learning technologies in civil security technology implies a form of governance through machine learning algorithms, which raises both ethical and political questions. Decisions made by or based on such systems can have direct major implications for those directly affected by them (e.g. an individual being denied entry into a country based on risk predictions made by smart border systems); broader societal effects may e.g. include stigmatization of or discrimination against certain groups. Both the deployment

and the design of such systems hence involve acts of governance in the sense that they implicate processes of social organization. Compared to security technology with potential military uses, which is regularly inspected with regards to dual use concerns, the development of civil security technology attracts considerably less attention and oversight. This paper postulates the need for a "governance of governance" in the field of civil security technology and enquires into possibilities located in the phase of development of such technology.
The phase of technological development is considered to be a crucial leverage point due firstly to the effects of values, presumptions, decisions and power struggles of a multiplicity of actors involved in the development process which are embedded in the finished product, and secondly due to the opacity of the exact working mechanisms of systems based on Machine Learning once the training-phase is completed. This paper takes existing global, regional and local approaches to the governance of innovation and technological development as its point of departure for investigating these issues at the overlap of critical security studies and science and technology studies.
Keywords: Governance, innovation, machine learning, security technology

The principle of integrated research on the example of decision support systems in the context of social work

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Today the usage of algorithms and Big Data Analytics in practice replaces processes of human decision making more and more. In the context of welfare institutions, especially in the area of social work, first findings and results of the implementations of decision support systems (DSS) were published in the United States, Canada, Israel, and Australia. Currently, in Europe, there is marginal exploration of usage of DSS in this context yet. With the AMS-model from Austria which will be used to determine the need for support measures of unemployed people to obtain a job, however, it becomes clear that research has already arrived here and a discussion about the opportunities and challenges of these technologies is indispensable. Another example of the application of DSS in the social sector is MAEWIN project which is part of the of the Digital Society research program funded by the Ministry of Culture and Science of the German State of North Rhine-Westphalia. The project inter alia aims to develop a prototype of a decision support system for the use in Social Work. In both cases, the DSSs aim to reconstruct patterns based on the documentation about a third party. The analysis of patterns becomes particularly problematic if these are used assessing of the need of interventions. The same seems to apply if the person who be assessed cannot participate in the documentation that is used for the assessment. The approach of integrated research can be a tool to identify such challenges at an early stage and to react accordingly. Although the concept of integrated research as a rallying cry has been part of the innovation programme of the German Federal Ministry of Education and Research (BMBF) since 2012, there are still no precise conceptual considerations. The idea of integrated research is the inclusion of ELSI (ethical, legal, and social implications) as part of the development of technology
and is intended to prevent the formation of technological fixes.
In the proposed contribution, I will discuss the approach of integrated research using MAEWIN project as an example after outlining main challenges in the usage of DSS in the context of welfare states. On the one hand, a proposal is made on how integrated research could be implemented. On the other hand, it will be illustrating which challenges and questions are nevertheless associated with integrated research.

Keywords: Integrated Research, Decision Support Systems, ELSI, Social Work

Algorithmic selection in social media: Risks and industry governance

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The emergence of algorithmic governance poses the question of how to govern algorithmic systems to avoid risks and serve public objectives. This paper contributes to the analysis of governance strategies by exploring evidence of industry governance of algorithms and its implications in one of its most central and dynamic fields of application: the domain of social online networks.

The relation between algorithms and governance may be conceptualized in two different ways (see Just & Latzer 2017). First, algorithmic governance – or "governance by algorithms" refers to the increasing power and influence that algorithms exert on individuals, the economy and socicety. Second, "governance of algorithms" refers to approaches to and the practice of regulation and control of algorithmic systems. The two concepts are interlinked, because the increasing influence/power of algorithms, coupled with the risks and damage accompanying their diffusion, serve as the causes of and justifications for the governance of algorithms in terms of regulatory response.

Hence, a "risk-based approach" (Saurwein et al. 2015) takes the risks of algorithms as a starting point for analysis and investigates the governance measures used to mitigate these risks.

This paper takes social media platforms as its arena for the study of algorithmic risk and governance. In particular, it explores the application and implications of "governance by design" to counter the risks of algorithms. Based on a literature review, the paper first identifies the risks of algorithmic selection in social media, using Facebook, Twitter and YouTube as primary objects of investigation. In the second step, it identifies how social networks themselves seek to govern these risks. Here, it is hypothesized that – for economic and organizational reasons – social media companies primarily strive to deploy self-regulatory, globally uniform and widely automated "by design" governance solutions. The paper then explores the companies' governance responses by means of two case studies: a) algorithmic filtering errors in content moderation and b) algorithmic amplification of hateful speech.

Intermediary findings show a broad range of measures to mitigate algorithmic risk which include changes to algorithms, recalibrating incentives, allowing users to alter algorithmic selection through settings, changing user policies and community standards to sanction unwanted behaviors, and introducing additional, new algorithms. To avoid algorithmic filtering errors in content moderation, social media companies invest in the development and training of machine learning algorithms, introduce options to appeal content takedowns, and give users more agency when algorithms go wrong. By comparison, the algorithmic amplification of hateful speech is addressed by counterweight measures to hide potentially hateful content ("quality filter"), the use of new algorithms to detect and filter problematic content and behavior, and reduce the circulation of "borderline content" in the News Feed algorithm (Zuckerberg 2018).

The paper identifies these governance responses and differentiates technological "by-design" measures from organizational measures at the company level and instruments that empower. Evidence shows that technological solutions play an important role in the governance of algorithmic risks, but governance strategies are broader and also include organizational measures and user empowerment. The paper concludes with a discussion of the implications of three approaches

(technology, company organization, users) for accountability of algorithmic governance (Saurwein 2019).

Keywords: Algorithms, governance, risk, social media

AI governance as black box: Public debate, virtue-signaling and the prevalence of business ethics

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Since 2016 Frank Pasquale's book "The Black Box Society", the operational secrecy by digital platforms and the extensive access to users' private data have become a highly debated subject. Reflecting on the responsibility and transparency of algorithms, Pasquale's "need to know", strayed into new layers of complexity. Those layers, coming from the implementation of artificial intelligence and enhanced machine-learning techniques (AI/ML), are both a) practical in nature and related to the modus operandi of technosciences and b) philosophical therefore ethical, social and political.

a) AI technologies stem from computer science labs and take forms in a specific "Triple Helix" system in which public actors, governments and universities, are deeply implicated and in constant relation with the private sector (Etzkowitz & Leydesdorff, 2000). AI developments are currently guided by the ethos or model of "open science" (Leonelli 2013), in which researchers and laboratories see the sharing of information as progress even though databases often remain proprietary.

These norms enable a type of "strategic openness" (Ananny & Crawford, 2017) in which a handful of star researchers benefit from the "war to attract talent" (Metz 2017). Meanwhile, this norm of openness benefits GAFA and similar actors as they can closely track the best publicly funded university research in what is then an "exploitable epistemology" (Levy & John, 2016).

b) While Mark Zuckerberg American senate's audition triggered much concerns, other businesses using AI/ML demonstrate their recent efforts to protect and reassure the public by developing partnership with social scientist or philosopher. Sadly, a recent study on value statements and ethics of AI/ML businesses (Greene, Hoffman and Stark 2018) also shown that theses different business initiatives have resulted in little more than casual "business ethics" and failed to incorporate the social justice objectives formulated or to address the main concerns of the social scientists with whom they collaborated.

Considering a) and b), our study of Montreal AI innovation ecosystem has shown a similar process where the collaboration of private actors with computer science's departments become a predominant discursive apparatus in which the values statements publicized have little consequences in actual AI/ML implementation practices. Moreover, our observation revealed how actors of this

AI community push a specific frame for the public debate forward. Between the technicalities of complex algorithms and the fear of killer robots, crucial social issues regarding those technologies are formulated either in terms of problematic but solvable technical inconsistency (database bias, interpretability) or as being purely political and therefore out of their hand (job loss, military drone). While performing a symbolic step toward "AI for good" trough themed conferences, bringing together philosophers, journalist and different actors from civil society, the AI community set grounds for a governance process where discussions are formatted.

Hence, the aims of our presentation is to address how both technical and cultural, aspect of this dispositif must be deciphered if we want to understand how power and legitimacy are deployed in

this important and rapidly expanding field.
Keywords: AI Governance, black box, ethics, triple helix, public debate

The Accuracy Paradox of Algorithmic Classification

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In the past decade, “fairness” has become a hot topic in Machine Learning research and neighbouring fields as Machine Learning increasingly permeates our lives. This resulted in a large body of research and several dedicated conferences tackling this and related issues. The focus of fairness research has been to eliminate the disparate impact on subsets of the population affected by the algorithmic classification. This is frequently framed as diverging accuracies for different groups, with a particular focus on vulnerable groups, pointing to a correlation between prediction and information about group membership.
In this work I argue that, while contributing valuable insights, paying too much attention to fairness and accuracy may create too narrow a focus when evaluating an algorithmic classification system. My argument builds on three pillars. First, close attention on accuracy may be a pragmatic and well-intended stance for data scientists and computer science engineers but can distract from problematizing the underlying problem formulation and the resulting model.
Second, I argue that any classification produces a marginalized group, namely those that are misclassified. This means that the marginalization increases with the classifier’s accuracy. Third, drawing on Kitchin’s assertion that ”the volume of data adds to the weight of evidence” (Kitchin, 2014, p. 135), I claim that increasing accuracy may reduce the ability of the affected to challenge the algorithmic classification. Combined, this leads to the paradox that a focus on fairness and accuracy may weaken the position and agency of those being misclassified.

Real-time governance of transportation systems. A simulation study of private transport.

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While not entirely new, algorithmic governance of traffic has become a source of hope concerning the reduction of emissions as well as improvement of traffic flow. The increased use of navigation systems (either stand-alone or app-based) has led to a rise of both real-time traffic data and traffic management opportunities (e.g. by individualised routing suggestions).
We conducted several interviews with members of navigation service providers, members of public transport organisations and the German Federal Highway Research Institute. Based on these interviews, we developed multiple governance scenarios, in one of which drivers are equipped with a smart navigation system that shows the best routing option based on real-time traffic data.
Another scenario combines this form of commercial navigation with governmental emission regulations into a coordinated governance mode.
Using agent-based modelling (ABM), we compared these scenarios with a status quo base scenario prior to comparing them among each other. Our findings show that smart navigation vastly improves traffic flow and the efficiency of an existing road network. Simultaneously, there are negative effects in terms of an increase of car usage. Due to improved traffic flow, road users are

incentivised to use their cars more often, since travel times decrease. In this case, social logics of individual decision-making contradict the goal of emission reduction with algorithmic governance alone. On the micro-level of the model, smart routing recommendations lead to better individual goal attainment (in terms of reaching desired destinations), while reducing individual autonomy when it comes to routing decisions.
When taking emission regulations into account, the coordinated governance mode can decrease emissions. Anyhow, this decrease is miniscule and goes along with a decrease of network efficiency forming a trade-off between emissions and network efficiency that comes to light in all our findings. On one hand we can show that algorithmic governance can reduce emissions and increase traffic flow but on the other hand it fails to satisfy the ambitious politically installed targets. This shows that the examined algorithmic governance can only be used to its full potential, if there is a simultaneous shift in societal prioritisation of different modes of transportation.
Assuming that the satisfaction of political considerations is a condition for the legitimacy of this form of algorithmic governance, our simulation shows that algorithmic governance is indeed an adequate tool. However, societal phenomena (like increased car usage) may contradict these efforts.
This shows a need for the incorporation of emergent social effects into the governance mechanism itself.
Keywords: Algorithms, governance, self-determination, simulation, traffic

On the redistribution of methods in policing

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On the redistribution of methods in policing – a qualitatively grounded simulation of cocaine transit networks Algorithmic governance in policing refers to the establishment of novel form of coordination and control as a consequence of the application of the so-called ‘new’ methods and techniques of the Big Data era. While these methods and techniques of data analysis have been hailed by some due to their time efficiency, reactivity and ‘completeness’ of data; they are criticized by others due the danger of losing the human perspective; their lack of traceability and the removal from the particular context of meaning.
With the aim of exploring ways to overcome the dangers of datafication and quantification policing, this paper reports on the procedures involved in and the resulting knowledge claims a ‘qualitatively grounded social simulation experiment’. This experiment incorporates both qualitative methods of data analysis as well a participatory approach to the validation of its outcome It is set up in such a way so as to keep the traceability (transparency) to the original (‘raw’) data and safeguard the context sensitivity of the findings.
Starting point of the experiment is a qualitative social network analysis of cocaine transit networks in the Netherlands (Vermeulen et al., 2018). This study was based on a large variety of both ‘big and ‘small’ data (i.e., digital and traditional). In accordance with a bottom-up approach to social simulation, the first step of the follow-up research concerns validating the observed relations (‘hypotheses’) of the qualitative analysis so as to draw up a conceptual model appropriate for social simulation. Second, the different network formations are simulated under a large variety of market conditions relevant for cocaine trafficking (e.g. an overly demand or supply driven market Third, these scenarios will have to be validated by the various domain experts in the field.
As the study concerns the analysis of both ‘big’ and ‘small’ data (i.e., digital and traditional), which parts of the procedure to ‘automate’ and what data to manually code requires careful deliberation

A qualitative participatory take on social simulation poses extra challenges to the treatment large and complex data sets and undoubtedly requires what is referred to as the 'redistribution methods' (Marres, 2012). The reason for this is that it concerns both the "uptake of social methods in digital online environments" as well as a required "refashioning of these methods" (ibid 151/152) so as to enable the analysis of large chunks of data.
Apart from asking the extent to which the social sciences should incorporate the 'new' methods and techniques of the Big Data era (Mützel, 2015), we dedicate our research to the digitization (e automation) of social science methods and the extent to which they may generate meaningful sights into particular social worlds alongside or in combination with the use of the so-called 'Big Methods'. The redistribution of methods in policing, therefore, entails not only a close collaboration with domain experts, it requires a close collaboration between the technical disciplines, such as data science and artificial intelligence, and the social science disciplines as well.
Keywords: Datafication, policing, redistribution of methods, qualitative data analysis, social simulation

Session 3: Socio-technical challenges of health technologies

Chair: OLOFSSON, Jennie, MALI, Franc

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The location of health in the digital knowledge landscapes

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The knowledge landscapes were used as a way to describe the complex multi-dimensional ecosystem where individual encounter the health-related knowledge. It comprises of the off-line traditional knowledge sources, but it is enormously extended in range by the abilities of the digitaltechnologies. The importance of the individuals to orient and navigate across knowledge landscapes is the base of the currently introduced person-centered health care system, opposing to the previous paternalistic systems of the health care, were medical professionals are those to decide about the medical intervention to be carried on.
The myth of health literacy, represents the idealized solution for the person-centered care in thesimplistic linear paradigm. This linear paradigm assumes that all relevant knowledge including the contemporary medical research should be part of the open access, i.e. digitalized and provided to the users without the barriers and for free. At the other hand the users, individuals looking for the health, would be asked to enhance their abilities in accessing and understanding these overall "available and accessible" medical knowledge by active effort of enlightment, i.e. through increasing of their health literacy.
Introducing the knowledge landscapes as a description of the health knowledge distribution, we try to counteract the simplification of linear knowledge distribution paradigm. In particular, in the digital environment, the medical knowledge is constantly challenged and the action of the medical professionals not taken for granted but encountered with distrust and questioned. In contrast to the expected increase of health literacy and empowerment of the patient by digital technologies, the individuals are disoriented and in difficulties to properly decide about their own medical

interventions. Nevertheless, the description of the geometries of the digital knowledge landscapes represents a difficult challenge. The tentative nature of the given categories as the knowledge, truth, or health, is confusing to the individuals looking for the definitive answers provided by the previously experienced paternalistic health care system. This uncertainty is increased by the nature of digital technologies. Subsequently instead of the fixed locations in the knowledge landscapes requiring only the positioning tools to help those searching to find the answers, we encounter the flexible landscapes changing in the time and space. Paradoxically, this increase of complexity is confronted to the reduction of the health-related advices to the oversimplified statements (reduce weight, exercise more, think positively, etc.). The understanding of these relations in the context of constantly changing digital technologies should provide the cue for the essence of the patient empowerment, being the base of the person-centered health care.

Keywords: Person-centered care, patient empowerment, knowledge landscapes, health care

General data protection regulation in healthcare: a revolution for patients, clinicians and technologies

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When designing Electronic Health Record Systems, a typical design start point is that patients come to their doctor confident, willing and able to describe their health concerns. Described in terms of an information exchange: a patient is willing to trade personal information related to their condition in return for good quality treatment. The exchange is shaped by many factors, not least the style, form and content of the clinician's communication (Wright et al, 2004) and by a power dynamic that benefits the clinician significantly (Pilnick and Dingwall 2011).

The converging of digital records, sensor technologies and AI re-shapes this power imbalance. It could be argued that the General Data Protection Regulation (GDPR) challenges the clinician-patient power dynamic by legally placing patients in a position of control of the personal data they release to clinicians and of the purposes for which such data is processed. For example, Article 25 states data minimisation, and Recital 75 outlines the risks to the rights and freedoms of natural persons that may derive from data processing, e.g. discrimination or financial loss.

We argue that none of the key stakeholders, that is, patients, clinicians and technologies, is ready for the revolution in information exchange within healthcare that GDPR offers. In particular, patients must have the powers necessary to derive the benefits of GDPR. Therefore both knowledge and the capabilities needed to successfully act on that knowledge need to be identified if GDPR is to achieve the intended transformation. Applying a capabilities lens (Sen 2005, Oosterlaken and van den Hoven 2011) makes a discussion of GDPR compliance attentive to the impact of social, economic and political inequalities on a patient's ability to manage their personal data in clinical settings.

Our presentation reflects on how social, political and economic inequalities challenge the ideal of GDPR compliance. We develop a critique of current guidance to explore how a compliance regime might respond to these inequalities. Our presentation will address three challenge areas:

Challenge 1. Identify under what conditions patient awareness and control of their rights under GDPR can be achieved and identify the capabilities necessary for a patient to derive benefit from the awareness.

Challenge 2. Identify under what conditions GDPR compliance is successful within clinical practice and the barriers to successful compliance that clinicians experience.

Challenge 3. Design GDPR compliance into all converging technologies in use. Authentication and authorisation checks should be transparent so as to ensure quick access to as well as protection of patients' data.

Keywords: Capabilities lens, awareness, power, inequalities, compliance

Code your own pancreas: technology assessment and sociological perspectives on the visions of do-it-yourself artificial pancreas systems in type 1 diabetes therapy

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Type 1 diabetes (T1D) is a severe chronic disease with potentially serious acute and long-term consequences. Achieving the desired blood levels is extremely difficult. Being affected by T1D means lifelong constant self-control that rarely leads to stable levels. Some people with T1D use an insulin pump, which allows more accurate dosing of insulin. A technology that adequately replaces pancreatic function is not yet available.

Committed people with T1D no longer want to wait for the approval of a commercial system and develop their own systems: Do-it-yourself-Artificial Pancreas Systems (DIY-APS) automatically adjust insulin delivery through the insulin pump to keep blood glucose levels in a safe range.

The systems are automated and supposed to be precise in their measurements. The developers of one system describe it as "far safer than standard pump" therapy and argue that it leads to "remarkable improvements in quality of life due to increased time in range, uninterrupted sleep, and peace of mind" (Lewis et al. 2016). Currently (January 2019), approximately 1078 people worldwide use DIY-APS, and the number of users is steadily increasing.

This technology comes with many promises, but also raises questions. DIY-APS are not officially tested and approved systems and therefore in a legal grey area. Since commercial distribution would be just as illegal as free provision of the system's software, prospective users have to write the code themselves. Instructions and a supporting community can be found online. A malfunction could have serious consequences; the wrong dosage of insulin can be fatal.

Drawing on empirical findings on DIY-APS community in the German healthcare context, this presentation will shed light on the following issues related to DIY-APS: The strong visions of DIY-APS go along with the promise, that every person with T1D can build and use a DIY-APS as long as that person is in possession of the respective devices. But first outcomes show that the challenges and hurdles of setting up such a system on one's own should not be underestimated. A technology assessment perspective will confront and evaluate these opposite positions. Also we argue that it is instructive to understand the emergence of DIY-APS amidst the omnipresence of medical knowledge in the course of a biomedicalisation of every aspect of life and the increasing global connectivity over social media platforms. In a global network of people with similar illness-related experiences, advice from medical professionals as well as national healthcare regulations seem to have diminutive influence on decision making of people with T1D. This global exchange can enhance solidarity and empowerment, but at the same time new risks can arise from programming one's own medical device.

Keywords: Do-it-yourself artificial pancreas, type 1 diabetes, biomedicalisation, technology and vision assessment, closed loop

Impact of online health communities on transformation of doctor-patient relationship

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Online health communities (OHCs) present one of the most important sources for online health-related information. In OHCs, which are a subset of online communities dedicated to various topics of health, users (usually patients, caregivers or other interested in health-related issues) can participate, search for and exchange health-related information, experiences, advice, social support, and/or influencing public opinion, as well as interact with other users and health professional moderators (usually doctors and healthcare providers). These processes lead to patients' individual and collective empowerment and may consequently change the dynamics of doctor- patient relationships. OHCs have become new venues of communication and interaction between patients or caregivers on one hand and health professionals (doctors) on the other. The importance of OHCs is growing and have been increasingly studied in the recent years, yet it is surprising that the research currently does not give much attention to the fact that OHCs have broadened and diversified channels for professional-patient interactions, which has transformed the perceptions of face-to-face medical encounters. The use of OHCs has been associated with development of different forms of patient empowerment and processes such as exchanging social support, comparing with others, sharing experiences have been related to patients' expressing greater confidence in relationships with their doctors. However, there may also be some potentially problematic aspects of patient empowerment that are related with patient's relationship with the doctor. For instance, OHCs can present a source of misinformation and patients' inability to understand, evaluate and process relevant health-related information, which can lead to development of low eHealth literacy.

Patient empowerment emerging from the use of OHCs does not necessarily lead to better communication with the doctor, can be unproductive for the relationship, can lead to negative encounters and nonadherence and may even induce conflicts between patients and doctors. The main aim of this study is two-fold. First, we aim to identify crucial social processes in online doctor-patient relationship in OHCs that (might) have beneficial as well as negative effect on face-to-face medical encounters in health care settings. Based on the identified crucial social processes in OHCs, the second aim of this study is related to the investigation of the effect of these processes on different forms of patient empowerment in (face-to-face) relationship with the doctor. The study combines data collected with (qualitative) in-depth semi-structured interviews with users and health professional moderators of the biggest OHC in Slovenia, Med.Over.Net, and a cross-sectional Web-based survey on a simple random sample of registered users of Med.Over.Net. This study demonstrates that social processes in OHCs do not have a uniform effect on doctor-patient relationship. OHCs and online professional-patient interactions should not be seen as venues that present a threat to, or a substitution for, face-to-face medical encounters but as important spaces that contribute, complement and advance interactions between doctors and patients.

Keywords: Online health community, doctor-patient relationship, patient empowerment, patients' involvement

'I've googled »depression«': Inquiry into the triangulation individual-virtual social group-information system in health domain

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The paper aims at presenting the platform for understanding the complex relation of instances - individual/"the machine"/virtual group of people – actively gathered around a specific health issue, and thus construing reliable, might-be-reliable or unreliable information base for a certain disease or other health issue. Epistemic background of the inquiry into the exposed relation is the conceptual transgression of the characteristic mental matrix of dichotomies: virtual/real, individual/social group, empowerment/powerment, knowledge/ignorance, and even facts/postfacts. The focus is on the three conceptual loci: - knowledge-ignorance relation in suggesting or declining certain information (Tuana 2006) on the social and professional health related web page, - formation of the special individual-group dynamics in sharing and commenting lay and professional health information (the concept of condividuality, Raunig 2011, and Deserris 2018), and – "activity theory" applied to articulate the humans–information system relation (Hasan, and Banna 2012).
Following the exposed conceptual tools the analyzed three referential health information web pages of the three EU countries (Croatia, Slovenia, UK), will be presented by the enter "depression", used in research in a certain period of time. This health issue is not only medically and factually "popular" problem – it clearly interrelate somatic, psychical, and social factors which should be and usually is reflected on the web (Svalastog, Allgaier, and Gajović, 2018) by users' and health professionals' attitudes and advices.
By the results of critical discourse analysis, sociolinguistics and semantics research, applied in the three case studies, and incorporation of the theoretical standpoints formed by epistemology of human activity, and knowledge-ignorance phenomena, certain indicators of credibility of the web information on health issue will be described: - the general relevancy of the web page, - the character of the 'condividuality' formed, - social/professional status of enunciator and her/his impact in the group,- main factors of approaching the consensus in the case studies, - "conflict potential", - hegemony in the final decision on health issue, if any.
Keywords: Health, information system, knowledge-ignorance, condividuality, reliability

The use of robots for the assistance of elderly people

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Demographic developments in modern European societies lead to a growing gap between the societal need for growing capacities of care and the number of people to provide these services.
One way to reduce this gap is the use of technology and in particular the use of robots. In practice, robots like "Paro" as well as robots for physical care are developed and used in the field of care for elderly people. The consequences of the use of robots in the care for elderly people are discussed controversially, while some see the use of robots as a path to avoid the lack of caring services which are expected in future, others see the use of robots in human care as a dystopic vision where the use of technology and robots in particular will lead to a care systems adapted at the needs of economic rationalization.
The question is important, what the public thinks about the use of robots in this field. The data of the TechnikRadar 2018 (TechnikRadar is a cooperation project of Körber-Stiftung, acatech and

ZIRIUS), a representative survey with 2000 respondents in Germany, allows not only to study how the public perceives the use of robots in the care for elderly people, but also the reasons for their evaluation. Dominating are negative views of use of robots in human care. The expectation that the use of robots will increase the independence of elderly people is only shared by one third of the respondents. On the other hand, about 80% of the respondents expect that the use of robots will lead to a reduction of human devotion for elderly people. The use of robots is perceived to be a social risk: more than 50% of the respondents think that the use of robots in this field is a social risk. Dominating is the dystopic view of a care system, where only people with high financial resources will get personal assistance from humans.

This does not mean that robots are rejected in general. A general rejection of robots is shared only less than one third, while one fourth of the population totally rejects the use of robots for the care of elderly people. On the other hand, almost two thirds of the public would support the use of robots if it would lead to a load removal for the nursing staff.

In consequence, whether robots in the field of care for disabled elderly people are supported or rejected depends mainly on characteristics of the socio-technical system in which robots are used. The perception and evaluation of robots depend on the goals of their application. If robots are used as an instrument of technical and economic rationalization, robots are rejected. On the other hand, if robots will support those doing care to be able to concentrate more on personal than on physical activities, robots are widely supported.

Keywords: Human-care robots, public perception, technikRadar 2018

The ethical challenges of the development of health technologies: how to define borders between medical treatment and human enhancement?

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In my contribution, the main goal will be to highlight some ethical controversies arising around the definition of the borders between human enhancement and medical therapy of humans. These controversies are arising due to the tremendious progress being made in the context of the new health technologies. In recent times, we are meeting with a wave of innovations in health technologies driven by new medical breakthroughs, novel scientific approaches and the rise of digital health technologies. The advances made in this broad spectrum of health technologies are leading to possibility of enhance some body or cognitive functions and characteristics of patients beyond what is today considered 'normal' medical treatment. Therefore are opening up a lot of bioethical questions. The existing, emerging and envisioned situations regarding the borders between human enhancement and medical therapy of humans are enforced us to search the answers on the following questions: is human enhancement merely a special case of medical therapy of humans?; does at all exist a strict distinction between human enhancement and medical therapies of humans ?; what are human enhancement that would give us some significant non-human characteristics?, etc. The answers on such questions are not easy. Contradictions are often arising already at definitional level. In my contribution, the conventional and largely uncontroversial measures of human enhancement will be not taken in regard. Accordingly, the bigger attention will be given on ethical controversies of health technologies which are promising to introduce tremendious revolutionary changes. I will concentrate on the cases of the last advances in biogenetical medical interventions.

Powerful new health technologies based on editing of genes hold great promise for advancing science and treating human disease. At the same times, these health technologies also raise a lot

of ethical concerns and present complex challenges, particularly because of their potential to be used to make genetic changes that could be passed on to future generations, thereby modifying the human germline. I'll make the critical overview of the main ethical dilemmas concerning the border between medical therapy and human enhancement.

Keywords: Health technology, ethical challenges, human enhancement, gene editing

Session 4: Applying artificial intelligence on vulnerable target groups: chances and challenges

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The principle of integrated research on the example of decision support systems in the context of social work

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Today the usage of algorithms and Big Data Analytics in practice replaces processes of human decision making more and more. In the context of welfare institutions, especially in the area of social work, first findings and results of the implementations of decision support systems (DSS) were published in the United States, Canada, Israel, and Australia. Currently, in Europe, there is marginal exploration of usage of DSS in this context yet. With the AMS-model from Austria.
which will be used to determine the need for support measures of unemployed people to obtain a job, however, it becomes clear that research has already arrived here and a discussion about the opportunities and challenges of these technologies is indispensable. Another example of the application of DSS in the social sector is MAEWIN project which is part of the of the Digital Society research program funded by the Ministry of Culture and Science of the German State of North Rhine-Westphalia. The project inter alia aims to develop a prototype of a decision support system for the use in Social Work. In both cases, the DSSs aim to reconstruct patterns based on the documentation about a third party. The analysis of patterns becomes particularly problematic if these are used assessing of the need of interventions. The same seems to apply if the person who be assessed cannot participate in the documentation that is used for the assessment. The approach of integrated research can be a tool to identify such challenges at an early stage and to react accordingly. Although the concept of integrated research as a rallying cry has been part of the innovation programme of the German Federal Ministry of Education and Research (BMBF) since 2012, there are still no precise conceptual considerations. The idea of integrated research is the inclusion of ELSI (ethical, legal, and social implications) as part of the development of technology and is intended to prevent the formation of technological fixes.
In the proposed contribution, I will discuss the approach of integrated research using MAEWIN project as an example after outlining main challenges in the usage of DSS in the context of welfare states. On the one hand, a proposal is made on how integrated research could be implemented. On the other hand, it will be illustrating which challenges and questions are nevertheless associated with integrated research.

Keywords: Integrated Research, decision support systems, ELSI, social work

Socio-technical imaginaries as drivers and indicators of discrimination and inequality regimes

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The digitization and datafication of society have triggered a lively debate about its potentials and risks (Houben/Prietl 2018). A scientific debate on this social transformation oriented towards social inequality, however, is still in its infancy. So far, it only attracts attention when AI applications or big data analyses quite obviously break the promise of objectivity they have been attested to – for example, when Google's ad posting algorithm displays advertising for jobs in management positions or leadership training significantly more often to such users, whose profile identifies them as men, whose profile identifies them as women (Datta/Tschantz/Data 2015), or if data-based risk assessment systems in the US prison system systematically attest African Americans a higher risk of relapse than "white" Americans (Angwin/Larson/Mattu/Kirchner 2016). In most cases, then, the terms used to explain or exculpate, such as "bias", "distortion" or "error", perpetuate the notion that neutral and objective results would be possible once all errors have been corrected (Zweig 2018). They thus fall short of the long established insight that technical artefacts as well as processes of knowledge production are never neutral, but always "political" (Winner 1980; Prietl 2019). Departing from a STS-perspective, therefore, in my presentation I would like to argue for a more general and instructive approach and examine leading imaginaries behind Big Data and AI for their inequality-effective and discriminatory assumptions. The question, then, is whether influential socio-technical imaginaries on AI and Big Data are compatible with postulates on equal opportunities and freedom from discrimination. My analysis is guided by the background assumption, that the discussions on AI are part of a "sociotechnical imaginary" (Jasanoff 2015). As strategies and visions for the future, they contain scenarios of how the world could and should develop. Imaginaries become socially effective because they serve as recursive points of orientation for various actors and reduce their uncertainty. In this sense, socio-technical visions of the future unfold specific performative social, economic, cultural and political effects. Accordingly, the narratives and imaginations of Big Data and AI are part of a wider social discourse that aims at transforming all societal areas and massively impact on the opportunities of any social group. This is because predictions and prognoses not only produce possible futures, but also create the present (Beckert 2016: 217). According to Jasanoff (2015), visions of the future and, in particular, social-technical arrangements are constitutive for the self-conception of modern societies and hence shape social opportunity structures and inequality regimes. Particularly in periods of uncertainty and social transformations, imaginaries channel societal expectations and stabilize further technological developments (Jasanoff 2015; Beckert 2016). Thus, AI and Big Data establish an "emerging Weltanschauung grounded across multiple domains in the public and private sectors, one that is need of [sic] deeper critical engagement" (Crawford/Miltner/Gray 2014: 1664). As indicated in this statement, imaginaries are of course controversial, as they also represent competing ideas of actors from different fields. In this respect, the struggle for sovereignty of interpretation which embodies in crafting imaginaries also decides which groups are discriminated against or not (Bourdieu 2017). Hence, the question arises as to which groups would be most affected by certain policies. In short, as Big Data and AI profoundly transform social structures a critical-reflexive analysis of the underlying ideas and expectations necessarily represents a socio-political and unequal analytical desideratum that can be assessed by analyzing leading socio-technical imaginaries and carve out their discriminatory potentials.

Should Artificial Intelligence be used to empower people with profound intellectual disabilities?

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People with profound intellectual and multiple disabilities (PIMD) often communicate at a presymbolic level and use unconventional behavioral signals (e.g. body movements, vocalizations) to express their needs. Hence, the exact understanding of their needs is not often possible even for very familiar persons. This significantly restricts the participation of people with PIMD in all areas of life. However, advanced ICT technologies allow to create smart systems that can potentially intelligently interpret those non-symbolic behaviors and translate them into actual needs of people with PIMD. This way people with this type of disability can get empowered to take actions themselves, especially when the direct support person is not available.

In the INSENSION project we focus on creating and validating an ICT system that is capable of recognizing the meaningful non-symbolic behaviors of people with PIMD and, through putting them into the context of what happens around a given individual at the time of a given behavior, enabling the needs of these people for use by assistive applications. While the primary application that can be foreseen is one facilitating communication with other people, other uses can be imagined such as increasing heating in the room when the person with disability protests against the cold or starting favorite music when they need to relax.

The INSENSION platform uses advances in computer vision and audio signal analysis to recognize gestures, facial expressions, vocalizations and psychophysiological state. Further on, similar techniques are used to understand the context of the behaviors of people with PIMD, additionally extended by readings from ambient sensors. Combination of these methods for automatic analysis of data acquired from the primary user – the person with PIMD, using cameras, microphones and other relevant IoT devices, constitutes the intelligence of the developed system.

Our primary goal in the project is verification whether creation of a system in question is possible from the technical point of view and whether the system is smart enough to accurately act on behalf of the primary end user. However, several additional questions arise when discussing real-life usage of such a system. These questions relate to the privacy of the primary end users, the extent to which the system should act on its own once it is able to recognize the meaning of the given behavior of person with profound disability, the possibility of allowing the system to act as a prosthesis of verbal communication for a person who is biologically unable to use verbal communication, and other issues. All these questions also are subject of the research conducted within the INSENSION project and have been included as important design issues to be solved with the participation of the representatives of secondary users group – the direct support persons like relatives or professional caregivers.

The research activities described above are conducted by an interdisciplinary team of researchers and practitioners from Poland, Germany, Slovenia and Spain and are supported by the European Union's Horizon 2020 research and innovation program under grant agreement No. 780819.

Keywords: Profound intellectual and multiple disabilities, empowering people with disabilities, ambient intelligence for people with disabilities

Session 5: Technology and the promise of decentralization

Chair: SCHRAPE, Jan-Felix

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Blockchain and the promise of decentralisation: A sociological investigation of the claim of social change through technology

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"Technologically, blockchain is enabling us to revive that spirit and build the decentralized digital community that the founding fathers of the Internet initially envisioned." (Seguin 2018)
"We just want to take the Internet to its logical conclusion: total decentralization" Stephen Tual, Former CCO Ethereum (Volpicelli 2015)
The idea that technology has a disruptive impact on society is a common topos in the public and academic discourse about decentralised technologies such as blockchain. Due to its unique technological architecture, blockchain is often promised to bring about a new mode of socio-economic organisation characterised by decentral and non-hierarchical cooperation (Swan 2015). However, while many praise the technology's disruptive potential, critics remark that 10 years after the technology's introduction, the 'blockchain dreams' (Swartz 2016) have not yet come true and the promised revolution has not yet occurred. This gives occasion to question the rigorous claims made about decentralised technologies and their impact on social order. In this context, the following question emerges: How can the impact of decentralisation on social order be understood in the context of blockchain?
The planned article engages with this question from a sociological perspective. It is argued that claims of social change by blockchain are often based on an overly simplistic view of social change that can be characterised as technological determinism, which regards technology as an external, autonomous force acting on society. The case of blockchain demonstrates that while the technology offers several qualities that may facilitate establishing and maintaining decentralised social orders, whether they can be realised is largely dependent on social actors. Thus, social change through technology should rather be understood as a contingent process that is to a large extent driven by how technology is produced and adopted by humans. It is concluded that the idea of establishing social orders by decentralised technology must always be taken with a grain of salt and that future research should focus more on how decentralised technologies are produced and the political struggles in their development process. This argument is developed in three steps. The first part of the article deals with the current public and academic discourse about blockchain and identifies conceptions of social change in promises of social change through decentralisation. The second part presents different ways of how blockchain technology can facilitate the establishment and preservation of decentralised and non-hierarchical socio-economic orders, using the examples of on-chain governance, smart-contracts and decentralised autonomous organisations (DAOs). The third part addresses the question how technology can lead to changes in social order from a theoretical perspective. Drawing on the structuration theory of Giddens and Orlikowski, an alternative conception of technology-driven social change is developed, which is able to account for the important role of actors to a greater extent. This perspective is illustrated by use of empirical examples from the area of cryptocurrencies.
Keywords: Blockchain, decentralisation, social order, technological determinism

Hiding the social – the unintended consequences of digitizing socio-technical work

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The German Federal Institute for Occupational Safety and Health has completed an investigation into the impact of digitization on the German occupational safety and health (OSH) system: does the German OSH-system still cover digitized work? The German OSH is enshrined in law, with the prevention of accidents and the avoidance of physical and mental impairments at work being its central pillars. Its executive is structurally linked to the structures in which work itself is carried out. Health and safety professionals and doctors are mandatory. At the same time, compliance with the laws is supervised by the German employers' liability insurance association and the federal states. A Grounded Theory Study completed 36 interviews with various stakeholders and supervisors. The study provides an accurate description of seven problematic phenomena of the OSH system in the era of digitized work. Phenomena such as access problems, problems of cooperation, the persistence of old models, shifts in responsibility, the lack of autonomy, the lack of sustainability and a general lack of access describe the current challenges of OSH practices. Nevertheless, the key insight is provided by one central phenomenon which connects the seven fields mentioned above, thus indicating the main challenge for OSH: the digitally produced reciprocal invisibility of actors and processes. For professional health and safety workers, problematic work situations, stress and cooperation have fallen from view. At the same time, employees lack addressable executives, participation in the organization of work and more casual opportunities to problematize their experiences.

All in all, as a deliberate and positive form of control, the functioning and impact of OSH is jeopardized by the mutual invisibility triggered by the digitization of work. Digitization – and therefore the decentralization of work – has a determinably negative effect on the mode of operation of the OSH-system.

How can this effect be conceptualized? As an enhancement of technological development, digitization goes hand in hand with black-boxing (Latour), stabilization and decontextualiza-tion (Rammert). Storage, transmission and processing become inaccessible in devices and networks. This makes work easier, as we fraternize with the digital agents. However, according to Rammert and Latour, the technology alone is not to be considered – describing the technology in isolation has no analytical value. The socio-technical constellation is the relevant entity because it processes the social meaning and power.

Digitization is black-boxing, with all the advantages and disadvantages, but it should not be mistaken as a purely digital process. With the storage, transmission and processing of workflows the social meaning and social stickiness is encapsulated too. Black-boxing concerns social and technical phenomena. Understanding, accessing and coordinating decentralized and digitized relations seems to be of growing concern – regardless of whether the obvious changes are positive or negative.

Still, the burdens and problems in OSH have not dramatically increased. We know from social theory that whenever forms of control fade out, other forms of regulation step in. Instead, we need to ask what forms of regulation, power and coordination are to be privileged in an era in which digital black-boxing is becoming ubiquitous.

Keywords: Digitization, black-boxing, regulation, occupational safety and health

Decentralized blockchain: Idea vs reality

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The blockchain is a relatively new technology that promises decentralization and financial freedom. Technology gives everyone with computational power possibility to participate in the network, where financial and data transactions are confirmed by all network participants without a central authority. Participants, also called miners, must solve mathematical challenges to confirm transactions and are given a reward for every confirmed batch of transactions, called block. Because many miners are needed to solve the challenge and confirm (mine) one block of transactions, no single person or group should not be able to change or prevent valid transactions, making the blockchain a perfect decentralized network. The development of the technology and updates to the core software are also voted by all participants in the network, where votes can be weighted based on the power provided by the participant or his wealth. This aspect opens some interesting question about who can really decide about the future of development, as wealthier individuals and groups possess a large part of the voting power. While technical and financial aspect is already being researched, not much focus is given on decentralization.

This paper explores decentralization level of blockchain on the example of Ethereum, second largest blockchain in the time of writing. Although there is no central authority, there are still some centers of powers, which can regulate the data and transactions, which is against the principle of decentralization. As confirming the new block of transactions is increasingly harder, miners are often working as a group, called pools. When single pool member mine one block, the reward is split with all pool members, based on their computational power. This way even participants with less computational power can get rewarded over time. Developers and blockchain enthusiast are stating, that this proves the decentralization of this technology. Lack of scientific research and different incidents, that already resulted in splits of blockchains are putting decentralization at a question, which can be explored and analyzed.

With the use of publicly available empirical data, I will try to prove, that Ethereum blockchain is not idealistically decentralized and center of powers are present. This paper uses data that comes directly from the Ethereum blockchain itself, as the nature of technology makes all data public, therefore ideal for exploration and analysis. Data includes the number of miners, their computational power, historical growth of the Ethereum blockchain network, number of nodes, that are keeping track of all transactions on the blockchain, mining reward and group (pool) sizes, including with their computational power.

With all the data I have come to conclusion, that idea of decentralized network did not succeeded in Ethereum blockchain, with largest 3 mining groups controlling more than 60% and 5 mining more than 75% of the computational power, participating in the Ethereum network.

Keywords: Decentralization, blockchain, ethereum

Self-driving cars and a promise of decentralisation: case of Russian development of self-driving cars

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Today the self-driving cars offer a proper example of how technologies might increase the decentralization. Some companies today underline the idea that self-driving car must be totally smart and autonomous from the infrastructure of cities and from their milieu. At the same time,

some policy projects propose to render self-driving cars as connected cars. It implies not only that cars will be connected to each other, but also that the cars will be connected to the city and regional road infrastructure, exchanging their data with the governments. These two visions of the future of self-driving cars exist side-by-side and there is uncertainty how this issue will be resolved. I would like to delve into the details about these two visions on the example of developing and regulating self-driving cars in Russia. Yandex, the influential Russian software company that is creating now its own self-driving car, insists in making self-driving cars as a technological monad, containing all the needed technologies for riding on every surface and in every road condition of Russia. Some of their arguments deal with the fact that the road infrastructure in the country is variable and only a bunch of cities may provide the necessary infrastructure for such innovation as self-driving cars. By contrast, the Russian government is developing and testing its own versions of self-driving cars mostly based on the idea of connected cars. In this case, it would like to make a technology that will connect all the smart cars to make them exchange the data to stay in touch with the current conditions on the road. Basically, this idea is supposed to impose on the big highway for providing transit of goods by the big trucks. At the same time, governmental research institutes work on v2x technologies that should also become a foundation of private self-driving cars in Russian cities. These two visions clash on the basis of whether self-driving cars will help to increase the decentralization or centralization of the transport infrastructure in Russia. Every vision imply its own answer to the questions like “Who own the data from self-driving cars?”, “What will be the architecture of self-driving cars”, “How much does it cost to make cars ride on their own?”. In my talk, I would like to provide the answers to these questions and to give pause to the thought about how self-driving cars may provide opportunities for more technological decentralization in Russia.
Keywords: Self-driving car, decentralisation, v2x, infrastructure, government

Centralization vs Decentralization in blockchain: Toward an analytical framework

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Blockchain has recently become a “hot topic” across a broad range of sectors: from finance to healthcare, to tourism and public administration. The main appeal of blockchain is the possibility to conclude transactions without the need for a central authority, thus to operate along a decentralized model without increasing the risks of the transaction.
Its specific design (a mix of cryptography, governance model, distributed computer network and individual economic incentives) defines blockchain as an enabler for trustless transactions: every actor does not need to trust anyone else (the other part of the transaction or a central authority) to conclude her/his arrangement. The absence of intermediaries and a strong anti-tempering system makes possible a transaction system without central authority.
This scenario was simply not possible before blockchain: a distributed database shared and replicated among all the nodes of a distributed network. It was developed as basis for Bitcoin and its double-spending problem, but it does not necessarily require a cryptocurrency to work.
Blockchain has the potential to remove a subset of risks and opportunistic behaviors during digital transactions, enabling a more decentralized space for social and economic activities. If it could support a shift towards a digital world where transacting with stranger is easier and safer, this could lead to new trends towards more direct and decentralized relationships. New services, products and business models could emerge from a large-scale use.
As every new and promising technology experiences, there is always a extremely high expectation

for its effects, a superficial understanding of its limits and real use-cases, and often a premature disenchant when the results are not immediately disruptive as expected. At the moment there are very few stable and running applications of blockchain, and even fewer have been deeply innovative.
Our research will consider the impact of blockchain on organizations as a multifaceted phenomenon that should be understood in its intertwined complexity without focusing only on single parts. We build on the assumption that the development and implementation of technological solutions is a social phenomenon. Thus, the managerial effects of using a certain technology rely on both technical and social factors.
The paper provides an integrated framework for analyzing blockchain and its adoption. We will explore a set of managerial and organizational theories (e.g. coordination theory, contract theory, economic governance) to provide an analytical understanding of the impact of blockchain and its potentialities.
Keywords: Blockchain, organization design, centralization, coordination, trust

Session 6: Exploring critical and engaged approaches for investigating the complexities of digital health

Chair: MARENT, Benjamin, HENWOOD, Flis

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The recruitment ”Call” into the digital lifesaving technology and its users’ response: Volunteers’ entry paths into their emergency work

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The paper aims to better understand the dualities brought by the use of the digital technology of participation in the context of the volunteer emergency work outside hospital. In particular, it looks at the entry paths of the digital lifesavers into their volunteer parallel careers.
The digital platform concerned rely on the mobile app technology. It has been developed in Sweden by cardiovascular researchers in collaboration with private actors to increase survival rate of the cardiac arrest patients. Its promises build on the mobilization of the public trained in CPR who is geo-located and if nearby at the time of an incident receives an alert to provide CPR or fetch and bring defibrillator at soonest and possibly prior to the arrival of formal emergency and rescue workers to the place of incident.
Thus, the “public”, including those who have had experienced cardiac arrest in their social circle or have or had been engaged in lifesaving work professionally, receives the recruitment “call” into the lifesaving technology to enter emergency work as the volunteers. Instead of seeing the volunteers as responding to an “individual call”, this analysis aims to illuminate the duality of “vocation” and “participation” of the volunteer users in this digital technology of participation in work of care in emergency. Near the analysis of the recruitment process into this lifesaving technology and therefore volunteer work, this paper thus in parallel looks into the volunteers’ reasons to engage and enter their “digital lifesavers’ volunteer careers”.
The empirical material includes the interviews with fourteen volunteer lifesavers and with the organisers of the recruitment into the technology.

Keywords: digital health, digital labour, volunteer work, emergency, technologies of participation

Exploring the functional and relational affordances of technologically mediated consultations in HIV care

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Healthcare services are increasingly utilising digital technologies to facilitate mediated forms of doctor-patient interactions that fully or partially replace face-to-face consultations. Because theories of the 'interaction order' – particular Goffman – have been largely focused on the physical co-presence of interlocutors, less conceptual repertoire has been developed to analyse technologically-mediated interactions and to understand their different affordances (Gibson 1979) that frame the possibilities of agentic action.

In this paper, we compare the affordances of face-to-face and technologically- mediated forms of doctor-patient consultations that have been introduced to follow-up stable HIV patients in five clinical sites (Antwerp, Barcelona, Brighton, Lisbon and Zagreb). As part of the second phase of a comprehensive sociotechnical evaluation of a newly introduced mHealth platform we conducted 8 co-design workshops and 66 interviews with a total of 72 HIV patients and 32 clinicians to understand how the new technology reconfigured practices of care. Particularly, patients and clinicians were prompted to consider the differences of routine consultations being performed face-to-face (all five sites), by audio-video interfaces (Barcelona), by telephone (Zagreb), by email (Brighton), and through the newly introduced mHealth platform (all five sites).

Our data offers concrete examples of how different modes of interaction gradually dislocate, dissynchronize and standardise the clinical encounter and how these functional aspects enable and constrain medical examination, dialogue, stigma management, patients' reassurance and the 'normalisation of HIV'. Understanding these functional affordances, we will outline what different forms of doctor-patient interaction mean for different people in different situations. Our empirical evidence of technologically mediated interactions challenges classic theoretical assumptions of co-presence through physical proximity and offers new avenues to reconceptualise the interaction order. By outlining a new comparative framework of the affordances of technologically-mediated forms doctor-patient interactions, we will draw important implications to be considered in the development and implementation of technological innovations for the clinical follow-up of patients with chronic diseases.

Keywords: Doctor-patient interaction, affordances, digital technology, practices of care

Exploring affect in human-technology interactions with an mHealth-based HIV self-testing strategy in South Africa and Canada

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Mobile health (mHealth) technologies for HIV care are developed to provide diagnostic support, health education, risk assessment and self-monitoring. These technologies are developed to improve an existing therapeutic relationship between a patient and provider or to replace part of this relationship. Current research focuses mainly on the function of mHealth technology for HIV

care, but part of what makes a therapeutic relationship work (or not work) is the emotional/affective aspect of that relationship. HIV-testing is an emotional experience involving many human and non-human actors including health care providers, diagnostic tests, and physical spaces. The concept of affective atmospheres considers how multiple bodies and objects together form a collective feeling in a setting. In this paper we aim to explore how different bodies and objects come together to form affective atmospheres in the practices surrounding HIV self-testing with a smartphone application (app); how these affective atmospheres are shaped in different situations and settings; and the implications of this for how people respond to and engage with digital health strategies in HIV care.

This paper draws on observations, interviews (n=41) and one focus group with study staff and participants collected from within a larger quantitative observational cohort study in South Africa and from a previous quantitative cohort study in Canada.

The interrelation between the user, care environment, and app created different feelings and emotions. For example, the anonymity and privacy provided by the app-based self-testing strategy created feelings of trust and reduced fear, circumventing issues of discrimination, stigma, or lack of confidentiality associated with previous testing experiences and relationships with health care providers. In other instances, feelings of mistrust and anxiety were created as norms around HIV risk inscribed into the technology did not always align with user beliefs, and the way and timeliness in which results were communicated differed from the conventional testing methods to which users were accustom. The feelings experienced during the self-testing process as well as factors such as personal ideas around the technology, familiarity with testing practices, and access to health care services influenced participants' willingness (or lack thereof) to use the app-based strategy.

This paper shows how different affective relations are created when digital health technology is used in HIV care practices and how multiple entities come together to create a feeling within the HIV testing space during the process of using the app-based self-testing strategy. It also illustrates how users engage with digital health strategies in different ways, which can result in the technology taking on different roles. People often related their feelings to specific entities within the testing environment such as previous healthcare providers or testing methods. Therefore, this paper further contributes to the empirical literature on affective atmospheres by showing that, although affects do not arise neatly from individual entities to create an overall feeling, the contribution of certain bodies and objects to this overall feeling can become foregrounded in different situations and settings.

Keywords: Affective atmospheres, digital health, HIV, self-testing

Data is potential agency: turning subjects into objects by means of algorithms

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On 17th of March 2018 Cambridge Analytica's whistleblower Christopher Wylie published the data breaches the company had committed jointly with Facebook (Briegleb 2018) in the New York Times and the Guardian. By turning the affair into a media event, he added fuel to the long-standing debate about the repercussions of datafication for human self-determination. For, whilst scholars, such as e.g. economist Shoshana Zuboff have warned in academic journals (Zuboff 2015a) and newspaper articles (Zuboff 2015b) against the dangers of the surveillance economy's practices for self-determination and other democratic norms, the controversy made graspable concrete political consequences likely to emerge if the dystopic visions turn into reality. If it was in fact possible for

data analysts to determine voting behavior of US presidential elections voters, as certain public statements of Cambridge Analytica's CEO at that time, Alexander Nix, indeed suggested, this would substantially undermine democratic values. In this sense, the affair raised public awareness of the relationship between values of self-determination on the one hand, and the behavioral engineering power of the data-based surveillance economy on the other.

Our paper provides a science and technology studies (STS) contribution to the empirical analysis of said relationship. It does so by presenting a material-semiotic ethnography of a "health and fitness" platform (runtastic.com) that promises its users to provide them with agency to develop self-determined subjectivity and to become a different bodily self. The promise of becoming a "fitness subject" takes to (corporeal) extremes the historical west's core value of subjective self-control.

How does this promise relate to the platform's sociotechnical practices and structurations? Answering this question will allow us to specify the relationship between data-based subjectivities and surveillance economies insofar as the platform under investigation forms part of the latter. How does the modern value of self-determined subjectivity intersect with economic value generation? How do market logics associate with communal ones?

To deal with these questions, we will firstly introduce shortly Quantified Self (QS) practice as an area of research that is particularly well suited when it comes to investigating empirically into the relationship between data-based subjectivities of self-determination and value creation in surveillance economies. Next, we will present the ethnographic strategy that we pursued by orienting our research towards Christine Hine's (2015) approach of "Ethnography for the Internet", moving deliberately "slowly" through this fast-changing Big Data environment. We will then proceed to the core of our analysis and present insights produced at five different "entry points" into the platform constellation: a situational map of the socio-technical network; a sequence analysis of the subject appellations at the front-end; an autoethnography of the usage practices; a technical app analysis of the material structuration of data flows induced by the device; and an analysis of the targeting strategies pursued at the back-end. By setting the material-semiotic findings into relation to each other we will analyze how the algorithmic structuring of the platform's data flow allows for the data-based translation of 'subjectification' agency at the front-end into 'objectifying' agency at the back-end.

Keywords: Datafication, surveillance capitalism, data-based subjectification, platform studies, data protection

Session 7: Humans & machines in healthcare contexts: interdisciplinary perspectives

Chair: BRUCKSCH, Susanne[1], GRÜNEBERG, Patrick[2], SASAKI, Kaori[3]

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Sustaining healthcare in Japan's regions by ICT-based telehealth networks

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Japan faces developments such as rapid ageing, rising healthcare costs and labour shortages, particularly among healthcare workers. Against this backdrop, some local communities and regions have begun to introduce telehealth networks to link local healthcare institutions. These networks have also been introduced to promote the establishment of "Regional Integrated Healthcare Systems" and to generate synergies between medical and long-term care regarding personnel, services and infrastructure. This leads to the question: what benefits and challenges can actually be observed regarding telehealth networks from the perspective of peripheralisation? Moreover, how do information and communication technologies (ICTs) influence the provision and practices of local healthcare in Japan's regions? The paper refers to the theoretical concepts of peripheralisation developed by Manfred Kühn (2015) and of socio-spatial-digital proximity in telecare developed by Nelly Oudshoorn (2011). I present findings from two cases of a telehealth network introduced in regions confronting peripheralisation regarding the provision of and accessibility to healthcare services, namely the ism-Link network of Iida City and Shimoina District, Nagano Prefecture, and Fukui Medical Net. More precisely, the data stem from an interview study and on-site visits conducted in 2017. Overall, the findings suggest that the telehealth infrastructure is a necessary precondition, not only to promote but also to initiate collaboration between healthcare institutions in order to realise a regional healthcare system. We also can observe a shift from in-patient treatment in hospitals to an increasing share of aftercare at home employing ICTs. Against the backdrop of a rapid ageing society, this approach is favoured under the frame of containing healthcare spending, managing the shortage of healthcare staff, reducing travel burden of, and preserving autonomy of, particularly for elderly patients.

Keywords: Telehealth, telemedicine, regional healthcare, peripheralisation, digital proximity

A comparison of past and current ethical and social debates on AI and its contribution to a better understanding of concerns regarding recent applications of AI in medical diagnostics

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At present, there is a great deal of controversy, not least in the mass media, about digitization in general and the use of artificial intelligence (AI) in particular. Regarding the omnipresence of terms like 'Big Data', 'Smart Technologies' or 'Internet of Things', their association with basic considerations on AI and its undergone more than 60 years of development is often not obvious.

One of the hypotheses underlying our contribution is that a closer look at the historical development of AI can provide insights into the state of technological development at a given point in time and the corre-sponding underlying objectives as well as the ethical and social questions arising from it. Potentially expectations of the approach lie in the identification of changing paradigms relevant to research and guiding technical developments, which to this day can be understood as drivers of epistemo-logical, anthropological and ethical debates. Such insights can contribute to a demystification of the underlying technology of AI and substantiate as well as bring objectivity to a partially normatively charged and very emotional debate.

Although historical AI-precursors were usually realized technologically quite differently than current systems, they raise comparable normative questions. In particular, the question of responsibility for the consequences of AI-supported decisions or even decisions made by AI systems is controversially discussed. However, the problem of responsibility is exacerbated by the technological foundation of modern AI systems: While expert systems of the 1970s and 1980s were essentially based on symbol processing and the explication of medical knowledge as rules, contemporary AI systems consist almost exclusively of neural networks that are prepared for their task by training on known data. What exactly happens in the neural networks and how they solve their tasks usually remains opaque. However, the lack of knowledge of how AI-supported decisions are made raises the question of responsibility in a new and intensified way.

Therefore, taking advantage of a thorough analysis of former debates concerning AI and the normative and social questions it raises might contribute to a better understanding of current debates. In this contribution, the historical lines of development are to be traced and compared with current methods. However, the focus will be on documenting the various non-technological debates about AI systems using the example of AI-supported medical diagnostics and identifying the various stakeholders. It is assumed that this can help to describe the various interests in more detail. Such an analysis should help to provide initial insights into the normative landscape, which could help to formulate ethical guidelines for the use of AI-assisted medical diagnostics. In principle, however, the contribution proposed here is not about deriving moral norms from ethical theories, but about empirical access to normative debates.

Keywords: Digitalization, history of AI, medical diagnostics, stakeholder interests

How do healthcare practitioners use incident reporting systems to improve patient safety in Japanese hospitals? A qualitative study

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The regulation of risks to patients has come under severe scrutiny in many advanced economies since the late 1990s because of several scandals and an increase in the number of litigations. Japan is no exception, and attempts are reform have been made over the last twenty years (Hirose, 2016). One example is the collection of incident data by a third-party organisation (Hirose et al., 2003). However, the self-regulation model of healthcare practitioners remained almost intact, with some adjustments concerning accountability and transparency.

Nationally, the Japan Council for Quality Health Care (JCQHC) manages the Web-based reporting system and collects data associated with serious untoward events and incidents, provided on a voluntary basis. Between January and March 2018, the JCQHC collated 1,088 adverse events and 209,874 incidents. While the JCQHC collects incident data at the national level, many healthcare providers use its reporting and learning systems at local level. Therefore, it is safe to say that online-

based incident reporting systems are now well established in Japan and elsewhere as an integral means to avoid preventable adverse events and improve the quality of care.
Despite the emphasis on incident reporting as a source of learning, there has been little research into how Japanese healthcare practitioners use the system and data to address weaknesses in processes and produce safer care, in particular how frontline staff perceive their actions (inputting the data) and interactions with the 'machine' (learning about and from the online incident data management system).
To investigate this, the study has been conducted in two Japanese hospitals (one acute care and one mental health hospital) by a group of patient safety researchers, utilising two methods (semi-structured interviews and ethnographic observations of incident review meetings). The 3-year study is focused on how organisations and clinical teams currently learn from incident data by tracing the life-cycle of the data within its reporting system. While the number of incidents and near-misses reported increases, hospital staff and the regulator do not know how effectively the lessons are communicated and learnt. In particular, little evidence exists to demonstrate how hospital staff discuss incidents, decide on solutions and then communicate and coordinate their actions with other units within the organisation.
The principal investigator previously conducted a study in the UK hospitals, and devised indicators of analytic process effectiveness (Anderson & Kodate, 2015, p.112). This present study has employed the same indicators and the team observed incident review meetings in Japanese hospitals, seeking to understand the interface between healthcare practitioners and the incident data system in an acute care and mental health hospital.
The paper focuses on preliminary findings from this study, with a particular focus on perceptions around the usefulness of an incident data system and its interactions with different professionals. Adopting a universally recommended systems approach, this interdisciplinary study highlights the importance of different cultural contexts and settings, when examining human-machine interactions in healthcare.
This research is funded by the Japan Society for the Promotion of Science (10101-11-2201-A-0001).
Keywords: Patient safety policy, incident reporting, healthcare, professional autonomy, organisational learnIng

Empowerment, enhancement and cyborgization –ethical implications of heterarchic human-machine relations in the robotic rehabilitation system HAL (Hybrid Assistive Limb)

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Converging technologies have a particular impact on healthcare technologies when considering human-machine interaction. One field is robot-assisted rehabilitation where numerous devices are used for supporting rehabilitation of impaired body limbs. A particular case is the exoskeleton robot HAL (Hybrid Assistive Limb). As other exoskeleton robots, it is successfully commercialized and used in several countries. However, the HAL system shows a unique feature: it establishes an interactive unity with its user in that it integrates into human agency and directly connects to volitional efforts to move the body. Whereas in case of other available exoskeletons the patient is being moved by the robot according to predetermined kinematic patterns, HAL follows the patient's intention to move, i.e. the gait-impaired patient controls HAL voluntarily and is thereby empowered to walk again. This feature is the result of the Cybernics approach that proposes cyborgization for the sake of human empowerment.

Corresponding ethical considerations usually concern the condition of impaired humans and potential risks regarding patient's dignity. This leads to discussions about the alteration of human nature and personal identity through machines. Another thread concerns borders between medical treatment and enhancement. These risk-oriented discussions (as well as the common engineering methods) rest on an individualistic conception of human-machine relations according to which human and machines are basically considered unrelated individual entities. Based on a strict hierarchy that prioritizes humans, both interact with each other occasionally.
In contrast, the engineering and related ethical approach of Cybernics employs a basically different conception of human-machine relations. Contrary to the individualistic conception, a relational approach departs from an intrinsic relation of human and machine. Following a heterarchic design, both stand in a twofold relation. Horizontally, human and machine are considered counterparts so that the latter are not primarily considered a threat to (impaired) humans. Vertically, human being enjoys priority over the machine in order to secure human autonomy and to foster human empowerment. It is thus part of the cognitive design process to consider human autonomy as the basic requirement for enabling empowerment, i.e. if the technical design did not secure human autonomy, then the device would not fulfill its function. The ethical question is then whether it is possible to safe patient autonomy sufficiently by means of this heterarchic design of an interactive unity of human and machine. Or: are "built-in" ethics feasible?
This talk investigates the relational approach as an alternative framework to the common riskoriented approach. First, I will introduce "Society 5.0" as the developmental framework of Cybernics and the cognitive design of the HAL system. Second, I will analyze the "built-in" ethical stance of the Cybernics approach as a "capability-oriented" conception of human-machine relations. Third, I will evaluate the scope and limitations of this built-in ethical approach regarding (a) cyborgization and (b) the relation between empowerment and enhancement.
Keywords: Empowerment, enhancement, cyborgization, human-machine interaction

Japan's experiences in integrating technology and long-term care - practical challenges of collecting daily-data using tablets among family caregivers of community-dwelling older adults with long-term care needs

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Under rapid increases of super-aged generations with fewer children, introducing technology in long-term care settings is expected to solve issues in Japan, such as financial challenge to maintain current social security system, a shortage of human resources to support older adults, or unceasing caregiving burden among family and professional caregivers. However, the society faces practical challenges to introduce technology in long-term care settings. One example is to measure longterm care situations in order to manage caregiving burden. The ability to understand variety in caregiver burden and caregiving activities has been limited by the reliance on data collected in periodic interviews.
This study practically and academically examined the collection of micro-longitudinal data on caregiving burden and care experiences, and discussed challenges to pursuing daily survey among caregivers, as well as key factors to promote integration between technology and long-term care.
We developed the Caregiving Visualization Project toolkit (Care VIP), a touchscreen-based software program for tracking on a daily basis components of care experiences such as care task of Activity

of Daily Living (ADL) and Instrumental Activity of Daily Living, Zarit caregiving burden, as well as caregivers' health and behavior domains including sleep. In May, 2018, we recruited three-month study participants, who provide instrumental help to older (65+) community-dwelling family members, through referral from different long-term care service providers. Participants accessed the Care VIP every day by using tablets. We interviewed 10 study participants to examine challenges of reporting their daily care experiences using tablets among family caregivers. Nine of the interviewee were female. One provided care for both parents. We had modified questions to evaluate daily psychological burden and satisfaction, but participants still reported some of the questions, such as those regarding caregivers' social life limitations, did not change daily.
Challenges of reporting daily care experiences were also tracking daily care provision time, such as defining caregiving task and their own housework and unchangeable some IADL task. Participants de-emphasized the importance of accumulating information of their long-term care experiences. Usability of the technology tools and recognition of the benefit from technology introduction could resolve challenges of integrating technology and long-term care.
Keywords: Assistive technology, long-term care, family caregiving, daily-data, long-term care information

Robots vs immigrants? Pepper and the human future of Japanese institutional eldercare

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Like many aging post-industrial societies, Japan faces a large and rapidly growing care labour shortage: the Ministry of Economy, Trade and Industry predicts a shortfall of 377,000 carers by 2025. A commonplace assumption is that the country has a binary choice that will shape the future of its institutional elderly care provision: increase the number of immigrant carers, or use robots and other emergent technologies to substitute for human carers. This paper, based on data from 7 months of ethnographic fieldwork at an elderly care home in Japan that was introducing three different types of care robot including SoftBank's Pepper humanoid robot, argues that this binary framing is an illusion.
While such robots may have been intended by politicians and engineers to solve Japan's care crisis by replacing human carers, the reality of robot use makes this highly unlikely in the foreseeable future. The introduction of these robots serves to reconfigure care – increasing the amount of (often less visible) work tasks for human carers, deskilling aspects of human care, and increasing the costs of care. Though unlikely to help address labour shortages, by reconfiguring care such robots may facilitate the introduction of immigrant carers by helping overcome linguistic and cultural barriers, at the cost of further precaritising care work. These findings are significant beyond the case of Japan, as other countries rush to develop similar care robots, and as Japan seeks to globalize its care robotics industry.
Keywords: Robots, eldercare, Japan, Pepper

Can assistive technologies improve quality of life among older people and professionals in care facilities? Investigating the impact of monitoring and communicative robots in Japan

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The potential benefits of ICT and assistive technologies (ATs) in health and social care have been discussed and widely highlighted in the public domain. While evidence began to be reported on the effects of robotics-aided care on older people, the impact of using ATs in care settings has not been sufficiently evaluated, particularly experience and perceptions among older people and care professionals.

This paper aims to combine findings from two separate studies, which the authors have recently conducted in Japan. The first study was a multi-centre, quasi-experimental project which investigated the impact of communicative robots on older people living in nursing homes. The findings have already been published (Obayashi, Kodate and Masuyama, 2018a, b). On the other hand, the second study was designed to examine the impact of communicative robots with infra-red radiation monitoring and alert functions on care professionals in one single nursing care facility.

For the first study, a total of sixty seven people aged 65 and over were recruited from six nursing care facilities in Japan (sixty females and seven males; aged 86.1±19.9 years). The International Classification of Function, Disability and Health (ICF) framework was employed to standardize the method of measuring the impact of communicative robots, when compared against usual care, on older people's activities and participation in residential nursing homes. The participants in the robot intervention groups showed greater improvements in their scores for targeted activities and participation, in comparison with the control group. Significant improvements were observed primarily in communication, self care, and social life.

For the second study, communicative robots were introduced to a nursing home (with thirty eight beds) in Tokyo. The robots had infra-red radiation monitoring and alert functions. The effects of communicative robots were quantitatively measured before and during the eight-week intervention period, with the participation of five care professionals. The participants were in charge of late-night work looking after twenty older people. Psychological stress was evaluated using the checklist for measuring subjective symptoms. Post-intervention interviews were conducted with sixteen care professionals eight months later. Reductions in the level of anxiety and discomfort were observed, and the total level of fatigue decreased ($p < 0.001$). The monitoring and alert functions were highly valued by the participants.

A communicative robot with infra-red radiation monitoring and alert system showed great potential for improving older people's quality of life by encouraging them to be more active and socially engaged. In addition, the introduction of a communicative robot with infra-red radiation monitoring and alert system lessened the psychological burden on care professionals working night shifts, and resulted in improvements in care systems as a whole. While these studies suggest a positive impact by robotics-aided technologies, the paper also highlights some of the challenges and future questions that we need to address to ensure that ICT solutions can provide better care for older people and working conditions for care professionals.

These studies were partly supported by the Japan Agency for Medical Research and Development and the Japanese Council of Senior Citizens Welfare Services.

Keywords: Assistive technologies, quality of life, gerontology, healthcare, robot, gerontechnology

Session 30: Knowing, Governing and Digital Technologies

Chair: WIESER, Bernhard, DAYÉ, Christian

TU Graz, Austria

Price for a life: A genealogical analysis of data-driven market governmentality

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My paper is an analysis of an emerging mode of governing people based intensive data mining of personal data on people's health, life course, use of health and social services, education, and social factors like age, sex or marital status collected in public registers and databases. I focus on a plan and proposition, presented in Finland in spring 2018, that a prospective price, i.e. an estimation of the future costs of the person's health and social services based on a personal risk assessment would be calculate for every citizen, with help of data mining of public register data.

In my paper, I trace political, epistemic, and technological sources, or lineage, of a data-driven political technology (Foucault 2001) described above. I ask what elements of Nordic (post)welfarist health and social policy, of extensive collection, storage and appropriation of personal data in public health, social and other registers, and in adoption of advanced digital technology have made an idea of setting personal price of living – in fact, a derivative price – for every citizen possible and even reasonable. In particular, I examine the changes in rationales and practices of the maintenance of welfare state data infrastructure, and the relationship between advances in digitalization of public health and social services and an expansion of neoliberal policy mode I call 'market governmentality' (Helén 2016). I also discuss how modes of 'being biopolitical' (Foucault 1976; Isin 2002) are being modified when people as populations, risk groups and individuals are subjected to intense data mining.

Keywords: data mining, public databases, health and social services, post-welfare state, political technology, data subjects

Sociology of the digital transformation: Re-thinking the human use of technology

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Human-Computer Interaction can be considered as the first interdisciplinary research field which aimed at putting the user in the focus of technology development. It evolved out of an understanding that technology needs to be developed for humans, in other words with keeping the end user in mind or even in the system development process. However, the current process of the so-called digital transformation causes a bigger paradigm shift not only in the way how end users interact with technology, but also in the world we are creating with and through technology. The novel research field of Digital Sociology evolves. Sociological studies on empirical aspects of digitalisation such as hacker cultures, computer supported cooperative work and online forums already developed in the early 2000s. Similarly, the discussions on digital methodologies for Sociology is already ongoing for two decades. In other words, one could say that a "Sociology of the Digital" is already existing. However, I argue for a Digital Sociology as a Sociology on Digital

Transformation. Nowadays a split between technical and non-technical actions is no longer possible besides on an analytic level. For instance, the internet changed, it so no longer a pure communication network between computers, but a network of very heterogeneous, such as robots, software, humans, trivial machines, vehicles, viruses etc. Moreover, data has changed. Data is no longer something sociologists just systematically collect in designed empirical studies. Data is a side-product of everyday actions of users who are mostly not even aware of the fact that their actions are constantly observed, recorded, and even traded as big data. Due to these developments the digital transformation entered all our life-worlds and therefore needs to be studied beyond a technology development process. I argue that the digital transformation we are experiencing is giving sociologist the possibility to enter a field of co-shaping technology and society going beyond a critical reflective stance of technology usage. Typical research in this field could be ethnographic studies consisting of interviews, observation, video diaries and other participatory techniques in order to understand the everyday social practices of technology usage. The important aspect of these studies would be not to isolate the digital out of its context, not only its context of use, but also its social context. Similarly, in a first step the aim of a Sociology of Digital Transformation should not be to generalise, but to understand and describe the diversity and the socio-cultural differences and contradictions. In my talk I would like to view some of my Human-Computer Interaction studies through a "Sociology of Digital Transformation"-lens. The exemplary studies were performed in the context of robotization in Industry 4.0 and elderly care, as well as a research agenda for exploring AI systems in the home context.

Keywords: Human-computer interaction, digital sociology, digital transformation

The promise of algorithmic governance

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For at least two decades, methods of algorithmic control and governance of public services have been expanding. It is becoming increasingly clear that this type of control also has problematic consequences for regulation, which are widely critically discussed (esp. opacity, selective performativity, bias; cf. Brauneis & Goodman 2018; Burrell 2016; Gillespie 2014; Introna 2016; Kitchen 2014, 2017; Kropp 2018; Sadowsky & Pasquale 2016). Nevertheless, in media texts and interviews a predominantly positive perception of the control performance of algorithmic systems is expressed, e.g. with regard to the transparency, objectivity and efficiency that can be achieved with them. As suggested in the call, therefore, it is indeed time to gain a deeper understanding of the ambivalences of algorithmic governance and their assessment. In my proposed paper I would like to deal with the question in particular, "what are the conditions for the legitimacy of algorithmic governance in the 21st century". For this purpose, I start from the results of several research projects in my field of work at the University of Stuttgart, which have so far only been compiled unsystematically: They suggest that the sometimes unrealistically high expectations of algorithmic governance and the exaggerated visions of its future benefits in solving social problems are related to the following core beliefs: Algorithmic decision systems are superior to human decision making due to the human decision system's susceptibility to errors and arbitrariness. In the face of growing complexity and opaque interdependencies (of LTIS), they alone acquire an orienting classification ability that enables efficiency and optimization through the determinability of the indeterminable. Their results will be perceived as mathematical-technical and therefore do not need further legitimation. The further implementation of algorithmic control also appears inevitable because a) it is seen to be promoted worldwide as a global cross-section technology („if you're not there,

you're gonna get hung up"), b) new possibilities of use are constantly emerging within the framework of a relational unfolding of collaborative cyborg-swarm-agencies, as unpredictably many outputs from multiple inputs, c) it is not regarded as a (static) artefact, but as an increasingly intentional and intelligently interacting counterpart and d) it fits seamlessly into the decision-making logic of economic rationality as a central narrative of the present.
It will be discussed which momentum is associated with this social ordering in the digital age.
Keywords: Algorithms, governance, promises, social ordering, machine learning

Coding, valuing and knowing: Intersections in the practice of programming

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Throughout the 1990s and 2000s, laboratory studies provided a key approach to analyse the dy namics and interrelations of valuation and knowledge practices in the natural sciences. Latour's take on Pasteur's roads from the fields of Puilly-Le-Fort to his laboratory and back showed how knowledge practices are threatened and re-established through value practices (Latour 1988). For example, the value practice of isolating and cultivating the anthrax bacteria in the laboratory enables both the hybridization of Pasteur and the bacteria. It also re-divides subject and nature outside of the laboratory as the basis for knowledge production.
This dynamic of an "immutable mobile" (Latour 1986) is not traceable anymore when it comes to highly computerized scientific methods. Therefore, we argue in our paper that with the advent of computerized scientific methods like computer simulations or artificial neural networks, a clear distinction of knowledge and valuation practices becomes more and more questionable. A key factor for this growing indifference of knowledge and valuation practices is the practice of programming itself. Transforming a scientific model into a programming language is not restricted to an adoption of the knowledge implemented in the model through the programmer. Like in the case of complex climate models, the programmer has also to interpret the model in order to adjust it to the structure and limitations of the programming language. Additionally, the programming process behind computerized models highly depends on the use of libraries – that means, standardized pieces of code that structure the scientific and the computer-specific data (e.g., for the visualization of the results) which are themselves an interpretation in this sense. In other words, the ascribing of value to a computerized model highly depends on knowledge resulting from the practices of programming – which are always recursive.
At the same time, these valuation practices within computerized methods influence the knowledge practices of the scientists who use those methods. The new knowledge representation which was made possible by the computerized methods may – and should – also lead to new knowledge which is limited however by the capabilities of the methods.
In the light of these developments, programming is central for the modes of distinction between valuation and knowledge practices in highly computerized sciences. Although approaches like the ethnographic code studies have extended the methods of laboratory studies to the social dimension of programming (e.g. Sundberg 2010), they did not pay enough attention to the impact of code itself.
On these grounds we developed a new form of code analysis and corresponding software-tools in order to understand these interacting factors within the code.
Keywords: Code studies, methodology, programming, computational science, digital research

STREAM: Sustainable and innovative public procurement & ecodesign

Session 10: Food water energy nexus and sustainable urban governance

Chair: WILHELMI, Olga[1], SARZYNSKI, Andrea[2], GOSZCZYNSKI, Wojciech[3], SUCHOMSKA, Johanna[3], WRÒBLEWSKI, Michał[3], NICHERSU, Iulian[4], BOZAGIEVICI, Raluca[4], TYE, Mari[1], HOEL, Paige[1], LABORNGE, Pia[5], WENDEL, Jochen[5]

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SUNEX approach for addressing the FWE-nexus and its proposed policy guidelines to support sustainable urban governance

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Forum that aims to address the emergence of urban FWE-nexus. SUNEX establishes a conceptual approach supported by an integrated modelling framework to assess the demand and supply sides of the FWE systems at the city-region scale. Innovation lies in the techno-economic optimization at the intersections of FWE supply chains and the analysis of selected nexus-effects to optimize their related synergies among the FWE systems. The aim is to formulate long-term sustainable urban FWE strategies in respect to future socio-economic and technological development and the prevailing environmental constraints and policy regulations of the city-region. The concept defines a set of indicators related to the SDG's 7, 6, 11, 12, 13 to monitor the sustainability of the formulated strategy that relies upon realising inclusive solutions among the three FWE systems, with particular emphasis on capturing the nexus-effects of FWE and making their synergies more impactful.
This coherent and inclusive perspective is essential for supporting the transition of urban planning from the silo to the integrated approach. Cities worldwide are developing long-term sustainable visons based on integrated approach to ensure inclusive and sustainable urban development. Following this spirit and to ensure wide applicability of the SUNEX concept, SUNEX solutions will be developed in the cities of Berlin, Bristol, Vienna and Doha reflecting different socio-economic, climatic and political characteristics and addressing local and remote resource uses among the FEW

supply chains. The developed sustainable FWE-strategy applies a co-creation process integrating the relevant stakeholders via the different stages of the process of visioning, scenario development and the KPIs-based monitoring of the results achieved.
In line with the long-term city vision and in co-design with local stakeholders and urban policy-makers (with emphasis on the FWE systems), the future development of city-region FWE demand and supply will be projected from the current situation and based on consistent scenarios reflecting future socio-economic and technological development of the city-region. The applied co-creation process involves relevant stakeholders and decision-makers through the process of scenario construction and the provision and processing of the required data. The results of the developed scenarios are checked and monitored in an iterative process implying the key stakeholders and decision-makers. Finally, the sustainable FWE-strategy is formulated and presented to the local urban governance of each of the 4 city case studies. Based on the outcomes of the case studies and the lessons-learned during the whole development process, policy guidelines for the design of sustainable urban FWE strategies and governance of urban areas will be formulated.
SUNEX supports a P2P learning process integrating the the best practices among the 4 cities (Berlin, Bristol, Doha and Vienna) taking into consideration their prevailing regulatory aspects. Nevertheless, SUNEX aims to provide a generic perspective for its developed policy guidelines. In its final construct, it seeks to include recommendations and directions towards replication plan applicable for fellow cities and urban areas taking into consideration the derived KPIs and their links to the considered SDGs.
Keywords: FWE-Nexus, sustainable urban development, optimization of synergies between FWE systems, policy guidelines for designing FWE strategies

The importance of nexus approach to water-energy-food security for transitional and resource-rich countries

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Water scarcity is increasing as demand for water intensifies with population and economic growth especially in transitional and resource-rich countries (e.g., China, Russia, Azerbaijan, Kazakhstan, Turkmenistan, and Uzbekistan). Challenges in securing enough water for energy, energy for water and water for food will increase with population, economic growth, intensive agriculture development and climate change. However, current energy planning in these countries is often made without considering changes in water availability and quality. For example, as part of its commitment to become one of the top-30 developed countries, Kazakhstan has a target of increasing the share of renewables and alternative energy sources in power generation to 50% by 2050. This greatly contrasts with the current situation, where around 90% of electricity is produced from fossil fuels. To achieve the target, the introduction of between 600-2000 MW of nuclear power is expected by 2030. This would impact water resources, already under stress due to significant losses, heavy reliance on irrigation for agriculture, unevenly distributed surface water, variations in transboundary inflows, amongst others. Using nexus scenario generation Foreseer Tool, this study presents the integrated analysis of the water-energy-food systems in transitional and resource-rich countries and investigates the current and future water resource availability to support transition from high to low carbon energy system.
Keywords: Water, energy, food nexus

FWE nexus in three cities. A governance analysis

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The paper will present results of the SUGI Nexus project "Creating Interfaces" (JPI Urban Europe and Belmont Forum, 2018-2021). It will concentrate on the analysis and comparison of the food-water-energy nexus governance structures in the three study areas in Wilmington (USA), Słupsk (Poland) and Tulcea (Romania). In each case study we analysed existing documents and conducted in-depth interviews with a diverse group of stakeholders. Firstly, we mapped the structures of nexus subsystems, especially: main institutional actors (public and non-public), policies, levels of governance. Secondly, we analysed connections and relations between subsystems.
In our paper we will present an overview of the comparative analysis of our three case studies. In finding the similarities and differences we are particularly focusing on: 1) level of integration of the nexus (do subsystems tend to work separately or are there any attempts to link them together? what are the barriers and opportunities for integration?); 2) institutional self-identification (are actors involved in governance aware of the existence of the connections between the subsystems?); 3) role of data governance practices and data infrastructures in each subsystems and the nexus as a whole (how, why and what kind of data are collected govern subsystems? do data flows connect the subsystems?); 4) spaces for civic participation (do citizens have influence on governing the nexus?).
Keywords: FWE nexus, data infrastructures, governance analysis

Designing for multistakeholder analysis of tradeoffs in water-energy-food nexus.

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The growing urban populations and economies in rapidly-developing countries inevitably lead to increased demand for water-energy-food (WEF) resources. Diverse interests regarding these resources among the stakeholders from different sectors in urban and non-urban areas often lead to conflicts and misunderstandings. The lack of transparency and information concerning the consequences of the different uses of the WEF resources prevent sustainable solutions. Nexus approaches call for cooperation and coordination through identification of interconnections between these resources and developing an understanding of trade-offs between different alternatives, in order to identify solutions that are beneficial for all involved stakeholders (Liu et al. 2018). Effectively implementing such nexus approaches requires novel toolboxes enabling non-technical stakeholders (with differing goals, backgrounds and information asymmetries) to identify and analyze trade-offs in the WEF nexus.
In this contribution, we present an approach that allows a multi-perspective visualization and analysis of trade-offs between the often-conflicting WEF issues and policy options in a way that promotes a more holistic view and cooperative decision-making in multi-stakeholder environments.
The approach is informed by the theory of "perspective making and perspective taking" (Boland

and Tenkasi, 1995) that demonstrates how interaction and cooperation between members of heterogeneous “worlds of knowledge” can be supported. Specifically, the developed prototype allows different stakeholders to formulate, visualize and compare their perspectives with respect to various alternative solutions and reflected in indicators representing their real-world impact. It provides both a holistic view of the WEF issues, useful for stakeholders with non-technical backgrounds, as well as detailed information on specific issues for stakeholders with special interests.

By supporting both a single-sector as well as multiple-sector perspectives the visualization tool allows the stakeholders to identify the interconnections between the different WEF issues, encourages communication and decision-making and also builds trust and increases willingness to use such tools.

The visualization tool has been developed within the DAFNE project (Decision analytic framework to explore the water-energy food Nexus in complex transboundary water resource systems of fast developing countries) funded by the EU Horizon 2020 program. The DAFNE decision-analytic framework provides scientifically-grounded data, models and simulation of different solution alternatives for the WEF nexus in the project’s case studies (Zambezi and Omo-Turkana basins).

This data is translated and visualized in the multi-perspective visualization tool in a form suitable for non-technical stakeholders and cross-sectoral group interaction. The data and the models underlying the visualization tool have been obtained through the project’s participatory integrated planning approach (Castelletti and Sessa 2006), the main aim of which is to involve stakeholders representing various sectors and especially those coming from urban and non-urban areas early on in the design process.

In this contribution, we first describe the theoretical foundations, design goals and the participatory design process for the multi-perspective visualization tool. We then present the design and implementation of the current prototype and a preliminary evaluation of its suitability for supporting and stimulating the analysis of WEF trade-offs from a cross-sectoral perspective, undertaken with stakeholders from the Omo-Turkana basin case study.

Acknowledgements: This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 690268.

Keywords: Multi-stakeholder interaction, visualization, water-energy-food nexus, participatory design, sustainability

Session 11: STS - Design – Sustainability

Chair: EGGER, Stefanie

FH Joanneum Graz, Austria

Smart spaces – Towards a smart-spatial-nexus in urbanism

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Smart Spaces – Spatialized Smartness
Urban technologies (Information and Communication Technologies ICTs) are globally implemented in cities in order to meet current challenges such as urbanization, global warming, environmental pollution and scarcity of resources. Against the background of global digital and technological tendencies of the last two decades this paper discusses on an urban neighborhood scale spatial conditions and spatial transformation in public space.
In current Smart City (SC) literature the discourse is divided in two directions of thinking, one is technology oriented and the other is socially oriented. This young field of research is lacking the spatial dimension of the urban process of digitalization. This paper contributes to this research gap by systematically analysing the spatial interfaces and interdependencies between physical urban space and the digital technologies. The specific research object are international projects in the German speaking area. The goal is to identify spatialization delays (Verräumlichungsverzug) of digital technologies on the urban neighborhood scale such as postal logistic services or advancing car sharing opportunities.
Different urban SC projects with specific focus on the key fields mobility and environment are examined. All SC projects include technologies implemented in dense urban areas and in cities with more than 300.000 inhabitants.
As part within the PhD research the identified spatialization delays will serve for future urban planning in order to not only improve technological and social convenience but also to assure a robust spatial improvement of quality in public space.
Keywords: Smart city, urban design, public space, smart space, sustainability

Can emerging research in design benefit from STS?

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Although STS and design research have a lot in common, they are not commensurable. Due to their subjects and some overlap in methods it is worthwhile to discuss differences and complementary assets to allow both disciplines to learn and to benefit from each other.
First of all, the two disciplines at hand pursue different objectives. Design synthesizes sociotechnical arrangements. Social and technical qualities are interwoven in new ways in order to achieve new goals or to reach a certain objective more easily. In contrast, STS is investigating these very arrangements with the scientific goal of knowledge production.
However, over the last decades the discipline of design underwent some fundamental changes. The outcome of this transition is visible in many ways and the process is far from being completed. While becoming a scientific subject, the self-conception of design underwent a major transition

(Latour 2008). Design used to follow certain concepts and it also used to focus on material entities like objects, infrastructures, cities, interfaces and so forth. Function and clarity are examples for popular principles in design. With Rittel and Simon (1973, 1969) the way design approaches a problem has changed fundamentally. Processes orientated around norms and principles transformed into open investigations, design research became more and more important. Participatory design, critical design, infrastructuring are not principles, but ways to investigate in order to find good answers to what Rittel and Webber call wicked problems in design (1973). In a nutshell, the goals and the methods of design became open and contextual. This epistemological change drives design research and brings it much closer to disciplines like STS and sociology. The new role of surveys, interviews, observations and cultural probes in design are indicating this development.

Designs' tremendous step towards research allows it to benefit from insights that are broadly discussed in STS. In my talk I would like to point out how design might become more political, more creative and more reflexive by taking into account three insights from STS and Sociology:

- Law and Singleton point out for STS that the choice of a research topic is an entirely political issue (Law, Singleton 2013). Consequently, the choice of a design problem and a research question are both political and powerful.
- The social construction of technology (Pinch 84) makes it obvious that users are creative and self-determined co-designers of technology. The situational and creative potential of users can be mobilized for better design as Bredies (2016) shows.
- The difference between intended actions and their mostly unintended consequences is a credo in sociology. Digital and material objects are full of intentions, whereas the difference between intentions and results is still a rare topic in design.

STS went through many discourses that might be fruitful for the development of design research; the latter could benefit deeply from the rich body of work in methods and theories in STS.

Keywords: Design, design research

Re-visiting and re-entangling science, technology and society (STS): Constructing inclusive sustainability

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Reflecting social contract and inter relationship between science, technology and society, we have explored society as subsequent form of science and technology and examining the critical issues as well challenges resulted from STS tensions only after the science and technology is being deployed into society. Instead of understanding science and technology in relation with society or from the perspective of society we thoroughly have tried to explain science and technology as something which resulting as an impact on the society and practising a kind of relationship in that context as expressed in the STS literature. Neither society has been considered a centre as of science and technology nor has been attempted to construct whole model of science and technology in order to put society in a kind of relation within the context of it. As resulted, scientific controversies are emerging and STS becoming contested practice which is showing the gape.

A new phase in early 1990 towards the science and society relation was emerged to deal with science and technology associated risks and regulations which further became major concerned issue with emerging science and technology at large both for public and government and gave rise to the concept of citizen science in order to analyze Science, Technology and Society relationship in broader context.

As response to controversial scientific practices, the conceptual models of social implications of S&T, trust building, ethics, public engagement with science and technology, inclusive governance and majorly trending responsible research and innovation(RRI) have extended and manifested to the STS. By doing so, we are giving a balancing approach not aiming at inclusive approach.
Another tension in STS, science and technology is exerting largely influence on innovation. On one side, Responsible Research and Innovation and open science are promoting inclusive and public participatory approach. On other side, IPR settings to encourage innovation in order to protect invention which is against the notion public open domain of S&T. While discussing STS, despite severe efforts the attainment remaining illusive not inclusive. We need to identify the gape at the fundamental notion of domain if we want to overcome the challenges.
The study will bring an attempt to fill this gap by investigating the roots of STS. This article will empirically give an analogy to the scientific explorations by analysing the science, technology, society and sustainability at the threshold (bottom of the pyramid) equally giving importance to the each intermediate process(from science to sustainability) during the complete process of innovation(empirically investigated).As lagging behind in one of the intermediate process, may lead to the criticality of issues and disputes in the Science, Technology, society and sustainability.
Another gape in STS domain is that sustainability is not a challenge or not something which is to be achieved. It is a practice encompassing together with STS. The paper will also present a conceptual framework where sustainability is incorporated and intertwined with the Science, Technology and Society.
Keywords: Analogy, scientific exploration, inclusive sustainability, entanglement

The tacit dimensions of design

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Most of the countless interactions with physical objects that happen every day flawlessly dissolve in our usual behaviour, so we are hardly aware of these interactions. Brushing teeth, making a phonecall, eating, washing our hands, driving a car, riding a bycicle, using public transport, working on a computer, writing texts – the only occasions when one of these interactions surfaces in our conscious awarenesss is when the interactionis either unexpectedly joyful or when there is an interruption in our intended flow of actions: a bottle seems impossible to open, anautomatic door does not slide open as expected, I can not operate the elevator because I am carrying groceries in both of my hands, buying a ticket at the ticket machine is so complicated or takes so long that I miss my bus. Most of the time the user knows what she isexpected to do with certain objects, she can read the Affordances (Norman1988, Gibson1973) in her surroundings. But how is this kind of communication possible? How come I seem to understand what things are trying to tell me? In my dissertation Iwanted to show on the one hand how these Affordances are designed into objects, on the other hand this concept needs the responding human being to be able to read or perceive what things are able to tell us. Therefore, ways of knowing and forms of (tacit) knowledge are of great interest for these questions. How is knowledge “distributed” between objects and users? And last, but not least, I will discuss the possibilities for and responsibilities of designers, who are able to design that process of „Translation“ (Latour). As objects and users seem to configure each other, this approach enables also discussions about implications for design for sustainable behaviour.
There search process drew on the concepts of Grounded Theory (Strauss et al.1970, 1994). 19 interviews were conducted with designers from London, Vienna, Graz and Salzburg. Complementing this research, I collected observations, short videos and photos of everyday

interactions that would help me discuss certain aspects of the phenomenon under investigation. In the end, all the material was once more revisited and processed into a quite unusual shape: a virtual exhibition on “Implizite Vermittlung”, taking place in a conceived room enabled me to convey my findings and allows for further insights.
Questioning our everyday interactions and how they influence our behaviour, especially as far as sustainability issues are concerned, is important for designers. However, trying to understand the fundamental mechanisms of how the communication between humans and things actually happens is essential for everyone who is designing in the broadest possible sense of the word. By conceptionally grasping such an intangible but astoundingly common everyday phenomenon, I aim to facilitate fellow designers of all fields with conceptual tools that allow them to better think about, talk about and argue their work.
Keywords: Design, science and technology studies, tacit knowledge, everyday objects, perception and design, interface, Implizite Vermittlung, forms of (tacit) knowledge, sustainability

STREAM: Towards low-carbon energy and mobility systems

Session 12: Towards a second stage of energy transition? - Socio-technical dimension of sector coupling

Chair: KEMMERZELL, Jörg[1], NEUKIRCH, Mario[2]

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The governance of sector coupling. Challenges of inventing the second phase of the German "Energiewende"

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From a technical perspective, sector coupling or sector integration (i.e. the coupling of electricity, heat/cooling, mobility) has become one of the central topics regarding the transformation of energy systems. The increasing share of renewable energies in the energy mix, coupled with obvious problems in achieving the energy system transformation goals formulated in the German government's energy concept, have triggered a broad discussion about suitable policies and instruments for the appropriate governing of sector coupling. While the expansion and integration of renewable energies in the electricity sector can be described as the first phase of energy transition, the increasing use of technologies for direct electricity use in the fields of heating/cooling and mobility indicate the transition to the qualitatively different second phase.

From a governance perspective, we can identify specific problems of coupling of the different sectors. Already in the 1970s, Renate Mayntz and Fritz Scharpf (1975) drew attention to coordination problems arising from the coupling of at least two different arenas. Scharpf describes these as "interaction problems". In his typology of policy problems, these form the most complex type, since they require simultaneous coordination of both territorially as well as topically differentiated units. With regard to the energy transition, this means: 1) The control of the expansion of renewable energies represents a "level/standard fixation problem" (which concerns the amount of produced goods), which can be solved relatively easily by distributive instruments. 2) Network expansion, on the other hand, is a "distribution problem" more difficult to solve, insofar it involves a territorially differentiated distribution of the costs and benefits. 3) The requirements for the governance of sector coupling fulfil the characteristics of "interaction problem". This raises the question of suitable institutions and instruments that can enable "problem solving" under the condition of twofold differentiation.

The paper aims to overcome the focus on the technical dimension of sector coupling and to develop an analytical political science approach to the topic. For this purpose, I will firstly present the characteristics of sector coupling as a transition to a second phase of energy transition. Secondly,

sector coupling will be modeled as an interaction problem. Thirdly, I will discuss possible governance strategies of sector coupling against the institutional background of the German multi-level system and, fourthly, examine the potential of institutions in the field of coupling energy and mobility (National Platform Electro Mobility, National Platform Future of Mobility) to initiate governance capable of problem-solving.
Keywords: Energy transition, Energiewende, sector coupling, governance, policy coordination

Observing converging infrastructures

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Energy Transitions around the worls are a multi-layered sociotechnical projects, which challenge and transform established patterns of technology, business and behaviour in electricity supply. Moreover, transitions seems to enforce the convergence of future infrastructures. Sector coupling has become a prominent case in that regard.
Those processes are often considered as the solution to society´s manifold problems, e.g. reducing CO2 emissions, circumvent resource scarcity, substituting dangerous technologies and avoiding hazardous waste. However, every new technological solution creates new problems. These problems cannot be reduced to merely technical, or to merely social variables. Instead, large infrastructures can be conceived as “a linked series of sociotechnical problems” (Paul Edwards). These problems need constant attention, because they cannot be solved permanently. Moreover, the problems mutually influence each other, and changes in one dimension cause permutations in the others. The concept of “sociotechnical problems” provides a comprehensive perspective on the energy system at large and therefore a way of recognizing consequences and interrelations of interventions.
Drawing on STS-concepts and System Theory this paper aims to develop a new way of system thinking: Rather than relying on conflicting definitions, the focus is on ‘reference problems’ which many disciplines can relate to with their own theories and methods. Hence three types of sociotechnical problems are distinguished according to their respective dimensions:

- In the structural dimension, the problem of control despite increasing complexity: More elements and relations can lead to emergent behaviour of systems, networks of systems and networks of networks.
- In the institutional dimension, the problem of change despite the need for stability: An overall loss of orientation should not occur whilst de-stabilizing institutions, unlearning proven knowledge and deviating from routines.
- In the operational dimension, the problem of uncertainty, in order to remain actionable despite non-transparency; There is an increasing discrepancy between ‘simple’ interfaces and complicated technological realities in the background.

The usefulness of the approach will be tested on the case of “sector coupling”, that is the convergence of energy, transportation and heating in future infrastructures.
Keywords: Sociotechnical Problems

Analysing expert networks in the climate-, energy-, mobility- and consumernexus

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In the course of the German “Energiewende”, energy policy has increasingly been seen as situated at the nexus between climate, mobility and consumer policy. The ‘double nexus’ between both ‘neighboring’ policy fields and the different worlds of policy, business, science, and civil society is now at the core of policy debates, notably the debates around the ‘sector coupling’. At this ‘nexus’, actors find themselves confronted with complex knowledge and coordination problems: problem frames are contested; knowledge on innovation paths is fundamentally uncertain; and the interactions between technical infrastructures and social actors operating on different spatial and temporal scales are highly complex.

Against this background, it is increasingly being brought forward that ‘nexus-expertise’ not only has to be scientifically valid, but also politically relevant and legitimate. ‚Nexus Expertise‘, it is being argued, has therefore to take into account a broad range of problem frames and knowledge claims, and to involve heterogeneous actors.

In response to this discourse, we can observe a gradually changing and increasingly differentiating landscape of ‘policy expert arrangements’ (PEAs) organized around the climate-, energy-, mobility, and consumer nexus in Germany. Classical formats of science advice, such as expert commissions and scientific advisory boards, come to be supplemented by more hybrid expert formats, such as multistakeholder fora, participatory policy foresight and assessments, or transdisciplinary platforms.

The paper sets out to empirically study the landscape of PEAs situated at the climate-energy-mobility-consumer nexus from the perspective of Social Network Analysis. The paper is based on a dataset comprising 2-mode data on actor attendance of PEA-events in German climate, energy, mobility, and consumer policy in the time period from 2013 to 2017. In the first step, it will be shown which PEAs are central in the network and act as ‘brokers’. In a second step, different PEA-clusters are identified. The paper concludes by accounting for these clusters by referring to different social and political ontologies that determine the ways of coping with nexus problems epistemically and socially.

Keywords: Sector coupling, expert networks, social network analysis, nexus

Energy transition without societal change? The blind spot of the current debate on “Sector Coupling”

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Still about 85 percent of the German energy demand consist of fossil and nuclear sources. Although there have been achieved considerable steps in greening the electricity system, a transition to more sustainability within the sectors of heat and mobility hardly takes place. Regarding this, the target of sector coupling, what refers to a wide-scale electrification of these sectors, recently has become a centre of gravity within the German debate on the energy transition. Although necessary on the one side, this debate reproduces critical shortcomings that already characterize the younger development of the energy transition’s frameworks: There is a strong tendency to reduce the transition to a large technical project that would succeed if the preconditions of technical feasibility,

economical efficiency and public acceptance are given sufficiantly. Thus, the assigned role of society is restricted to passivity.
Against this background, the proposed paper will discuss in how far democratic and participatory characteristics contributed to get the transition off the ground. To a large extent, economic and political success was achieved by this way in the past. Conflicts and social movements not only didn't hamper the process, but even played a supportive or constructive role during earlier phases (section 1).
In contrast, the debate over sector coupling rather follows the path of the status quo. If society is addressed at all, it is usually mentioned in the context of "lacking acceptance". As a consequence, there are several blind spots in this debate. To identify them and to analyze in how far they might jeopardize the progress of transition will be the task of section 2.
Whereas the main tendencies of the current transition process are centralization, increasing lacks of active participation by citizens and decreasing pace, electrification of heat and mobility will require new dynamics. Looking at the examples of the reformed Feed-In-Law (EEG), the contested extension of the energy transmission grid and the "Mieterstromnovelle", the final part will propose, how significant deviation from the current path may enable the transition to draw new vitality (section 3).
Keywords: Energy transition, sector coupling, electrification, socio-technical regimes

Session 14: The spatialities of waste

Chair: OLOFSSON, Jennie[1], VIDMAR, Matjaz[2]

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Electronic waste in an urban Indian household: out of space (place), out of mind

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With the advent and subsequent progresses in information technology and electronics comes the ever-increasing usage of electrical and electronic equipments (EEEs). While the EEEs and associated technologies are subjected to rapid innovation providing consumers even greater and convenient user experiences every time, the lifespan of these EEEs observes a constant decline. Consequently, most of these EEEs are out of use way before their actual functional life gets over. One of the best instances is probably the mobile phones and associated technologies. New and newer versions of mobile phones are introduced into the market every few months rendering the older one obsolete before their practical lifespan. Within the category of mobile phones, smartphones provide for a brilliant example here. The way the smartphones die down is both overwhelming and thought-provoking. Ultimately, this leads to the increasing volume of electronic waste (E-waste) or Waste Electrical and Electronic Equipments (WEEE) – one of the fastest growing toxic waste streams in the world today. Unfortunately, the research and policy efforts undertaken to address and manage this hazardous waste category is still at its embryonic stage, especially in the developing countries and emerging economies including India.
Accordingly, in this paper, we attempt to evaluate the status of electronic waste in the form of waste mobile phones in the urban Indian households. The primary intention is to locate the 'space'

of both 'used' and 'out-of-use' mobile phones in a household. We address the motives behind the constant purchase of smartphones by the consumers, their untimely discarding and its final location in or outside an urban Indian household in terms of publics' consumption, awareness and disposal behaviour. After providing a brief of the current global scenario, we narrowed down to two empirical studies carried out in the Indian cities of Bangalore and Pune in order to assess the same. India is considered as a case owing to the fact that the country is one of the largest markets for mobile phones in the world today and one of the largest generators of E-waste as well. Taking into consideration the elements from the Theory of Planned Behaviour and Conspicuous Consumption, we developed a conceptual framework of 'Public Understandings of E-waste and its Disposal' in the context of urban India. For this purpose, a number of empirical insights in terms of actual voices of the respondents were taken into consideration. We argue that it is essential to analyse the planned and pre-mature obsolescence of mobile phone technologies, especially smartphones, both from the ends of the producers and consumers and analyse their 'space' in a particular geography. Considering the fact that mobile phones are rich sources of precious and valuable metals, they have immense potential to contribute as 'Urban Mines'. But, for this to happen, it is equally indispensable to evaluate its space in or outside a consumers' household. Also, mobile phones are a major source of heavy metals and other toxic pollutants which have the potential to cause despair to the human and environmental health. Thus, it is imperative to manage this category of waste both responsibly and sustainably in order to ensure and assign its appropriate 'space'.

Keywords: E-waste, urban India, space, Bangalore, Pune

From closet-fill to toxic sublime: The aesthetics of e-waste

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Electronic waste (e-waste) has a peculiar relation to space. It is well-documented how a large part of discarded electronic devices still remain in people's homes, instead of reaching the recycling centres. This is especially true with digital media and communication technologies such as computers and mobile phones (ironically the devices with the shortest life cycles). This phenomenon has been described by the term "closet-fill" (as opposed to land-fill). However, representations of electronic waste in public discourse such as news reports, seldom focus on this aspect. Instead, they tend to portray e-waste dumping sites as strange, almost alien spaces. Sublime imagery invites the viewer to a contemplation over Western consumerism in a fashion recognizable from visual arts. Consequently, imagery of electronic waste has also become an object of aesthetic value in the works of renowned visual artists such as Pieter Hugo and David LaChapelle, who have gained recognition because of this inclusion of imagery of e-waste in their photographic art.

The aim of this paper is to address these aesthetic qualities of electronic waste. The purpose is to contribute to the expanding literature on media materialities and waste with a conceptual understanding of manifestations of electronic waste in popular discourse. The paper draws on theories on media aesthetics, environmental communication and waste management to build an analytic framework that explores the benefits and limitations of presenting electronic waste as an aesthetic object. Empirically it engages in analyses of visual representations of electronic waste. The paper addresses the tension between aesthetic contemplation/appreciation, and critical information. It could be argued that if e-waste is to be presented and understood as an urgent topic, there might be a problem if it is portrayed as something strange, exotic or even beautiful. The concept "toxic sublime" has been used in analyses of visual representations of pollution, and Peeples (2011: 383) argues that this construction of the toxic as sublime comes with a risk: "It may

predispose people to look for toxins in the extraordinary, as opposed to on the shelves of their garages".
It could be argued that e-waste faces a similar problem. The focus on the sublime strangeness of e-waste "dumping sites" is an ineffective way of creating proximity and urgency to the e-waste problem, something that takes place somewhere else than in our homes. LeBel (2015) argues that e-waste aesthetics fails to address the temporal dimension of waste (e.g. planned obsolescence, toxicity). This paper intends to add to that argument by highlighting the tension between the closet-fill and the toxic sublime.
Keywords: Media, e-waste, aesthetics, digitalization

Risk or resource? Trade of electronic waste

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This presentation explores movements – in terms of national and international trade – of electronic waste (e-waste) and how these movements also determine the status of e-waste as a risk or as a resource. As such, it draws on interviews with representatives of companies in Slovenia and in Sweden. These companies – both publicly and privately owned – are part of different sectors: the mining industry, production and distribution of electrical and electronic goods and services, collection and/or management of electronic waste as well as reparation of obsolete electronics. E-waste distinguishes itself from other types of waste in that it contains complex material compsitions: both hazardous components such as mercury, beryllium and brominated flame retardants, and valuable materials and metals such as gold and copper. Using the vocabulary of Kärg Kama (2015), WEEE adheres both to the logic of hazard and the logic of resource. The dual status of e-waste, as both risky and valuable makes it a rather complicated waste fraction to recycle, which also constitutes one of the reasons for this presentation's focus on this particular fraction. The findings suggest that e-waste is considered a resource, only insofar, it is recycled within the economic system of EU, or other western countries. As the representatives of the different companies discussed spatial transferences of e-waste between EU countries and other western countries, e-waste was largely conveyed as a resource. Discussing spatial transferences of e-waste to countries outside of the EU/West on the other hand, its status as hazardous was emphasized. Saying this, e-waste is simply not transformed into a risk as it is transferred outside of the EU/West. Rather, the findings suggest that its status as hazardous actually serves to reinforce its status as a resource.
This means that the status of e-waste as a risk is inextricably bound up with its status as a resource. Hence, in order for e-waste to be regarded as a resource, the understanding of its status as a risk needs to be potentially present.
In sum, engaging in e-waste, as it is subjected to national and international trade, this presentation seeks to demonstrate the malleability of risk, or risk as (also) socially constructed. As such, space, it is suggested, is constitutive of the status of e-waste as a risk or a resource.
Keywords: E-waste, space, trade patterns, risk, resource

Cleaning outer space: Is normalising the problem with every-day metaphors stopping us from doing anything about it?

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It seems likely that in the coming decades the Space Industry will be looking to providing and utilising regular space travel solutions to access select key objects in our Solar System. In particular, as first long-term missions and temporary exo-Earth settlements will be established. However, any future space access architecture is in jeopardy due to the problem of space debris (Klinkrad, 2010). NASA outlined the scale of this issue by noting that: “More than 500,000 pieces of debris, or “space junk,” are tracked as they orbit the Earth. They all travel at speeds up to 17,500 mph, fast enough for a relatively small piece of orbital debris to damage a satellite or a spacecraft” (NASA, 2013). Several “solutions” have been proposed on micro level to detect and manage (even remove) specific objects (see Ebisuzaki et. al., 2015; Soulard, et. al. 2014; Guang and Jing-rui, 2012; Liou, 2011), however in the era of Moon and/or Mars colonisation, perhaps a more systemic response needs to form. These attempts also seem to be hindered by the very slow uptake of any of these “solutions” though perceived lack of urgency in their development and application.
Examining the main features of the industry discourse surrounding this issue, this paper presents a participatory ethnographic account of the narratives of “cleaning Outer Space”. In particular, I will argue that due to the inherently abstract/invisible nature of “the problem” and dominance of positivist socio-technical “solutions”, and the use of the every-day metaphors of “waste”, “junk”, “debris” and the concept of “cleaning”, obscure the environmental criticality at the heart of this challenge.
Keywords: Outer space, waste, discourse, metaphor

Session 16: STS perspectives on China´s low-carbon energy and mobility systems

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After western capitalism – a Chinese anthropocene? Evidence from China’s urban mobility innovation

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Daily news reports now seem to evidence increasing Chinese capacity – possibly world-leading – in ‘green’ and/or digital technologies and their ongoing conjunction in forms that are widely read to promise various low-carbon system transitions, e.g. in urban mobility. Such discourses add fuel to a Western zeitgeist of cultural panic regarding the seemingly inexorable rise of China as an increasingly credible contender to US hegemony and its flipside, the decline of Western liberal capitalism.
But what is actually happening in China regarding its capacity for world-leading environmental innovation? Exploring low-carbon innovation in China as a window onto the systemic and

qualitative change of the global system now unfolding, this paper draws on over 10 years of research regarding the ongoing transition to electric vehicles in China (summarized in a recent book "Liberalism 2.0 and the Rise of China – Global Crisis, Innovation, Urban Mobility" (Routledge, 2018)), now the biggest EV fleet in the world with sales now pushing 1million EVs per annum. Moreover, across the 'ACES' (automated, connected, electrified, sharing) elements of the emerging 'Mobility-as-a-Service' (MaaS) model of urban mobility, China presents multiple cutting-edge examples and a seemingly unique technological dynamism, particularly regarding the conjunction of mobility and disruptive digital innovations. However, exploring this process in China through a bottom-up, STS-inspired lens of innovation-as-politics reveals a much more complex, contested and uncertain set of dynamics. This approach not only can make sense of the characteristic boom-and-bust, non-linear dynamic of Chinese (low-carbon) innovation generally, but also yields surprising qualitative insights into where these may be leading in the medium-term. Specifically, this suggests an emerging regime and transformation of capitalism that is likely to thwart both the doomsday forecasts of the new Western declinism and any sanguine predictions of 'China saving the world', even as Chinese innovation does indeed look set to become increasingly influential at global scale.
Keywords: China, low-carbon transition, mobility-as-a-service, Anthropocene, liberalism 2.0

Green energy transition in China: the wind and solar energy industries

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The past 15 years there has been an explosion of renewable energy installations globally, and this development has been accelerated and led by China. China is today the country with the most installed bio power, wind power, hydro power and solar PV (REN21 2018), and China is also world-leading in manufacturing these technologies. In particular wind and solar has had an almost exponential growth. How has this development been made possible in China? Moreover, beyond formal policies and numbers, how are government decisions translated into action? Even in an authoritarian country, such a large scale directed effort does not happen automatically. This presentation goes into detail to convey how China has mobilised the development of its wind and solar industries, and what the benefits and disadvantages with such a development have been to energy production, innovation and governance. The wind and solar industries are seen together in order to better understand the ways in which innovation and technological learning happen and can be understood in China. Taking a broad view on innovation, i.e. incorporating interactive learning and circulation of knowledge, experiences and expectations, I show how the wind and solar industries are part of complex transactions and negotiations of power, pride and culture that transcend the technologies. This sheds new light on the overall strategic development of China's renewable energy industry development, the flexible governance methods employed, and the internal struggles that Chinese local and central policymakers, industry, state-owned enterprises and academia have faced.
Keywords: Energy transition, China, governance, politics, renewable energy

From eco civilization to city branding; How far can a neoMarxist interpretation of sustainable urbanization take us?

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In response to serious environmental deterioration and the wish to play a leading role worldwide in countering climate change, the Chinese government has introduced a new policy discourse and a number of new policies. A prominent concept for the direction in which the Chinese economy and society should evolve is that of building an 'eco-civilization'. Although the term may evoke a faint idea of living in harmony with nature or even a Daoist impression of living a natural lifestyle where nature is equal if not superior to humans, in effect what an 'eco-civilization' entails in practice has been left largely undefined. Another attractive new concept is that of 'new-type urbanization', with which China's central government proclaims that future construction of new towns and upkeep of existing urban areas should be done in a more environmentally friendly manner and with stronger local stakeholder involvement.

These high-brow discursive ambitions expressed at the central level, concretized or not, are certainly echoed at the municipal and district levels of the Chinese administrative hierarchy. The country now counts hundreds of eco cities, low carbon cities, low carbon eco cities, sponge cities and smart cities which in one way or another reflect the wish the make buildings more sustainable, transport systems greener, technologies cleaner and industrial parks more circular. However, when it comes to effective policy implementation, serious doubt has emerged on the extent to which the proclaimed deep urban transformation is actually occurring. Various scholars have highlighted in recent work on sustainable urban development in China the existence of a systematic 'implementation gap' (Caprotti 2014, de Jong et al. 2016, Lu et al. 2018). Viewing urban planning processes through the lens of the policy sciences, a complex of administrative incentives and mechanisms can be 'held responsible' for this deficit in policy effectiveness. This is argued to hinge on different policy actors having different interests, embracing different objectives and controlling different policy instruments required to make a policy work. Successful policy implementation obliges these actors to engage in forms of collaboration leading to a package deal in which these instruments are deployed and pooled in particular ways conducive to problem solving.

In many cases, no such workable and constructive compromises are generated during and after interaction, because actors are unable or unwilling to produce them. This constellation makes it far from certain that the sustainable cities the central government asks for and local governments state they are constructing actually physically come about. Consequently, a bottom up view of sustainable urban development in complex and dynamic policy networks looks far more fragile and fragmented than a top down view where attractive concepts are introduced, national developmental goals formulated and key performance indicators assigned to organizations and policy-makers at lower levels. While certainly pinpointing impasses in policy processes and clarifying reasons for implementation deficits and policy failures as they emerge, policy scientists also offer suggestions for addressing these problems by stressing the importance of constructive dialogue among actors, anticipating implementation difficulties by involving stakeholders upfront in the policy formulation phase, taking the goals and perceptions of various actors seriously and developing innovative and constructive approaches acceptable to all and changing the institutional rules of the game if beneficial for improved patterns of interaction. These suggestions, mutatis mutandis, apply to planning and policy making in China as they do to the rest of the world.

Mainstream scholars in public policy appear satisfied with offering policy recommendations in the sphere of improved interaction among policy actors involved in policy-making (level of policy actors) or adaptations in the regulatory framework and cultural patterns structuring interaction

among them (level of institutions). More critical scholars, however, tend to dive 'deeper' than (1) interaction among policy actors or (2) institutional rules for behavior and point at the presence of (3) structural forces underlying the emergence of these institutional rules and policy interactions (Mc Cairney 2012). They would argue that systematic and lasting imbalances can be observed in the positions that various socio-economic strata, classes and groups occupy in society. Systematic inequality among these groups in their ability to influence the evolution of institutional rules and the admission of political problems onto the policy agenda leads to a so-called 'mobilization of bias' (Schattschneider 1965). If this bias is structural, policy-making can be expected overwhelmingly to serve the interests of dominant strata or classes in society. This would be a strong argument in favor of elitism (a relatively small coterie of people in society wields disproportionate amounts of power and this is reflected at the institutional and interactional levels) or even neo-marxism (if a capitalist class is seen as holding most or all of this structural power), the latter situation one in favor of pluralism (implying that input to the policy process comes from various sides with sometimes some groups winning and sometimes others and outcomes depending more on skillful play than on privileged positions).

In this contribution, we aim to throw light on the position of China's administrative system, it- self originally inspired by Marxist principles, and the impact on sustainable urban development.

Answering that question will help us understand how general discursive principles are translated into effective action and which societal groups benefit from that process and its outcomes. We will examine the interactive and institutional mechanisms through which the Chinese national discourse on sustainable urbanization is converted into policy implementation at the local level and what role structural forces play in this process.

Keywords: Eco civilization, city branding, eco city development, China, neo-Marxism

Session 17: The role of users in energy transition: What do we know, what should we know?

Chair: ORNETZEDER, Michael[1], SUSCHEK-BERGER, Jürgen[2]

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The role of ports in energy transitions. Port users as transition agents

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Ports are under increasing pressure to reduce their impacts on climate and environment, hereunder revisiting their role in the energy system. As nodes in transport systems, ports represent an opportunity to transform energy use and practices in entire supply chains. Port activities and operations encompass a wide range of actors: port authorities, terminal operators, wholesalers, forwarders, carriers, shipping companies, rail and barge operators, industrial business, port service providers etc. This array of actors that we may call "port users" can potentially play a vital role in energy transitions at ports.

This paper explores the role that users in Norwegian ports play in transitioning these ports towards

sustainable energy nodes in the energy system. The paper will shed light upon what different user types can be identified in ports and what role port users can be expected to play in energy transitions. This have been done empirically by, first, port users are identified and categorized according to if and how they take active roles in encouraging/discouraging transitions. Second, by port users' potential for encouraging or discouraging energy transitions is investigated through exploring their expectations and visions for current and future operations, their involvement in formal and informal networks and their perspectives on (prerequisites for) use of sustainable energy.

The analysis is based on interviews with approximately 30 users in three Norwegian ports. In reflecting the variety of ports users, the paper captures the complexity of energy transitions in entire port systems. Results will be discussed in light of prominent themes in the transitions literature, i.e. if and how the orientation of port users facilitate transitions through fostering expectations, establishing deep and broad networks and nurturing reflections around own operations and realities.

Keywords: Energy, sustainability, port, user, transition

Community battery storage: What do users expect?

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The transition of the energy system in Germany (Energiewende) requires radical changes in energy production and consumption. It includes growing shares of renewables and of consumers producing their own energy. In order to compensate fluctuations of power generation there is a need for different storage and flexibility concepts. An increasing number of battery storages is installed in Germany, mainly in private households. Once installed they can rarely be adapted to a changing power demand. We assume that community storages provide more flexibility. However, their application is limited and we know little about factors influencing their acceptance.

We aim at identifying consumers' attitudes, expectations and needs regarding battery storages and potential services provided by storage systems. Our focus is on community battery storages. Our research questions are: What do citizens who own solar power plants expect from battery storages? Under which conditions are they willing to invest in storages and additional services?

Moreover, under which conditions do they prefer a community solution? We conducted empirical research applying a written survey among inhabitants of two communities with community battery storages as well as one user innovation workshop in each community, two focus groups with owners of solar power systems and an online survey among German citizens who own private or community solar power systems.

Our results show that consumers are generally open to battery storages and perceive advantages such as an increased rate of self-sufficiency, increased independence from energy suppliers and reduced electricity cost. Moreover, consumers mention normative motives such as contributing to mitigating climate change. Consumers show a higher openness towards community storages and less concern on risk regarding storages in the two communities and in the focus groups than in the online survey. Different perceptions of community storages in the two communities seem to be related to current living conditions and structural conditions in the community (e.g. single-family houses vs. apartment houses; individual vs. common solar power system). We suppose that negative perceptions and limited openness correspond with the lack of experience with community storages and the complexity of implementation, particularly under current legal conditions. We assume that due the fact that experience and information on community storage are limited, the

introduction of community models for energy storage needs a dialogue with potential users.
Consumers express a need for additional services such as monitoring, information or energy management. Their interest in additional services however strongly relies on their perception on costs in comparison to potential savings. In the innovation workshops, consumers moreover, developed ideas for further services such as cloud storage systems, which are however difficult to realize under current legal and technical conditions.
Keywords: Community battery storage, smart storage services, urban energy solutions, user needs, consumer

Linking technological innovation and governance, the case of community induced wind turbines in the Netherlands

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For the energy transition in Western countries, citizen involvement is a crucial problem. Citizens are expected to accept new technologies, such as solar fields, biogas plants, geothermics or large wind turbines, to meet national energy targets. In addition, governments are asking citizens and their organizations to contribute to the transition as political and financial partners. However, implementation of energy projects is lagging in many European countries. More than 25% of wind projects had to stop because of public resistance. At the same time, consumers have started to play a new role themselves, as prosumers, social entrepreneurs and open innovators. In Europe, thousands of energy cooperatives arose to found their own wind turbines, solar fields or heat districts.
In this paper we will focus on these new roles of citizens. Science & Technology Studies scholars conceptualize citizens as co-creators of technology, while policy studies focus on their role in political decision-making, looking for acceptance of new technologies. We will examine how in some Dutch cases citizens have influenced both socio-technological innovation and political decision-making on wind turbines. In these cases, citizen groups worked together with govern mental agencies, farmers, environmental organizations and local entrepreneurs, despite different interests and values. It resulted in various changes in the regulations and in newly designed wind turbines.
To identify underlying values of relevant stakeholders, we will use the value sensitive design (VSD)-approach. This approach assumes that both technology development and decision-making processes are strongly related to values and that they can only be improved if values of relevant stakeholders are assessed and taken into account seriously. These values concern processes (for example procedural justice) and outcomes (for instance distributive justice), covering social, economic and environmental issues.
We studied two Dutch wind projects. The first study concerns a 10kW wind turbine, designed to fit the local context. With its low tip height of 21 meter, it does not disturb the open landscape. Furthermore, it has been developed and produced in the province of Groningen using locally available materials. The producing company uses support of the local community and regional authorities as a precondition for sale. The second study concerns a wind park, also in the province of Groningen. The park is being developed by a group of farmers in an area where local support is extra difficult due to previous industrial developments (among others large windfarms), which has faced societal resistance. The farmers established a consultative group to involve the local community, local governments, and an environmental NGO. Furthermore, the farmers will compensate the community through a community benefit fund.

Our case studies show there is room to adjust technology to local stakeholders' values during processes of design and decision-making, despite limitations concerning the goodwill of the developers and financial and political constraints. Adjustments include physical and spatial design, as well as procedural aspects such as co-ownership and community compensation.
Keywords: Citizens involvement, value sensitive design, technology, renewable energy

Defining the intermediary role of users in energy transitions: brokerage across structural holes via sharing technological expectations

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In the literature on socio-technical transitions, scholars have identified three main processes that underlie the formation of niches: raising expectations, creating networks and co-learning. According to Schot et al. (2016), users may serve several functions within these processes. One of these functions relate to the role of users in creating 'spaces for the appropriation, shaping and alignment of the various elements of emerging socio-technical systems' (p. 11). However, whereas this intermediary role is viewed as particularly important for the 'upscaling and mainstreaming' of niches, it is the role that is least understood. Particularly the question of how users interact with and connect to other actors (and actor groups) within and beyond niches has been paid only little attention. In this work, we aim at filling this gap by combining insights from the sociology on brokers and structural holes (Burt, 2004) and on technological expectations (Borup et al. 2006).
For this purpose, we suggest an open (working) definition of broker-users: Broker-users are individuals or organisations (actors) that stand near the holes between users and other networks that are relevant for the transition process. Their proximity to, and knowledge about, the different networks provide them a structurally superior position in interpreting ongoing events and formulating expectations. We elaborate on two brokering situations, each of them analysed by using an empirical case study: the one between users and the industry in e-mobility transportation in China and the other between users and the government in biogas industry in Austria. Our conceptualization goes beyond the general four ideal types of users suggested by Schot et al. (2016), where clear cut associated characteristics for each category are not provided. We argue that broker-users are engaged in political bridging processes between users, government and industry as they leverage power via the knowledge they possess in two directions towards production and consumption.
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Keywords: Socio-technical transitions, sustainable energy, structural holes, technological expectations, technology users

User innovators in the energy transition: The case of VLOTTE

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Innovations that companies develop for themselves are a subject that has been researched for a long time. Usually they do not find a suitable product on the market and therefore start developments according to their own requirements and they push the developments forward, although the necessary skills are located outside their actual technical core competence. However, there are hardly any examples of companies tackling such in-house developments with a view to transforming the energy system. In this talk, we will present a case study conducted as part of the recently finished MATCH project in which various smart energy pilot projects in Austria, Denmark and Norway were investigated and compared. In the VLOTTE project in Vorarlberg, an energy supply company built up an electric vehicle fleet with the active involvement of its own employees. In the case study, the development of this project will be outlined, the different user roles and their influence on the developments will be analysed and different success factors will be discussed.
Keywords: User innovator, energy transition, e-mobility, case study research

The electric driver-car assemblage: Users in the electric mobility transition

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Inspired by Tim Dant's (2004) work on the driver-car (the assemblage of vehicle and motorist), this paper draws upon concepts from actor-network theory to both centre the users of electric vehicles, and to explicitly highlight the interplay between the user and the changed material aspects of the electric mobility transition. In other words, the paper focus on how the user transforms the electric vehicle, and how the vehicle transforms the user.

The paper provides an empirical inquiry into how the interplay between users of electric vehicles and their cars entail new considerations of environmental and economic factors. This framing further offers insights into new scripts, new driving practices, and changes to the act of driving as embodied practice. This includes accounts of how engine noise from a poorly charged, or inefficiently operated, plug-in hybrid may translate into shame, and narratives of battery electric vehicles communicating energy efficiency that also translates into wider aspects of everyday life.

I also find that these are assemblages that do not necessarily untangle when the car is parked, and the driver has left the vehicle.

While I primarily emphasise the smaller network, centring the user and their everyday lives, this account also draws upon larger networks surrounding electric mobility – such as local and national electricity infrastructures, the Norwegian cabin culture necessitating long-range electric vehicles, and cold winters making batteries less cooperative. These parts of the larger network surrounding the electric vehicle user are often oblique or black boxed, but susceptible to become apparent when issues arise.

Norway is currently a market leader when it comes to the proliferation of electric vehicles and thus constitutes a fertile research laboratory on electric mobility transitions. This paper is based on 40 in-depth qualitative interviews with users of electric vehicles in Norway, offering an exploration of the emerging electric driver-car assemblage. I argue that these are potentially substantial reconfigurations of mobility, both with regards to individual driving practice, but also to larger socio-material conceptualisations of energy, mobility and environmental concerns.

Keywords: Actor-network theory, electric vehicles, users, assemblage, sustainable mobility transition

Gender discourses and user scenarios around e-mobility

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Electromobility in private transport is of central importance in the context of the discussion about phasing out fossil fuels. With the help of subsidy programmes, the purchase of electric cars is to be stimulated. Due to storage capacities and still limited charging infrastructures, the focus of usage scenarios has so far been on inner-city mobility. However, the private purchase of electric cars has so far fallen far short of the expectations of political stakeholders and the automotive industry. Against this background, two striking developments can be observed with regard to the expansion of user groups and the creation of markets in recent times, which follow well-known socio-technical discourses. On the one hand, women are to be developed as a specific user group that is understood stereotypically as non-technical and as causal for the lack of acceptance of technology compared to the new technology. On the other hand, financially strong men are to be inspired for electric mobility by developing new user scenarios through the development of powerful electric cars in the luxury segment.

In my contribution I would like to trace, on the basis of a media analysis as a pilot study with discourse-analytical methodology, which discourses are used to design gendered users and which roles and responsibilities are assigned to them. It is to be worked out which actors are decisively involved in the transformation process. The underlying media are policy papers, car magazines, web pages of research projects, daily and weekly newspapers.

Finally, from a transitions perspective, it will be discussed which consumer groups are conceptualized as users who are seen as important stakeholders in the innovation process of energy transformation and in which way. Contradictions will be shown in the user scenarios between users who are seen as potential to shape new routines and users who will be addressed by old routines in order to enact system change. Thus, it is worked out how unequal allocations of responsibility are embedded in the negotiation of new and traditional routines of mobility and thus reflect complex power relations.

Keywords: Gendered user, discourses, e-mobility, energy transformation, media analysis

Session 18: Is the circular economy able to transform the built environment in cities?

Chair: FOSTER, Gillian

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The environmental impacts of cultural heritage buildings: a circular economy perspective

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Adaptive reuse of cultural heritage buildings to new uses that reflect the changing needs of communities is an important aim of today's sustainable city planners. These buildings are historically and culturally significant, creating a distinct character that is integral to the identity of the place.

Nevertheless, in practice, their continued use and preservation is often determined when compared to an alternative, such as demolition or new "green" building construction. On what basis are these decisions made? In order to answer this research question, we critically reviewed the current literature for case studies of adaptive reuse of cultural heritage sites as well as the literature presenting methods for evaluating adaptive reuse of cultural heritage buildings. We review these from a circular economy perspective. We found that although there are many disparate methods applied for assessing environmental impact in the main: (1) energy, specifically climate change impact defined as modeled fossil fuel and related carbon dioxide avoided is discussed; (2) other environmental impacts such as water use impact and air pollution are relatively lacking; (3) environmental impacts are conceptualized and measured at different landscape scales and levels of detail making comparisons or aggregations difficult. (4) Circular Economy perspectives are not explicitly discussed. Further, we see an implementation gap between the European Union level environmental indicators of circularity and how project data are managed.

To our knowledge, this is the first in depth treatment of the methods in practice for the environmental impact assessment of adaptive reuse of cultural heritage sites from a circular economy perspective.

Keywords: Environmental impacts, cultural heritage, climate change, barriers to adaptive reuse

Circular economy strategies in the historic built environment: Cultural heritage adaptive reuse

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As a concept with the potential to guide the transition towards more sustainable cities, the circular economy (CE) is currently promoted through policy, urban and regional strategies as well as emerging as a relevant research sector (Marin & de Meulder, 2018). Within this context, circularity in the built environment is attracting attention with applications in many design and urban projects. This is the case because increased circularity in the built environment offers many benefits such as economic growth, reduced environmental impact and improved quality of life (EMF et al., 2015). The general principles of CE are applied to existing and new buildings, focusing on the "end-of-life"

stage and developing sustainable innovative solutions to optimize dismantling and reuse of materials and technological parts of buildings.
Ellen MacArthur Foundations (EMF et al., 2015) defines four domains in which CE can be applied in the built environment, namely: “construction”, acknowledging that 10-15% of building material is wasted during the construction phase; “utilization”, avoiding empty and abandoned spaces; “usage”, in terms of energy consumption; and “end-of-life”, avoiding landfill.
However, in historic urban areas the principles of dismantling and reuse of materials remain barely applicable (end-of-life), as well as application of standard renewable energy systems (usage), due to cultural heritage unique characteristics and heritage regulations oriented to its preservation, conservation and transmission to future generations.
Cultural heritage is ideally projected to an indefinite time horizon, towards eternity. It represents the memory and identity of urban/territorial systems (Fusco Girard, 2018). In the case of cultural heritage, CE models can only be oriented to the conservation of its functionality and “use values” over time, identifying new uses / functions compatible with the conservation of authenticity and integrity as well as contemporary needs; to durability, reuse of abandoned areas / buildings, and to preservation of their “embedded energy”. For these reasons, adaptive reuse of cultural heritage seems to be the most viable solution to apply CE in the historic built environment. Yet, research on the application of CE principles in the built environment has mostly concentrated on construction waste minimisation and recycling (Tebbatt Adams et al., 2017). In this article, we aim to identify CE solutions and indicators able to support circular adaptive reuse choices in the historic built environment drawing from The Horizon 2020 “CLIC” project (Circular models Leveraging Investments in Cultural heritage adaptive reuse), which focuses on adaptive reuse as a key strategy for CE implementation in historic cities and regions. This is a relevant area of enquiry since the application of circular principles to the historic urban landscape “leads to the ability of maximizing the value of settlements, activating social, economic and environmental synergies” (De Medici et al., 2018, p. 3).
The concept of “urban metabolism” will be explored starting from the analysis of “De Ceuvel” project in Amsterdam focused on the reuse of old boats to create a full “circular” neighborhood, in terms of materials, energy and even financial resources. A second application at a different scale is referred to “Rehafutur Engineer’s House project” (France), an adaptive reuse of historic villa following CE principles, more focused on building materials. Finally, the adaptive reuse of a rural village in Spain, within the “ReDock project” in La Junquera, will be explored highlighting circular metabolisms of materials, energy and financial resources.
These projects will be analysed to identify “key performance indicators” that could be used to foster and to monitor the implementation of CE strategies in the adaptive reuse of cultural heritage.
Keywords: Circular economy, cultural heritage, adaptive reuse, built environment, urban metabolism

The circular character of building tradition: Which challenges for the HUL approach?

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The lifespan of built environment is radically longer than the one of other goods. Buildings and cities are under permanent challenge and pressure of changing needs, lifestyles, services of society. Hence any consideration of circular economy within built environment needs different approaches and models that refer to continuity, adaptability, resilience and intrinsic quality. In history of

architecture, urban centers were built by using sustainable techniques and resources and were constantly maintained with the intention to make best use of the available material, by reusing what was possible and thus reducing waste. The use of local materials, techniques, crafts and competences has been shaping the built environment for centuries, generating testimonies of local cultural authenticity in different forms (Acri, Dobričić 2017). Such local cultural authenticity that characterizes each place has been evolving by being resilient and strictly connected to its environmental context. Indeed, considering the historic urban landscape as an approach to urban management of change, we refer to the city in its capacity to represent its development in time, to put in common different urban "facts" in time, as well as nourish a genius loci that made it different from others, fully breaking the obsolete idea of identity.

This process has been dominant until some of the means of linear economy, namely the mechanization of transport and production, developed so as to eliminate limits in the building sector. The absence of barriers in many senses changed the previous rules and slowly imposed new models for urban regeneration, which included new materials, new technologies, new skills, new competences, becoming more and more globalized. The treatments of historic buildings and the development of the built environment were slowly standardized at different scales. Often this resulted in the loss of construction details and of the continuity of the place that were an expression of past human creativity and of the genius loci.

The recent trends that have put circular economy at the core of discussions on sustainability are moving in favor of the preservation of historic cities, opening interesting economic and cultural scenarios that will not let "preservation" being considered as a burden. Suddenly, local qualities and resilience are again becoming important and there is a run in giving back to the built environment its partly (or even totally) lost integrity and authenticity (Jokilehto 2017). Even tourism is contributing to this trend by developing new models based on experience, direct feedback and taste.

The paper will reveal the strict relationship between the built environment in cities and circular economy. In specific, through the preservation perspective, it will address the concept of HUL as the relationship between urban morphology and building typology jointly with the specific genius loci, highlighting the needs to understand the qualities of global knowledge in local contexts.

Taking into account the forces of development in the historic territory, HUL is intended as a context for living and a place where individuals have the capability to recognize the qualities of their environment and act through responsible attitudes.

Keywords: HUL, authenticity and integrity, urban resilience, building tradition, genius loci

Embracing circularity. Individual factors in implementing innovation

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The success of circular economy depends on the ability of people and communities to change their behavior and a way of thinking. The linear model of economy has encouraged people to maximize their utility without taking into consideration environmental effects. The circular economy challenges this approach by stressing natural constrains of production and utilization of goods (Stahel, 2016). It highlights the fact that natural resources are limited and people need to learn how to optimize usage by preventing depletion and pollution.

We argue that the model of circular economy imposes on people the need to adopt new norms, usage of new technologies and openness to innovations. Therefore, in this perspective, readiness

for change is a preferable trait of the whole society rather than a super quality of few individuals. However, the adoption of change is not easy and not all communities have the abilities to embrace this challenge. There are many factors that may hinder the process: fear of change (Eagle, 1999), conflict of values (Roger, 2002) lack of proper knowledge (Argyris, 1993), etc. In the context of built heritage, the conflict between values such as tradition and openness to change can be of crucial importance. How one can reconcile them?

In general, cultural heritage evokes such values as pride and respect for local customs. Traditional ideas that are transmitted by cultural artifacts often restrain actions that could violate social expectations and norms. Modernity and novelty, on the other hand, requires values such as openness and exploration. In some societies the gap between tradition and modernity can be less visible than in others. Especially, in societies in which progress, experimentation and innovation are seen as a norm, the model of circular city can be adopted faster than in societies where more emphasis is put on the past. As Roger (2002) has already spotted, one of the characteristics of innovation that determines the speed of its adoption is compatibility with values, needs or past experience of the particular population.

The other vital trait of innovation that speeds up its adoption is observability. People who can monitor results of their choice are more prone to learn new skills and habits (Andersen, 1995). The information works even better if people are not only informed about their choices but about the choices of others. This type of feedback has a great impact on peoples' individual decisions, especially when they find out that the new behavior was adopted by local majority which makes this behavior a local social norm (Allcott, 2011). Policy makers should be equipped with appropriate tools for monitoring and giving feedback on citizens behavior that contribute to the success of implementation of the circular city model but the national and international well-being indexes are detached from the micro level perspective of an individual citizen. This paper offers insight into possible solutions in this regard.

Keywords: Facilitating the change, monitoring circular economy, conflict of values

Circular economy concepts for cultural heritage adaptive reuse implemented through smart specializations strategies

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Although concepts of circular economy are growing, circular economy design processes in the building sector are not advanced yet, neither well-articulated, despite the fact that circular economy models could greatly fit for cultural heritage assets and construction sector in regions and cities. Policy and decision makers lack knowledge on benefits of cultural heritage assets adaptive reuse, but also lack tools, not only to implement these actions, but to accordingly express and articulate them in policy instruments, like smart specialisations(1) and others.

Smart specialisation approach is becoming a strategic instrument for identifying regions' opportunities for growth and development. It is a place-based approach and plays an important role in benchmarking regional competitiveness. To have a smart specialisation strategy has been thought of a key factor in making choice for investment. The EU Member States and regions recognized that supporting a limited number of well-identified priorities for knowledge-based investments and/or clusters could advance focusing on competitive assets and realistic growth capabilities reinforced by a critical mass of action and entrepreneurial resources.

Recently developed study at Uppsala University, on mapping European regions (NUTS entities) that are recognising cultural heritage and culture as an integrated part of their strategies for

development, offers a comparison in approaches per economic, scientific domain and policy objectives and shows that only a small percentage of regions consider cultural heritage as an asset for their growth.

The purpose of this research is to lay the basis for a new, stronger complementarity between cultural heritage adaptive reuse practices and circular economy concepts through smart specialisation strategies and, in particular, specific economic domains, reviewing approaches of different European regions towards these links. Preliminary results show that cultural heritage is not fairly recognised as a potential for economic development under economic domain (2) associated with adaptive reuse, Construction, and its three sub-domains: Construction of buildings, Civil engineering and Specialised construction activities as well as under the domain related to the Water supply; sewerage, waste management and remediation activities. The research aims to overcome a gap in data regarding this topic and understand which regions and cities (NUTS entities) are oriented toward cultural heritage adaptive reuse and identify their features across cultural heritage and circular economy through the instrument of smart specialisation strategies.

(1) According to developments regarding implementation of cohesion policy after 2020, Smart Specialisation approach shall remain as very meaningful for Cohesion policy implementation. Prior to that, for the 2014-2020 programming period national and regional authorities were advised to harness investments into cultural heritage for the development and support of creative industry clusters.

(2) Classified using the Statistical Classification of Economic Activities in the European Community (NACE rev. 2) and the Nomenclature for the Analysis and Comparison of Scientific Programmes and Budgets (NABS 2007)

Keywords: Cultural heritage, adaptive reuse, sustainable development, smart specialisations, circular economy

STREAM: Gender – Technology – Environment

Session 19: It´s time for structural change, sister!

Chair: DAHMEN-ADKINS, Jennifer[1], RATZER, Brigitte[2], WROBLEWSKI, Angela[3], THALER, Anita[4]

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What we actually mean by „co-producing gender equality knowledge together"

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In the Horizon 2020 financed project "CHANGE"*, tailor-made gender equality plans will be implemented in research performing organisations (RPO) during the duration of four years. In order to make related activities more sustainable, efforts also aim at the initiation of long-term structural changes towards more gender equality in science and research. To accomplish this ambitioned goal, we learned from previous projects in gender but also sustainability research and came up with a new approach.

In our experience, many "gender in science"-research projects in the past finished with stating current gender in-equalities, naming several barriers for women's careers, and giving recommendations for gender equality in science and research (cf. Thaler & Wächter 2005; Caprile et al.2012; European Commission 2012; Carvalho & Machado, 2017; Carvalho et al, 2013; Carvalho &Machado, 2011, Dahmen & Thaler 2017). But due to the knowledge-to-action gap (described e.g.by Strauss et al. 2009) respectively the research-to practice-gap (discussed e.g. by Roxborough et al. 2007) these recommendations were too seldom put into action or their actual impact remained marginal. Above these translation gaps, the politics of feminist knowledge transfer and power issues (Bustelo et al. 2016, Thaler 2019) led to a situation where gender equality often stayed nice words on a website, but the real problems have not been tackled in many academic and research organisations as well as in policies of research funding organisations (RFOs). This means, gender experts and scholars have provided enough evidence and knowledge, but we are lacking strategies to translate this knowledge for the relevant stakeholders and put this knowledge into practice. Our CHANGE approach therefore aims exactly at these two major problems:

First, the knowledge-to-action gap should be closed by integrating and co-producing gender equality knowledge together with relevant institutional actors in RPOs and RFOs directly from the

project beginning, in order to produce practical knowledge which is relevant and meaningful to them.
Second, power issues ("the politics") of the feminist knowledge transfer will be tackled by integrating so called transfer agents (TAs) in a very early stage of the project. The TA-concept of has been tested in the former EU-FP-7-project GenderTime (Thaler 2016; Thaler, Karner & Wicher, forthcoming) by engaging institutional actors who are committed to gender equality and structural change and most importantly have a certain authority within their organisation (management level – in the organisation which works on gender equality plans) as TAs. Later in the project progress identified stakeholders from RPOs and RFOs will be engaged in the project consortium, and regional communities of practices (CoPs) will emerge.
In our presentation, we want to show with practical examples what we actually mean when we say we are co-producing knowledge together and building CoPs in order to enable structural changes (cf. Karner et al. 2014; 2016; 2017).

*"CHANGE" - CHAlleNging Gender (In)Equality in science and research has received funding from the European Union's Horizon 2020 Research & Innovation Programme under Grant Agreement no. 787177. Consortium members: Interdisziplinäres Forschungszentrum für Technik, Arbeit und Kultur (IFZ) – coordination, Rheinisch-Westfälische Technische Hochschule Aachen (RWTH Aachen), Universidade de Aveiro (UAVR), Zilinska Univerzita v Ziline (UNIZA), Nacionalni Institutza Biologijo (NIB), Fraunhofer Gesellschaft zur Förderung der angewandten Forschung e.V. (IFAM) & Beit Berl College (BBC). Website: https://www.change-h2020.eu.
Keywords: structural change, gender equality, communities of practice, feminist knowledge

Gender- and Diversity-Trainings in academia: difficulties and potentials

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Regarded as a valid sign of professionalization, gender and diversity awareness trainings – with diverse focuses and target groups - are increasingly gaining importance in today's academic field. In this talk, we want to present, first, evidence-based training-tools and concepts of gender and diversity trainings, particularly in the context of personnel selection processes in academia (e.g., in professorship appointments), of empowerment-trainings for gender equality officers or for workshops in order to develop gender equality policies. Despite the broad range of these contexts and target groups, our talk shows and elaborates on the shared difficulties, problems, and questions (e.g., very heterogeneous levels of knowledge and understanding of gender and diversity equality within a rather homogenous group of people). That often initiates the necessity for a more professionalized approach to both gender and diversity equality as well as organizational processes. Second, from our multiple perspectives as trainers, academics as well as gender equality actors, we want to share our success factors in these trainings per se as well as our dealings with and overcoming resistances and other experiences of fears and anxieties in the light of organizational chang. In addition, we want to collect current needs and "pain points" (ranging from "We don't have any money for equality measures" to "We don't know how to spend our equality-funding.") as actual chances for more structural change in the direction to more equality in academia. Finally, we want to shed some light on the future development and potential as well as the limits of such gender and diversity trainings.

Our talk is very much informed by our coaching and training methods and offers an interactive and integrative approach by which we would like to add to different layers of understanding to the panel.
Keywords: Gender-trainings, resistance, gender equality policies

Building gender equality through communities of practice: how to structure the CoPs and to evaluate outcomes?

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This paper presents challenges faced by the ACT project (H2020, 2018-2021). ACT will advance gender equality in the European Research Area by increasing gender expertise and operational effectiveness of Communities of Practice (CoPs) engaged in promoting institutional change, and in particular implementation of gender equality plans (GEPs), within and across research performing organisations (RPOs) and research funding organisations (RFOs).
After mapping stakeholders and building communities of practice to increase knowledge exchange and identification of best practices and build on existing networks and on the former « GenderNet Portal », ACT will consolidate and strengthen existing infrastructure for knowledge sharing and mutual learning in the field of institutional change and gender equality across Europe. A European network will be set up across 7 CoPs. A first part of the paper is dedicated to the challenges and the questions raised by the definition of the CoPs and the criteria to build them.
Evaluation is coordinated by Joanneum and CNRS and will provide a methodology to evaluate CoP development and learning outcomes. It involves to revise and adapt the Wilder Collaboration Factors Inventory; to develop interview guidelines for gathering more qualitative, in-depth data on collaborations between CoP members, in order to assess the acceptance and usefulness of provided tools/services and learning outcomes. The interviews shall also enable to assess the impact of the CoPs on gender equality development in their member institutions.
In addition to this work, Joanneum/CNRS will carry out semi-structured interviews with CoP Facilitators and 2-3 representatives of each of the 7 supported CoPs. The evaluation will use Summary Reports/data and deepen the analysis based on interviews. Joanneum will be in charge of producing a comparative report analysing the enabling and hindering factors of CoPs for GEP implementation and institutional change across the supported CoPs. The report will summarize suggestions for technical improvements to GenPORT+, the survey tools, and the CoP toolkit.
The paper will present the first outcomes of the evaluation of CoiPs as a tool to develop gender equality knowledge and GEPs implementation.
Keywords: gender equality, CoPs, structural change, networks, evaluation

Mapping activities and needs of GE-practitioners: First results of the ACT community mapping survey on GEP activities in the EU 28

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Despite the ongoing efforts, there are common problems with the successful implementation of Gender Equality Plans (GEPs) in research organisations. These problems typically stem from a lack of practitioners' necessary 'know how' but also result from scattered efforts at inter- and intra-organisational levels. The Horizon 2020 project ACT aims at overcoming these struggles in

implementing GEPs by promoting institutional change through the advancement of communities of practice (CoPs). ACT will create a range of services and resources to support targeted CoPs and will enable the development of new, demand-driven CoPs. The focus will be on enabling effective sharing of experiences and lessons learnt from gender equality actions, by CoPs located within and across institutions. The result will be a more systematic implementation of GEPs, and greater synergies between organisations achieved through GEPs and through related EU structural transformation initiatives such as HRS4R, RRI, ERA, and Open Science.
For this purpose, ACT in a first step currently carries out a Community Mapping Survey to map actors – practitioners and experts – who are engaged in the advancement of gender equality objectives at universities, research centres and research funding organisations across Europe. First results of the survey will be available by the end of April 2019. We will then be able to give an overview of which equality measures have been implemented so far, differentiated by types of organisations and regions of Europe. Moreover, the survey data also provides information on whether RPOs and RFOs perceive progress or set backs when it comes to gender equality issues in their organisation. And it can be shown which barriers affect the implementation of gender equality measures and what kind of internal and external support would be needed to improve gender equality in the organisations surveyed. All in all the results of the Community Mapping Survey can serve as an ideal starting point to discuss previous experiences and approaches to promote equality in RPOs and RFOs.
Keywords: Institutional change, Gender Equality Plans (GEPs), Communities of Practice (CoPs), international survey

Community of practice – a key factor of a reflexive gender equality policy. First experiences of TARGET

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Aim of the TARGET project (H2020) is to initiate institutional change in seven gender equality innovating institutions (GEIIs, RFOs, RPOs and a network of engineering schools) in the Mediterranean basin. TARGET takes a reflexive approach which goes beyond the formal adoption of a gender equality plan (GEP) by emphasising an iterative reflection of progress made as well as establishing a community of practice (CoP) to effect institutional transformation. TARGET is based on the assumption that a CoP is a key element of a reflexive gender equality policy as it provides room for reflexivity of current developments regarding gender equality and supports mainstreaming gender within the organisation. It also avoids a situation where the responsibility for gender equality is exclusively assigned to an expert or a gender equality office.
The paper is based on the experiences of the seven GEIIs with the establishment of a CoP. GEIIs pursue different concepts in the establishment of their CoP. The CoPs differ regarding their links to decision making bodies, the involvement of external stakeholders, the frequency and form of involvement as well as the role assigned to members of the CoP. Promising strategies assign different roles and tasks to specific members of the CoP and develop targeted communication strategies for different groups of members. It seems to be easier to actively engage stakeholders when gender equality is linked to other current institutional strategies.
Experiences with the establishment of a CoP show the importance of a moderator who should bring along specific characteristics (e.g. gender equality expertise, knowledge about the institution, acceptance within the institution, social skills, strategic thinking). The role of the moderator has not been discussed in the literature on communities of practices so far. However, the role of the

moderator is especially important in the context of a reflexive gender equality culture as s/he has to create a room for reflexivity, use empirical evidence and build alliances with other strategic goals and projects of the institution. Hence we assume that the CoP as such and the moderator in particular are key factors for a sustainable gender equality policy.
Keywords: Community of practice, structural change, gender equality, reflexivity

Temporalities and care: gendered tensions in scientific practices

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Changes in the organizational norms of science connected to new management and evaluation culture are awakening a set of studies working, on the one hand, on the effects of the acceleration of the working pace on academics (Ylijoki & Mäntila, 2003; Müller, 2014; Walker, 2014; 2015; Mountz et al., 2015; Vostal, 2015), and on the other, on the effects and changes on epistemic practices (Anderson et al., 2007; Burrows, 2012; Fochler et al, 2016; Horbach & Halffman, 2019). This brings broader reflections on temporalities and science and on the direction of science itself under neoliberalism: slow science (Stengers, 2011; Müller, 2014; Mountz et al., 2015); chronopolitics (Felt, 2017) and dominant temporalities neglecting care aspects in technoscience (Puig de la Bellacasa, 2015) are some examples.
In this paper I want to develop an argumentation that puts in relation time, care, gender and neoliberal regimes in science following feminist care approaches developed by Tronto (1993; 2017) and Puig de la Bellacasa (2015). Through a qualitative analysis on public scientific slogans, researchers' interviews and two focus groups on evaluation practices I explore three levels: researchers' lives, their knowledge practices and the direction of science. Field work shows tensions and dysfunctions in the relationship between time and care that affect not only researchers' well-being and their caring relationships in a gendered way, but also their professional identity, their practices and choices sometimes (dis)connected to quality or 'excellence', and furthermore, it shows tensions in the direction of science as a public good free from economic interests. A diversity of temporalities is shown and defended in order to promote care time and care practices in science. The paper also defends the notion of care as a possible guiding principle for a better and more inclusive and diverse science.
Keywords: Science, temporalities, care, gender, inclusion

Habitus / Power / Education - Contesting hegemonic practices in teacher education

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Educational institutions by and large are still shaped by a male middle-class habitus. Bourdieu and Passeron (1971) or bell hooks (1994) have discussed how educational institutions and the people involved in them contribute to reproduce intersecting inequalities (e.g. gender, class, migration, disability). Even today, against the background of wide spread gender equality policies and programs that are designed to encourage and support students from non-academic backgrounds, teaching and learning continues to be shaped by hierarchies and inequalities.
In this presentation, we will present a project that is implemented in a BA teacher education course

at the University of Graz. The project aims at developing educational material for the reflexive handling of inequalities (in a broader, intersecting understanding). Since teacher habitus affects their perception and assessment of high school students, preparing teachers adequately is necessary to achieve lasting structural changes. The project goal is to raise critical awareness and help future teachers to address the hegemony of educational institutions by utilizing different reflective instruments that highlight the mechanisms of privilege and inequality in education.
Realized as a combined teaching/research project and embedded in a pedagogical research seminar (two parallel courses), we address the phenomenon of social inequality and privilege with a mix of deconstruction, analytics of power and self-reflection. In a participative setting and with methods like narrative interviews (Schütze 1983), collective memory work (Haug 2008) or photovoice (Wang/Burris 1997) as well as diverse tools for self-reflection, the goal is for student teachers to gain knowledge and learn to scrutinize their own social status and their gender in relation to their paths of education. This should help them to develop an understanding of inequality as a structural problem rather than focusing on individual experiences of success or failure. Therefore, we aim to address the following questions in our presentation: How can we foster student teachers development of emancipatory ideas? How can we better address intersecting social positions or address gender issues in a more fruitful way?
Keywords: Hegemonic practices, emancipatory power, inequality, habitus, education

Lessons learned from conducting interviews about gender equality plans in research organizations

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This contribution presents the experiences from setting and conducting some results from interviews, held as a basis for the development of tailored gender equality plans (GEPs) in the context of the H2020 project “CHANGE”. The aim of this project is to support research performing organisations (RPOs) to promote, design, implement and institutionalise gender equality plans (GEPs) by means of short, middle and long-term actions over four years. The project’s approach strongly builds on mutual learning, the co-production of knowledge, networking and the establishment of communities of practice. Thus the engagement of key actors, such as so called Transfer Agents (TAs, Thaler 2016), is central throughout the whole process of planning and realisation of the GEPs.
Before developing tailored GEPs, interviews were conducted with key institutional actors, who were asked to provide insights into the current state of the art of gender equality and potential gender inequalities within their organizations. The results of these interviews provide essential pieces of information to successfully establish the GEPs, tailored to each implementing organization. Interviewees did not only offer valuable information, but they also will, together with TAs, help to promote CHANGE activities and structurally change their organizations towards more gender equality.
Findings discussed in this presentation result from a comparative overview of two research institutions participating in CHANGE, where one is a traditionally technical institution, while the other is a life sciences institute. Most of the interviewees are not gender experts. Interestingly, the feedback from the interviewees that were reluctant to the idea of CHANGE and expressed doubt in

the necessity of the project was the richest with new ideas for the GEP content.
After a thorough revision, a clear pattern emerged. The respondents mostly (1) debated about their perceptions on the status of gender equality within the organizations and (2) gave their feedback regarding the possible activities that could be conducted during the project. Finally, (3) the respondents suggested the content of individual GEPs.
Overall, the exercise of interviewing selected staff members was positive. Many respondents recognized that the problematic is wider and goes beyond gender; there are differences in seniority levels. In order to initialize changes, the project should and will target all seniority classes (from PhD students to top management). The respondents jointly acknowledged that open discussions should be initialized during the project that will lead to establishing informal communities and networks that will lead to change and enable the sustainability of the actions.
However, interviews showed also that first, awareness raising about gender inequalities in science and technology research organizations is a crucial first step in the participation of managers and TAs in the project CHANGE as well as for implementing gender equality plans. Secondly, gender in science and technology research could be a good entrance point for gender equality measures, as many research grants include gender in their evaluation. By supporting research organizations to get funding by including gender aspects in their research proposals, CHANGE can positively and meaningfully bring gender equality issues into the respective organizations.
Keywords: Gender, CHANGE, H2020 project, interviews, benchmarking

Systemic action for gender equality (SAGE) at Kadir Has University

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Kadir Has University, Turkey

Since 2016, Kadir Has University has been a partner on the project entitled "Systemic Action for Gender Equality (SAGE)" funded under the EU Horizon 2020 programme. The project is designed to seek stronger action on gender equality in higher education and research and the consortium consists of seven institutions and is led by Trinity College Dublin. Under the framework of the SAGE project and the coordination of the Gender and Women's Studies Center, Kadir Has University (KHAS) has conducted an analysis of the state of gender equality at the University and formulated an action plan for gender equality. We are now in the process of working with University administration and various stakeholders to implement the actions outlined in the plan. This presentation relates our experience, some successful and some less so, of the process of attempting to nudge an institution towards equality.
Part of the keys to success have been that the gender equality plan built on an emerging culture of equality already developing at the university. Prior to the creation and implementation of the equality plan, the University had taken a number of steps demonstrating a commitment to gender equality and this was something that the SAGE project and the gender equality plan could build upon and eased implementation.
Higher education institutions in Turkey are largely centralized top down organizations where Rectors retain an abundance of power. We conscientiously chose to leverage this aspect of our organizational culture to ensure the creation of a more equitable institution through the implementation of regulatory and policy changes. This continued after a change in Rector and reinforced the importance of an upper administration that possesses a gender perspective.
There is a sense that higher education in Turkey is a space of relative equality and lacking in the kinds of egregious discrimination that is too often witnessed in the wider culture. This may in fact be true but it does not mean that there is equality or a lack of discrimination but this widespread

belief spawns a passivity to gender equality issues within the institution. We have experienced little or no outright hostility to the gender equality plan which would be perceived as unacceptable but resistance has taken place in a lack of interest and action. People seem uninterested.
On a more theoretical level, we have also had difficulties trying to implement an intersectional approach to gender equality. The difficulty is two-fold: raising awareness concerning diversity within gender categories but also regarding how to operationalize and implement in a concrete ways an intersectional understanding of gender. Part of these difficulties stem from the cultural context in which we operate and the desire to adhere to an understanding of gender that is both routed in binaries but also committed to gender roles that are narrowly constructed. As we complete the SAGE project we hope to continue to move toward gender equality but also to create a culture of equality overall at KHAS.
Keywords: gender equality, higher education, Turkey, SAGE, gendered organizations

Understanding the challenges of structural change in RPOs out of the perspective of a critical friend evaluator

SCHIFFBÄNKER, Helene, Joanneum Research, Austria

The GENERA project (Gender Equality Network in the European Research Area Performing in Physics) took up the challenging task to support structural change in regard of gender equality in the research field of (astro)physics. This particular field can be characterised as one of low gender awareness, with most partner organisations being at a 'starting' point in relation to engaging in activities for structural change; therefore providing valuable insights in the structural change processes right from the beginning.
From the evaluation perspective, we focused on the phase of negotiating a Gender Equality Plan (GEP) within the various GENERA partner organisation as this phase proved to be as challenging and time-consuming on their side as it was enlightening on ours. By accompanying the 11 partner organisations throughout this process and critically discussing their experiences from our role as a Critical Friend, we could gain interesting learnings regarding the organisational resources, structural change issues, gender knowledge and the role of implementation managers as agents for change.
The evaluation revealed e.g. the missing commitment of the management, unclear understanding of roles within the process as well as different levels and understandings of gender knowledge as delaying or hindering factors of the process. Another problem was that the organizations were often not aware "what they are getting into" in terms of the procedure and the extent of the process.
These findings help to better understand why progress is slow in implementing organisations and which support is needed to be able to implement a GEP. In a next step, the findings of the evaluation were bundled and translated into policy recommendations regarding structural change in RPOs, in particular for starters.
Keywords: Structural change, astrophysics, accompanying evaluation, gender

Open Fishbowl conversation

Input: Dance with resistance

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GEECCO is a structural change project financed within HORIZON 2020 SwafS and lasting from May 2017 to April 2021. As presumably all sister projects, the GEECCO consortium came across the fact, that there are obstacles when implementing Gender Equality Plans (GEP) to European universities. We are facing diverse barriers at each technical university participating in the project, so the goal is to build the "tailor made" strategies and solutions for partners from Austria, Italy, Poland and Spain. Our attempt was to involve experts and get as well expert knowledge about resistances as practical hints for further work. So we invited some of the GEECCO advisors from the non-partner countries, namely from Sweden, Great Britain and Czech Republic, for an exchange session in one of our consortium meetings. GEECCOs 4 university partners, briefly depicted the threats they are facing when implementing their GEPs and formulated questions to the advisors.
The session then was designed as a discussion round were the advisors responded to our questions. Our presentation summarizes the topics of the exchange session and includes some concluding remarks based on the expert's advice, the GEECCO members' experiences and the recent literature on resistances and gender equality.
Keywords: Gender equality, resistance, STEM

Session 31: Intersectionality in research - celebrating equality and diversity

Chair: ERNST, Waltraud
Johannes Kepler Universität Linz, Austria

The salience of gender, race and ethnicity for Indian immigrant women in the highskilled workplace

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The literature on highly skilled immigrants focuses more on the professional lives and careers of men and overlooks the experiences of women. Addressing this gap, this article draws on interviews with twenty-six Indian immigrant women working in the Research Triangle Area of North Carolina. Using an intersectional framework, it examines their professional experiences in their predominantly white and male-dominated workplaces. Findings suggest that while gender barriers exist, race, ethnicity, and nationality assume greater salience for respondents earlier in their careers as they acculturate to the United States mainstream work culture. Gender gains in importance over time. They face pressure to prove themselves, are not taken seriously, and are expected to conform to stereotypical behaviors associated with their gender. Gender and cultural differences also hinder networking efforts. This article highlights the ways in which race, ethnicity and gender are fluid and may be experienced in a variety of ways, sometimes individually while at other times interwoven

with each other. Ultimately, it appears that the experiences of these women share many similarities with other high-skilled women, including white women, in these sectors, in the latter parts of their careers.
Keywords: Indian immigrant women, professionals, workplace, gender, race, ethnicity

Intersectionality and computer science education: Building sensitivity and awareness

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School is the only place that many young people will have the opportunity to engage with computer science (CS), to develop their knowledge, new ways of thinking and interest in this area. However, to inspire and engage students is a challenge for teachers especially to empower those who experience exclusion in technology (e.g., girls). While initiatives such as girls-only events have had much success, they are limited; including only a small percentage of the population and are not realistic in mixed-gender classrooms. Moreover, most students are not interested, or do not feel intrinsically motivated in learning about Computer Science (CS), thus, it is uncertain that they will join any tech related off-campus activities voluntarily or will not choose optional CS related subjects during their school time voluntarily. We argue that it is essential that our youth acquire computational thinking skills and in particularly learning about coding, is of great importance for building a positive economic, developmental, and innovative future. The next generation of jobs will be characterized by new standards requiring employees with computational and problem solving skills in all areas, even if they are not actual technicians. To address the issues that emerged, it is important to design computer science activities that take into account intersectionality and gender aspects in CS. Our approach presents an educational inclusive model which is informed by key literature from gender studies, computer science and the learning sciences, including findings from a large-scale European study and national projects together with educators, educational institutions, sociologists, and physiologists. Play, engagement, and creativity are key components of such inclusive CS activities and foster extrinsic and intrinsic motivators of young learners. The model should help to optimize coding activities for students, explore and apply potential motivators, and finally, show educators how to engage all students equally and make CS something that is accessible, meaningful, and fun for them. Moreover, teachers need to consider social constructs, which may exclude students at-risk from traditional or especially more male-oriented CS curricula. Key factors of the model include: 1) teaching fundamental principles of coding in a constructionist way, 2) presenting a realistic picture of the people and the work in IT professions, e.g., by introducing role models, and 3) building safe environments that provide room for self-expression and creativity.
Keywords: Computer science education, constructionist pedagogy, gender and intersectionality, digital equity, pedagogical issues

Diversity beyond gender stereotypes

ERNST, Waltraud
Johannes Kepler Universität Linz, Austria

This paper explores the ways in which the exclusion of the history of women industrial workers and

of women beyond heteronormative living patterns from large parts of feminist theory have contributed to a stereoptypical figure of women, especially in regard to science and engineering. In discussing intersectional feminist work, it presents with two examples, how this shortcoming can be overcome.

For example, technological devices designed either for "the general user" or specifically for women or men, often exhibit and reinforce gender stereotypes. This is demonstrated by research on electric shavers (van Oost, 2003), websites for women (Rommes, 2011), and "computational artefacts" (Bath, 2014). With the elaborated concept of the "gender script" (Rommes, van Oost & Oudshoorn, 1999) it has been shown how modes of use designed into technological objects often devalue femininity and actuate stereotypically gendered patterns of use. However, in her discerning analysis of feminist technology studies, Catharina Landström (2007) uncovered that these obstacles do not prevent all women from becoming more deeply involved in technology (p. 13). She proposes to study how technological discouragement of women is entangled with the "heterosexual matrix" (Butler, 1990) and how femininity and masculinity may provoke diverse ways of "wanting to be-long" (Probyn, 1996). Therefore, Landström (2007) suggests to refigure "subjectivity as constituted in complex relationships with technology, placing the relationship as the crucial mechanism, not identity" (p. 17). This suggests that replacing gender as a deterministic binary within the apparatus of research with a more complex and fluid way of relating promises a more diversified investigation of "intra-action" (Barad, 2007) between humans and machines.

Second, women have been the operators of industrial machinery for centuries. However, as extensively analyzed by feminist research, as workers they have also been agents of change. For example, Maria Tamboukou (2016) analyzed the birth of the feminist movement in Europe in the nineteenth century on the basis of the archival documents of seamstresses working in the garment manufacturing industry. They struggled to unify women workers to fight for their rights and better material living conditions, both on the streets and within institutions. Tamboukou (2016) delineates the "assemblage of women workers' radical practices, which are inextricably entangled in the political, social and cultural formations of modernity" (p. 193) without ascribing to them any specific heroic or unified autonomous subjectivity. Instead, following Foucault, she describes their technologies of the self as proceeding "intra-actively" with changing technologies of both work and political struggle. She understands them as "narrative personae," as "conceptual figures, whose actions leave behind them storylines to be followed in the pursuit of meaning and understanding" (Tamboukou, 2016). These storylines depict women as competent knowers, professionals in the garment industry, writers, and powerful political agents. As a fluid collective political subject, the seamstresses serve as a networking example of emancipation from domination and ascribed gender norms. Their struggle can be understood as an emancipatory interference with material-discursive fields of profit and subordination—fields in which industrial machinery acted as a powerful and ambivalent material agent.

Keywords: Women worker, intersectionality, lesbian, industrial machine, gender stereotypes

Gender (in)equality through the lenses of native and migrant researchers in German academia

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Academic work in Germany and elsewhere is known for high competitiveness due to restricted resources and limited tenured positions, as well as for persisting gender inequalities especially in leadership positions. Yet, Germany demonstrates a high degree of childlessness mainly among

female scholars, which makes gender inequalities particularly explicit. This is all the more surprising, since care obligations are believed to hinder scientific career in research performing organisations. Parental duties allegedly force women to postpone or even to renounce motherhood in order to fit into the pervasive ideal of a devoted and ever available scholar. This arouses the question why childless women still face gender inequalities while climbing up the academic ladder, and whether there exist feasible options for change.

Both career inequalities and childlessness are being repeatedly brought in connection in German scientific discourse as well as in public. While research usually identifies structural causes, such as precarious employment, fixed-term contracts and uncertain career prospects, recent suggestions have been voiced that not structural factors alone, but in combination with certain values and traditional role models result in gendered career inequalities. This article addresses viewpoints and experiences of native German scholars (N=25) and researchers with migration background from the former Soviet Union (N=10) to analyse their perceptions of gender equality in German academia. The study focuses on individual viewpoints and wishes of women scholars stemming from different academic contexts and, thus, coined by different cultural values. Such an approach makes it possible to entail individual demands, that are increasingly associated with good job conditions, and figure out measures for cultural change.

Based on a qualitative empirical study, the article puts native German and migrant Russian-speaking early career researchers in German universities in the centre of attention in order to reveal their perceptions of gender (in)equality in German academic institutions in a comparative manner.

Highly qualified scholars from the former Soviet Union (FSU) represent one of the largest migrant populations in German academia (Wolffram, 2015; DAAD, 2016). Moreover, they demonstrate a high proportion of women in various subjects ranging from STEM to humanities. Besides, the standardization of the qualification sequences in the German academia is comparable to those in the FSU, which facilitates the familiarization phase after immigration. In that way, the paper contributes to a current discussion on gender equality and diversity in German academia.

Foregrounding diversity approach, this empirical study draws upon explorative interviews and focuses on precariousness, family formation plans and career advancement in native and migrant scholars. It reveals the importance of gender socialisation and culturally rooted stereotypes. In a strict sense, it does not report on top-down policies promoting gender equality, but it provides deliberated considerations on implications for diversity officers and management leaders in German research organisations and elsewehere.

Keywords: Gender equality, German academia, native and migrant researchers

STREAM: Teaching STS

Session 21: Engineering education and STS: courses and teaching/learning units on the social and ecological responsibility of engineers

Chair: BAIER, André

TU Berlin, Germany

Integrating social sciences and humanities into teaching about energy

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In the context of the Erasmus funded project TEACHENER (https://www.teachener.eu/) teaching modules have been developed that aims to fill the gap between social sciences and humanities and energy teaching at universities in Europe. Innovative educational practices will provide the graduates of technical energy studies with interdisciplinary skills, knowledge and competencies in social sciences and humanities.

Each of the 8 modules addresses one topic: energy awareness; philosophy and ethics of energy development; energy and the public; social impact of energy technologies; technology assessment; social risk perception and risk governance in smart metering; conflict management; social aspects of energy production and use. Curricula related to technical energy studies are focused by the content of the courses; this is reflected in the examples chosen. However, it is possible to adopt course structure and social scientific contents to other fields of technology.

Basic idea is that teachers with engineering or natural scientific background are able to teach the courses. Thus, content of the modules is prepared accordingly. Each module consists of up to 4 sessions that combine interactive methods such as group work, role play or oxford style discussion, and to a lesser extend lecture formats.

To date all modules have been tested in regular courses and two winter-schools at the higher education institutions that are partners within the project. In the first half of 2019 all related teaching materials (group work instructions, presentation slides, and a teacher's book) will be freely available at a web platform (all materials are in English).

The (shortened) teaching unit that is going to be conducted is a group work and discussion taken from the first session of the module on technological assessment. This group work takes daily experiences

as point of departure and the subsequent discussion leads the students to reflect on the complex interdependency of the social, political, ecological and economic surroundings in which technology decisions are embedded.
Keywords: Energy teaching, technology assessment, interactive methods

Building blocks and tesserae: A no-frills integration of an education for sustainable development in existing (engineering) courses and lectures

BAIER, André
TU Berlin, Germany

The Blue Engineering Course is a student-driven course design that addresses the social and ecological responsibility of engineering. The student-driven character of the course is achieved through a set of over 150 building blocks and tesserae. These are two types of teaching/learning units which are well-documented freely available online.
The building blocks contain all necessary content and didactical instructions so that just about anybody will be able to facilitate a demanding 60-90 minutes workshop on a complex topic, like ethical codes, recycling, pre-implantation diagnostics and cooperatives. This is possible through the extensive use of methods that take the shift from teaching to learning seriously, e.g. role play, station learning, crime scene investigations, educational games and democratic pedagogy.
Therefore, the person conducting the building block does not function as an expert that simply conveys knowledge but as a facilitator that organizes a complex group process.
Tessarae complement building blocks and are typically 5 to 15 minutes long. Thus, they may not only be used in courses but can be easily integrated into lectures. Tesserae therefore offer not only a valuable, didactical break within each lecture but also the chance to acquire competences of an education for sustainable development in a teacher-centered environment.
Overall the modular course design allows a flexible adaptation to the local circumstances of a course, lecture and university. The design of the Blue Engineering Course has been implemented at Technische Universität Berlin since 2011. Here, over 800 students participated in 14 consecutive semesters.
In addition, the course design is used at TU Hamburg (since 2013), Hochschule Düsseldorf (since 2016) and Hochschule für Technik und Wirtschaft Berlin (since 2018).
Keywords: Sustainability, ethics, democratization

Making ‘Responsibility’ an issue of engineering: A case study of „Blue Engineering“

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With the permanent increase of opportunities in technology there is also a growing demand for social and ethical inputs, which could make a contribution toward developing not only new or ‘innovative’ devices but technological solutions for complex ecological and social problems. Therefore it is crucial to transfer issues of social-, climate- and also gender justice into the classroom of engineering. As Lucht & Paulitz (2008) show, to focus on social matters of technological materialities is important for three reasons: In the first place, engineers are not necessarily enabled to take sociological and ecological responsibility into account while doing engineering, secondly, doing engineering is not all about developing something technical but moreover about constructing a social artefact for its use in a

specific surrounding and thirdly, doing engineering is also doing gender.
The student-driven course design "Blue-Engineering – Engineers with social and ecological responsibility" represents an innovative concept of binding together democratic and participatory learning environments as well as a certain focus on social and environmental responsibility within teaching engineering. The students acquire the competence to unveil the complex interdependence of their social, political, ecological and economic surroundings. Since the start of the course 2009 around 140 teaching/learning-units have been created by students for the course as well as made openly available for other educators on the website. Specific topics of the seminar include gender and diversity, workers' rights, risk technologies, code of ethics and many more. The course is conducted entirely by student tutors with quality assurance through the faculty chair. About 90 students participate each semester at TU Berlin alone, but the Blue Engineering network has spread to four other German universities as well. Due to the course design learning-modules are self-consistent and could be implemented in a range of other contexts and learning environments.
In our contribution we present an interactive teaching/learning unit that focuses on gender and diversity. Despite huge political efforts to involve more women into the field of technology, numbers of female participation are still low. While there are some reasons to find within gender-stereotype-based socialisation and education, it has also been claimed, that women experience various discriminations in science and technology and that technology remains gendered. Thus, the assumption still unfolds that technology 'is for men only' (Weber 2017).
In connection with that presentation we would like to share results of our empirical study on "Blue Engineering: a pathway to a responsible self?" Here we present some findings of our analysis of student's learning journals to reflect about the learning outcomes of the presented unit.
Literature:
Lucht, Petra/Paulitz, Tanja (ed.) 2008: Recodierungen des Wissens. Stand und Perspektiven der Geschlechterforschung in Naturwissenschaften und Technik. München.
Weber, Jutta 2017: Einführung. In: Bauer, Susanne/Heinemann, Torsten/Lemke, Thomas (ed.): Science and Technology Studies. Klassische Positionen und aktuelle Perspektiven, 339-368. Frankfurt am Main.
Keywords: Engineering, responsibility, participatory learning unit, case study

Blessings of open data and technology: e-Learning examples on land use monitoring and E-mobility

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The combination of theoretical knowledge and practice-oriented education are key for future professionals and young scientists. Open data and technologies are providing manifold opportunities within the scope of open science era. In order to utilize such enormous potential, a new set of concepts and approaches need to be adopted by the knowledge institution for efficient capacity building. The "OpenGeoEdu1" project is developing an open eLearning Platform on the geospatial domain. At this development stage, the project partners come from both educational and applied research institutions. Every partner contributes their thematic expert knowledge, offers dataset, services that can support practice oriented career preparation with the blessings of open data and technology. The major components learning module are: (1) Lecture, (2) Test, and (3) Exercise; besides short teaser and technical tutorials. The multimedia components includes: videos, scripts, interactive elements, web-portal and so on. The lectures are introducing to the scientific state of art and background on the study

topic (e.g. land use monitoring). Upon completing the lecture section, the participant should be prepared for working with given exercises that deal with data and basic analytics. Participants are encouraged to pass a short test (max 20 minutes) for each case study module.
The research area of "Monitoring of Settlement and Open Space Development" at IOER is offering the case study module on "Land Use Monitoring". The practical exercises include: (1) computation of land use share for settlement and transportation (WebGIS, QGIS), (2) estimation of transport related land use indicators (OpenStreetMap), and (3) quantification and detection of changes in settlement and population density (open-GHSL, ArcGIS-online).
The Department of Geodesy and Geoinformatic at University of Rostock is offering the case study on E-Mobility. The practical exercise on eMobility are: (1) assessment of accessibility to electric vehicle charging stations (2) analysis of national charging infrastructure in the regard to consumer potential of electric vehicles (EVs), (3) planning a journey in Europe and evaluating this route with regard to the availability of charging stations.
Most of the practical exercises are designed in consideration of space (scale of analysis), time relation, scientific merit and practical relevance to spatial planning; however, there are open options if someone wants to choose a study scale, study area, dataset and software packages. For doing so, each of the practical exercise prepared in three different format: Basic, Advance and Click-by-Click. The Basic version describes the components: general problem, data research, modelling, visualization and interpretation; besides related clarifications, tips and tricks. The Advance format introduces the tasks and guidelines for experienced learners. Both Basic and Advance version are independent and flexible to space, time and software requirements. The Click-by-Click version demonstrates an example for beginners with a specific spatial scale, time and software dependency. Every instruction is documented point-by-point with the necessary literature and further clarification; however, it does not include any results rather asked to produce. A test course were administrated in WS2018/19 where the active tutoring was offered and the next one is scheduled in SS2019. The course participants have the opportunity to earn academic credits points (also certificate) upon completing all formal course requirements. The learning contents available on public platform (e.g. Github) under open license (CC-BY-SA 4.0). Therefore, everyone can enjoy to learn, participate, contribute and disseminate.
Keywords: E-Learning, open data, spatial information, land use monitoring, e-Mobility

Session 23: Teaching STS: building the knowledge basis

Chair: WIESER, Bernhard
TU Graz, Austria

Transformative Encounters? An experiment in exposing biotechnology students for knowledge about science-society relations

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Scholars from the Social Sciences and Humanities (SSH) suggested that research training in higher education can be considered a fruitful approach for making students from the natural sciences and engineering consider science-society relations to a greater extent (Mejlgaard et al. 2018; Bernstein et al. 2017; Tassone et al. 2018. In this paper, we present an experiment in preparing biotechnology students for considering science-society relations. The experiment was a PhD course for biotechnology

students on Responsible Research and Innovation (RRI) held in Norway in spring 2018 that we developed for a national centre for biotechnology called the Centre for Digital Life Norway (DLN). The course was based on the STS scholarly literature in combination with history, philosophy and sociology of science, and can be seen as a possible approach to implementation of STS teaching for students from the natural sciences and engineering. The main course objective was to enhance participants' knowledge of how scientific work is intertwined with relations in society and to introduce them to ideas of democratization of science and current international discussions on RRI.

Considering that RRI is based on long-lasting developments in the social science and humanities scholarship on emerging technologies, the course started from the assumption that the participants needed to learn about the main premises of this literature before being able to comprehend the implications of RRI for their research practice. The aim of this course was therefore to give the participants a deeper understanding of the reasoning behind RRI as policy idea, not only to teach the concept of RRI. In the paper, we argue that through teaching STS and Philosophy of Science, RRI can be better explained by focusing on the background, content and context of RRI in order to give the knowledge and tools to understand also potential (and likely) new developments in this landscape of research policy. In other words, the thoughts from STS and Philosophy of Science's that underlies RRI are in this case more important than the term or the policy strategies themselves.

An implied assumption is that any preparation to consider science-society relations entails a set of learning processes, but also a process of reconsidering one's own ontologies. When teaching STS to natural scientists or engineers in a setting like this, RRI does not make sense unless one is familiar with theories that science and technology development are neither deterministic nor value-free and unless one knows why engagement with society is called for.

In Graz, we want to contribute to the workshop by sharing our written rapport on this PhD course, which includes a detailed description of group exercises and plenum discussions, as well as an ethnographic analysis of the event, and the syllabus and other teaching materials. We are keen on discussing and getting further insights into the teaching of STS to scientists.

Keywords: Teaching STS, Biotechnology, Science-Society Relations, Responsible Research and Innovation (RRI)

Technological somnambulism: a key concept for teaching STS?

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I'd like to participate in the "Teaching STS" workshop by contributing to the theme "Building the Knowledge Basis." For the workshop I wish to contribute to a discussion of which suitable textbooks and key concept(s) that I think would be valuable to teach undergraduate students.

I am an STS-trained instructor who have been teaching two introductory level STS courses since the fall of 2015 at NU-Q, the twelfth and the only internationally-based school of Northwestern University. Known by our students as a Media School, which grants undergraduate degrees in journalism and communication, NU-Q also has a Liberal Arts Program that offers social science and humanities courses to our students. One of the disciplines represented in the program is STS.

Drawing from my own experience teaching STS courses in the past four years, I propose to discuss several textbooks that I have used in my courses. They are: Sergio Sismondo's An Introduction to Science and Technology Studies Second Edition (2010), David E. Nye's Technology Matters Questions to Live With (2006), Gillespie et al.'s Media Technologies (2014), James E. McClellan III and Harold Dorn's Science and Technology in World History An Introduction, Third Edition (2015), Jim Al-Khalili's House of Wisdom (2011) and Harry Collins and Trevor Pinch's The Golem What You Should Know About

Science Second Edition (1998). Each of these texts have its own advantages and disadvantages that I'd like to share and discuss. For example, Sismondo's text serves as a good text to introduce STS to beginning graduate students and upper-level undergraduates, but it doesn't serve quite well for undergraduate students. The book synthesizes many good STS literatures, but each of the thematic chapter is too concise for undergraduate students to understand the topic fully. I have therefore used only selected chapters from the book. I've also supplemented my textbooks with other readings that are pertinent to my students' interests such as articles on science and film and science and journalism. As for key concepts and theories, there are several that I think are important to introduce to students such as "sociotechnical system," "co-production," "technoscience," "technological determinism" and several others. Of all these concepts, I'd like to propose one concept that perhaps captures the essence of STS pedagogy at the undergraduate level. That concept is "technological somnambulism," a term that Langdon Winner coins in his book The Whale and the Reactor (1986). Winner mentions and proposes this term as an alternative to "technological determinism," and argues that in the increasingly technoscientifically complex world that we are living today, we need to be cautious not to fall into uncritical acceptance of scientific and technological development. In other words, we need to be mindful not to become technological sleepwalkers (Winner 1986, 10).
Keywords: Teaching STS, technological somnambulism, key STS textbooks

Teaching the classics: time to revise or time to forget?

WIESER, Bernhard
TU Graz, Austria

Teaching is an important element of scientific reproduction. Apart from educating new generations of academics, teaching is also a way in which members of the scientific community negotiate the theoretical basis of their discipline. What belongs to the core knowledge of STS? Defining a selection of relevant publications that embrace STS as a discipline is of course not an easy task.
Beyond this apparent difficulty, it is possible to challenge the idea of a core body of knowledge in the first place. Arguments in favour of an explication of what is expected to know by those who graduate from STS programmes may include claims as follows. A common ground enhances mutual understanding especially amongst scholars with primary academic training as diverse as it is characteristic for STS. Clarity about shared literature enhances peer review processes ranging from master- and PhD-thesis to journal papers, books and project proposals.
Taking a point of departure in acknowledging the usefulness of specifying what counts as core literature in STS teaching programmes, there is a range of issues arising from the nature of classical texts, which may be considered to belong to the disciplinary body of knowledge. Many of the classical STS text were written in the 1980s and their claims may appear in a different light today.
Some of the authors contradicted their earlier work in later publications. Furthermore, there are highly regarded texts with mistakes and faulty (empirical) claims. Teaching classic STS works does not only need to take into account early reviews but also recent findings relevant for the issue at stake.
As a contribution to the workshop, I will invite the participants to generate a list of core STS literature. In a joint deliberative process, the participants will be encouraged to select one text each they feel compelled to review. The workshop aims to conclude on how a critical revision of the discussed texts would enhance their further use in teaching STS.
Keywords: Teaching STS, core literature, review

Session: 24: Meaningful science and technology education for kids

Chair: THALER, Anita[1], HOFSTÄTTER , Birgit[2], JAHRBACHER, Michaela[1,3]

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Kids4Wearables: from fashion to wearable Technologies

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The project Kids4Wearables is an example of transdisciplinary development of inclusive technology education. Together with teachers of five schools in the region of Salzkammergut (Upper Austria) we develop didactical concepts that use fashion as a vehicle to discover wearable technologies as a field of technological innovation. Fashion is a topic meaningful to many young learners regardless of their gender. Starting from fashion, leading through electronic enhancement of clothes or accessories, the participating pupils themselves are invited to come up with their own ideas for wearable technologies. They are supported by physicists, computer scientists, an artist, students of education and their teachers to realize some of their ideas. In this talk I will introduce the idea of the project in detail and will present some results and insights on the process.

The project is funded by FFG through the scheme of Talente Regional.
Keywords: Education, transdisciplinary, inclusive education, technology education

The children's manifesto on smartphones

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'Beyond technology in primary schools: the role of technology ownership in different subjects and the impact on pedagogy' is a project conducted collaboratively between three primary schools and three Universities each from Denmark, Sweden and Finland. The project's aim is twofold: First, we aim to identify the practices, and appropriateness of use when primary school students use 'Bring Your Own Device' (BYOD) technology at school. Such technology could include any kind of smart technology (phones, tablets), but also cameras, digital watches and any applications that such devices may be using to access information or collect data. Second, we are interested how school-owned technology is used to connect with such devices including if they are used to collect information from students.

Since the beginning, through meetings, letters of informed consent students, teachers, and the students' parents were invited to be involved and participate as actively as possible, including in the analysis of the collected data. We worked with students and teachers on reviewing, refining and adding to the research questions and research design, asked students to reflect on and expand on their own transcribed discussions on selected topics and view and help to interpret video data from classroom observations to develop what Annemarie Mol (1999) describes as 'construction stories' that come together also because 'we get stuck on some things' and not others. Asking the children to be collaborators and experts of their own lives meant that they were also asked to (re)configure their world (Barad 2003) for others.

What is presented here is the production of 'the children's manifesto on smart phones', a written reflection produced recently by the class of the then 15-year old Danish primary school students.

The children considered how they experienced smartphones in their lives within and outside of school and prepared a list of recommendations. The production of this work was inspired by the researcher's reading of Floridi's (2015) edited book called the Onlife Manifesto. In it he writes that the technologies in our lives are shaping 1. our self-conception (who we are); 2. our mutual interactions (how we socialise); 3. our conception of reality (our metaphysics); and 4. our interactions with reality (our agency) (Floridi 2015, p.2). In this presentation, I will discuss the children's reflections in the light of Floridi's description of 'ICTs as environmental forces'.

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Mol, A. (1999). Ontological politics. A word and some questions. The Sociological Review, 47(1_suppl), 74-89.

Keywords: Smart technology, construction stories, children as co-researcher

Experiencing young learners from non-directive schooltype as science project participants.

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After multiple participation within science projects with groups of young learners exists some ideas of possible building blocks for didactical concepts.
The pupils are based in a private school with non-directive education that exists since 1992. The pedagogical principles could be described as 'contemporary Montessori' combined with actual knowledge about neuronal development.
The short presentation touch the following topics:

- developing a narrative for long term projects
- gender problematic within active research situations
- building up a relationship between the involved Scientists and the pupils

The experience is based on an Artist-Science-project for intelligent animals and a School-Science-project for wareable technologies.

Keywords: Technology education, participation, transdisciplinarity, gender, diversity, progressive education

Students' vision and representation of gender-inclusiveness in science

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National Research Council Institute for Research on Population and Social Policies, Italy

The contribution presents data and lesson learned on a national high school competition fostering students' critical reflections on women' role in science. The competition, that involved 120 high schools and more than 830 students, was organized in the framework of the H2020 – GENERA project

(https://genera-project.com/) and it constitutes one of the outcomes of the first Gender in Physics Day (GIPD) event, organized by the Italian National Research Council (CNR) and the Italian National Institute for Nuclear Physics (INFN).
The Competition required the candidates to create a project about the issue of gender equality in physics with the aim to explore students' perceptions on the prejudices embedded in dominated culture concerning the role of female scientists in society. The competition produced tales, reportage and videos about gender equality and the female role in scientific careers.
In line with the learning theories, such as the cognitive constructivist theory (Bruner, 1966) and the social constructivist learning theory (Vygotsky, 1978) we support the idea that meaningful knowledge raises when students are actively involved with learning materials (Long et. Al, 2016).
The school competition has proved to be an effective tool to sensitise students on Responsible Research and Innovation topics and on gender equality in the specific case. The results show that school competition could be used as educational tools as well as awareness raising activities for high school students with a relevant impact on group learning dynamics and on teachers' active involvement. The paper presents the data on the students' participating at the school competition and a evaluative students generated contents structure useful to promote further edition of the school competition. Particularly, a detailed analysis of the gender composition of students, of the supporting teachers, of the typology and the geographical distribution of involved schools along with the team composition of participants is presented. Moreover, it presents the first results of a content analysis related to videos, which was carried out based on an evaluation schema. In particular, the framework takes into account different features such as the technical and narrative characteristics and how women and men scientists are represented. The analysis of the explicit and hidden contents shows students' perception and attitudes toward gender inclusiveness in science.
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Vygotsky L. 1978. Mind in Society: The Development of Higher Psychological Processes, ed. M Cole, V John-Steiner, S Scribner, E Souberman. Cambridge, MA: Harvard Univ. Press
Keywords: Gender equality, school competition, women in science, gender equality, group learning dynamics

What could possibly go wrong? About evaluating technology education projects

THALER, Anita
Interdisciplinary Research Centre for Technology, Work and Culture - IFZ, Austria

Having done technology education projects myself, I always had the strong need for an evaluation approach, which considers not only 'measurable outcomes', but includes the whole learning environment and process as holistic as possible. My preferred approach is pedagogical ethnography, which comprises participatory observation, interviews, analyses of documents and learning materials, and reflection workshops. With these ethnographical methods, teaching and learning can be accompanied in their 'making and doing'. Results from pedagogical ethnography are not limited to verbally and consciously accessible information, nor are they censored by social desirability or 'political correctness'.
However, real life brings sometimes additional challenges.
For instance, when

• the evaluation study is supposed to deliver ‘impact indicators’ and ‘before-after-measurements’;
• the same quantitative methods to measure the impact should be applicable for 6 to 15 year old kids and youths;
• the education project consists of various different sub-groups which are learning/working with different teaching methods at various locations;
• the evaluation team works four train hours apart from the education project.

In the project “Kids4Wearables” all these (and more) challenges occurred. I will critically examine the proposed pedagogical evaluation approach, and present how it has been adapted in the course of the on-going project.

Keywords: Pedagogical ethnography, process evaluation, technology education, science education, schools

STREAM: Life Sciences – Biotechnology

Session 25: Genome editing: revolution or another incremental step in the life sciences?

Chair: LANG, Alexander[1], SPÖK, Armin[2], GRIESSLER, Erich[1]

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Biohacking as possible playground for genome editing

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Genome editing is a technique of molecular biology that allows precise modification of DNA. The advantages and often called revolutionary potential of genome editing are its simple principle and every high precision that allows to target and modify, delete or insert single bases in a large genome. Genome editing can be used on any organism – from bacteria to plants to human and has different potentials and fields of applications, as medicine, agriculture and synthetic biology. Recent applications of genome editing have led to discussions about the potentials and risks of this technique.

In this uncertainty the collaboration of ethicists, scientists and policy makers and a broad public discussion are required to find reasonable arguments on regulation and safe handling of genome editing. So far, these debates circled around the main actors in applying and developing genome editing – academia and industry.

The easy accessibility of genome editing tools, like CRISPR-Cas9, also opens up new opportunities to biohackers. Biohacking, also known as do-it-yourself biology (DIYbio), is a growing social movement connecting people, with or without scientific background, interested and motivated to conduct experiments with biological material outside of academic, corporate or industrial laboratories. As the term suggests, biohacking adopts the idea of hacking, which is to explore a system by one's own interest, trying to address problems playfully in an inconvenient way. The underlying philosophy of the movement is to open up science and research for anyone interested and to spread the idea of open source and sharing information. Recently, concerns were raised that genome editing considerably extends what biohackers can do in their community labs while possibly lacking safety standards and governmental oversight.

In our project we want to investigate the European community of biohackers and analyse the differences and similarities of the various branches of this movement. We will figure out the potentials and risks that biohacking might be associated with by focusing on the role of the DIYbio community's own safety, procedural and transparency standards. Our results will be supplemented by a conducted survey of biohackers on their experience and thoughts on genome editing. In July 2018 the European Court of Justice decided that genome editing has to be regulated under EU harmonised legislation. We will, therefore, also investigate the consequences of this legal judgement for the biohacking community. Based on our research we will draw conclusions about future prospects and risks of genome editing in the biohacker community and about possible needs for regulatory oversight.

Keywords: Genome editing, biohacking; DIYbio, science, technology and society

Ethical and technical challenges in genome editing: A qualitative study with researchers

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Genome editing is shaping the way humans influence fields like medicine, agriculture and industrial biotechnology holding clear transformation potential. The present paper addresses the technical challenges and ethical concerns of CRISPR-Cas9 genome editing. It reports on a project developed in the context of Responsible Research and Innovation (RRI), the European science policy that intends to engage the public by ideally "co-creating the future with citizens and civil society organizations, and also bringing on board the widest possible diversity of actors that would not normally interact with each other, on matters of science and technology"1,2. Our project covers the above mentioned areas of human intervention. In medicine, genome editing plays a role in the so-called P4 model (predictive, preventive, personalized and participatory)3 alluding to the principle 6 of Helsinki Declaration4. Access to genome editing technologies such as CRISPR-Cas9, facilitates personalized and preventive strategies, representing a promising tool for therapy when addressing monogenetic diseases, well-known cancers and other diseases like HIV1,5. The development that makes widespread genome editing technologically advanced however, also makes the ethical and policy discussion urgent. Only through constant argument interchanging between stakeholders like policy makers and governance bodies, responsible researchers and health professionals, together with media and general public inclusion will enable a more participative role when it comes to decision-making of the most controversial interrogations under debate and be aware of the benefits versus risk scenarios that these comprise1,5. Addressing them, as the recent case of a reported human germline genome editing case driven by He Jiankui6 made evident, entails a discussion that cannot wait7. In fact, this research led to revisiting the International Summit recommendations released in 20158 and the article 13 from Oviedo Convention9. Human applications are not the only ones giving rise to discussion. The precise introduction of traits for high yields and disease resistance in crops and animals through CRISPR-Cas9 technology highlights the innovative potential of genome editing tools and shows promise for better resource availability for a growing population1,5,10,11. On the other hand, concerns are also voiced over the use of genome editing for purposes of feeding and the environment; toxicity, safety and species endangering represent a few 5,11.

As part of the Marie Skłodowska-Curie ITN IMGENE, we are investigating genome editing with CRISPR-Cas9 from a perspective of RRI. In the first phase of the study, presently in progress, we are interviewing expert stakeholders. Using semi-structured interviews, we are addressing the potential, limitations and concerns from a technical and ethical perspective. The interview guide was developed to invite participants to talk about human health, animal welfare and environmental safety in the context of different CRISPR-Cas9 applications. The interviewees were senior researchers with expertise ranging from fundamental to applied field of genome editing, respectively.

Representing both academia and industry, these researchers work with a range of research models (from cells to vertebrate animals) and applications. The preliminary results from interviews with approximately 20 researchers from Europe and America (North and South) will be presented and discussed at the conference.

EU Horizon 202012

Keywords: CRISPR-Cas9, technical-ethical challenges, RRI, stakeholders engagement, semi-structured interviews

Gene drive - a game changing technology?

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Gene drives are self-propagating genetic elements based on genome editing, that are transmitted to the offspring in rates exceeding the inheritance rules in nature and conventional breeding.
At present, two main types of gene drive applications are being discussed: a conversion drive, which could spread a specific genetic trait within a population and a suppression drive, aiming to reduce or eradicate a certain population. Applications are suggested or under development for various fields, the most prominent one being the eradication of Anopheles midge carrying Malaria.
Gene drives for controlling invasive species in nature conservation and reducing pest populations in agriculture are also targeted, especially where conventional methods fail.
Due to this unprecedented invasiveness, gene drives are referred to as "game changing" and disruptive technologies, where even an accidental release could lead to irreversible consequences of global scale. While some attribute an enormous potential to this technology contributing in solving world problems, others see the urgency and the need to call out for a moratorium – even including research activities. Several questions need to be answered here. Where does research on gene drives take place? What exactly are the potentials, risks and challenges attributed to this technology? What measures can be taken to minimize risk? Are they enough?
While most countries do have a risk assessment and governance frameworks in place ensuring that only safe genetically modified organisms will be released into the environment, the question is if these regulations are fit and sufficient to deal with the novel properties of gene drives.
Against this backdrop the paper will explore expert and stakeholder views on specific risks of gene drives, the applicability of current regulatory frameworks, and possible needs and options for amendments. It will also discuss if gene drive technology would require - more than other biotechnologies before - a global governance regime as once released, they do not consider political boundaries.
Keywords: Gene drive, invasiveness, reversibility, risk, governance

In hope for ignorance? A popitzean assessment of the current regulation of genome editing in EU agriculture

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Revolutions—be they political, economic, or scientific—are always social events. The question of whether Genome Editing initiates a revolution or represents just one small step in the life sciences thus cannot avoid considering social aspects in one way or the other. The proposed paper emphasizes a specific social aspect, ignorance, and—with a focus on agriculture—discusses ignorance's role in the current state of affairs in Europe.
The recent decade has witnessed an enormous incline in studies on ignorance. Ignorance, it has been shown, can both foster and inhibit revolution-like changes or innovations. In an essay that predated this recent interest, German sociologist Heinrich Popitz emphasized that for societies, ignorance had a preventive effect. Societies, Popitz argued, have an interest to lack full information about norm breaches within their confines. They don't want to have exhaustive deviance statistics, because they fear that if all the breaches happening were known, the societal institutions in charge of control and sanctions would lose credibility and the validity of the norm itself would be weakened. Ignorance about norm breaches prevents a norm from eroding and thus has a positive effect (or perhaps function) for

society.
Put in slightly different terms, Popitz described a difference between discursive and practical realities. Even in „enlightened“, „modern“ and „democratic“ societies, some aspects of practical realities are intentionally kept from entering the discursive reality because they are deemed to damage the value order of the society. The proposed paper elaborates on Popitz' perspective with regard to how the current GE regulation in the EU plays out for agriculture. Here, we are heading for a situation in which ignorance—more precisely the unability to know—clashes with the knowledge claims implied in the regulations. Surprising to many, a recent decision by the European Court of Justice ruled that organisms obtained by mutagenesis are legally genetically modified organisms (GMOs) and are thus subject to the obligations laid down by the European GMO Directive. This, however, comes at a time when it is not possible to scientifically determine in all of possible cases whether a specific organism has been treated by mutagenesis. Methods of mutagenesis mostly operate on a very small scale and it hardly possible to identify changes in the genetic code as being caused by mutagenesis. We are thus heading for a situation in which it is not possible to know how often a specific norm is violated.
After establishing that the case at hand—the GE regulation in the EU—shows some crucial characteristics that make it adequate to be analyzed in Popitz' terms, the paper assesses the specificities of the case and assesses the benefit of a Popitzean perspective on the topic. In concluding, the paper focuses on the most original idea of Popitz', the preventive effect of ignorance as a result of intentional non-action. It speculates on the question whether or not it is the hope of the EU regulators to intentionally create a situation as described by Popitz.
Keywords: Norms, mutagenesis, GMO, agnotology, strategic ignorance

Session 26: Governing life science in the age of globalization: security, ethics, and emotions

Chair: RYCHNOVSKA, Dagmar

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The commons in relation to intellectual property surrounding the human genome

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Developments in biotechnology and genomics has made the human genome a prized possession of immense genetic wealth. Imparting this highly sensitive topic a 'property' edge. This is new industrialization with the human genome at the center. This paper is analysis of the evolving legal concept of property while analyzing the commons, intellectual property and indigenous peoples regime. It explores this premise through the study of bioprospecting and biopiracy of the human genome. Further investigating the tragedy of the commons. Concluding with the need to revisit the commons to avoid a new form of tragedy.
Keywords: Biotechnology, human genome, intellectual property, indigenous peoples

Genetic technologies between globalized markets and national 'gene worlds': the case of expanded carrier screening

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Today, new genetic technologies are increasingly developed by commercial laboratories and offered in a potentially global market. The dynamics of these markets, however, meet with different, path-dependent "gene worlds" (Timmermans/Shostak 2016; Raz/Timmermans 2018) which are constituted by national politics, health systems, cultural contexts and ethical considerations.

The focus on such different gene worlds calls into question the wide-spread belief that once a biomedical technology is made available, there is little constraint on its use if it appears to benefit individual or public health. By contrast, the adoption and use of such technologies is strongly influenced by the special features of the respective national gene worlds they interact with. This will be illustrated in the proposed paper, using the example of „expanded carrier screening" (ECS) and its divergent acceptance in the Netherlands and Germany.

ECS is a novel genetic technology developed in 2010 by commercial laboratories in the United States. ECS aims at informing couples in reproductive age whether or not both partners unknowingly are healthy "carriers" of the genetic variation for the same recessively inheritable and usually rare condition (such as cystic fibrosis, spinal muscular atrophy and many others). If so, each child of the couple has a 25-percent chance of inheriting the variation from both parents and being affected by the disorder. With ECS, several hundreds of recessive conditions are screened for in one single and relatively inexpensive test. Since almost all humans are assumed to be carriers for at least one such condition, all individuals and couples, even those without any family history of genetic disease, become the target group of ECS, thereby creating both a huge market and "risk population". In fact, any couple is "at risk", if a rather small one, to be a so-called "carrier couple".

In addition, many medical researchers as well as ethicists recommend to undergo the screening before pregnancy, because in case of a positive result a carrier couple would have more "reproductive options" (such as preimplantation genetic diagnosis or gamete donation) before than during pregnancy in order to prevent the birth of an affected child.

Initially, ECS has been offered almost exclusively by commercial laboratories as a "direct-to-consumer" test. Recently, however, in a lot of countries and institutional contexts debates have emerged about whether and how to offer ECS within state-sponsored public health systems. The Netherlands are among those countries which appear to be rather open to offer ECS as a public health service: in recent years several pilot studies have been launched, and there is a vivid scientific and ethical debate on the pros and cons of carrier screening. In Germany, by contrast, ECS is hitherto almost completely absent from medical, ethical and public agendas. In the paper, this remarkable contrast will be traced back to the gene worlds characteristic of the two countries. The aim is to elucidate the divergent adoption of a potentially powerful, but ethically controversial biomedical technology in the two countries as well as to further develop the concept of gene worlds.

Keywords: Expanded carrier screening, gene worlds, genetic risk, Germany, Netherlands

"Reasonable mothers go to hospital": addressing the role of resilience in the homebirth controversy.

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While resilience has recently gained prominence in security studies, addressing this issue in health and medicine still remains rather scarce. The aim of our paper is to fill that gap by looking at the Czech controversy over whether it is 'more secure' to give birth in hospital or at home. We suggest conceptualizing of resilience in health and medicine as an important argumentative device that allows to display the individual feelings in the context of birth as 'reasonable' and legitimate parts of the chosen way of giving birth. While normative discourses on body and mind regulating health care choices are not new in STS approaches to health and medicine, the present paper highlights the increasingly individualized and intimacy-based character of such discourses and addresses it through the notion of 'resilience'.

The Czech controversy on homebirth, which has taken place since 2001, is very dramatic including trials and attempts to "ban" homebirths. Its link to resilience becomes visible through the referring to intimacy and security in the public debate on birth: to begin with, medical experts, dominating the public debate on birth, prioritize security of birth over the respecting of all sorts of emotional needs that mothers might have in the context of labor. In their view, the key organizing value for births is organizing security for both mother and child and the latter can only be assured by the hospital staff and appropriate technical equipment provided by maternity hospitals only. At the same time, official strategic documents of medical stakeholders argue in support of medical interventions during birth; even those that might hurt mother's intimacy, because, security comes before the concerns about emotions and appropriate dealing with them.

The paper problematizes the relation between intimacy and security through 'resilience' by exploring how mothers (either giving birth in hospitals or at home) relate to the security narrative, through particular strategies of coping with their need for intimacy of birth. Resilience enables to visualize how mother cope with the category of security and how they evaluate it in response to their feelings in the context of their birth. Our interim findings suggest that both groups put security and intimacy on a weighing scale and that the concept of resilience helps us to understand the dynamic of this relationship. While women delivering in hospital accept medicalized meaning of safety and argue how they withstood all the inconveniences in the name of safety, for women who gave birth at home, safety plays a different role and contains also other than medical indicators.

The paper will benefit from 7-10 biography interviews with mothers who delivered in hospitals and 7-10 biography interviews with mothers who knowingly delivered at home. We thus suggest conceptualizing resilience as a strategy of governing emotions in health and medicine.

Keywords: Birth, controversy, emotions, health & medicine, security

Czech farmers' attitudes and risk perception of genetically modified crops

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The use of genetically modified organisms (GMOs) in agriculture has been highly controversial for more than past two decades. Agricultural GMOs have been framed by their advocates as a safe means to increase food production sustainably and to react to challenges brought by climate change; whereas those opposed to employing GMOs in agriculture pictured them as a threat to biodiversity, animal and

human health, and food sovereignty.

Genetically modified (GM) Bt maize MON810 is currently the only GM crop whose cultivation is permitted in the EU. It was first sown in 2003 in Spain, with the majority of European countries never joining in. In the Czech Republic, Bt maize was grown for commercial purposes from 2005 until 2016 continuously. However, the greatest cultivation area, in 2008, did not exceed 3% of the total maize acreage.

This paper is part of my doctoral thesis which aims to answer the research question "What is the experience of Czech farmers with Bt maize cultivation?". First results show that Czech farmers who grew Bt maize in 2015 base their acceptance of GM crops' cultivation on their experience and some assumptions related to the biotechnology and its effects. Farmers' argumentation in favour of GMOs notably resembles slogans of GMO advocates. They frame GMOs as a progress and means of sustainable development necessary for feeding the world that is beneficial for the environment.

In a follow up, farmers growing maize in the conventional regime of cultivation whose fields neighboured with Bt maize fields will be interviewed. The aim is to compare characteristics of farms and farmers who grew Bt maize with those who did not. Furthermore, qualitative analysis of the interviews should shed some light on how do risk perception and understanding of agricultural GMOs and genetic engineering differ between these groups; and how does GM and non-GM production coexist.

Keywords: GMO, genetically modified crop, farmer, risk perception, co-existence

STREAM: Science and society relationships revisited

Session 27: Valuing and knowing: studying the entanglement of valuation and knowledge practices

Chair: ASDAL, Kristin[1], FOCHLER, Maximilian[2]

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How knowledge and valuation practices travel International mobility and epistemic practice

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Contemporary scientific research is increasingly structured by new regimes of valuation and worth (Fochler 2016). Researchers are asked to meet particular demands, and are evaluated according to the extent to which they live up to these: to publish widely and in international venues; to carry out 'impactful' research; to frame themselves as entrepreneurial in their relation to various forms of capital; to gain external funding (Ball 2012; Müller 2014; Shore 2008). Though these regimes are patchily applied and experienced (Boggio et al 2016; Felt 2017), it seems clear that these modes of assessment are shaping epistemic practices (Müller & de Rijcke 2017). One such demand is for international mobility and collaboration. Excellent scientists are understood as those who have travelled: as Kathrin Zippel (2017) notes, the ideal researcher is framed as a 'hyperflexible jetsetter', able to move from country to country for the good of their research, and with minimal ties or attachments. The policy demand for international mobility (see, e.g., Nature 2017; Wohlert et al 2016) raises a number of questions concerning how knowledge production is evaluated. If excellent science is that which readily travels – for instance via high ranking international publications – what is the value of engagement with diverse local research cultures, and why is this framed as a priority? How do researchers encounter and manage multiple assessment regimes in different national contexts? How does the experience of mobility, and the evaluation practices associated with it, impact upon knowledge production?

In this paper I start to explore these questions by reflecting on the relation between international mobility, evaluation regimes, and epistemic practice. I do this in two ways. First, I use data from an interview study with internationally mobile scientists to discuss the ways in which knowledge production is represented as different in different locations. I therefore outline how mobility is framed as valuable through scientists' insistence on the diversity of local epistemic cultures. Second, I start to explore the key questions at stake in unpicking epistemic practice and international mobility, and the methodologies that can be mobilised to help answer these. I therefore seek to open up discussion concerning the ways in which knowledge – and evaluation of that knowledge – travels, and how mobility is made to matter in the assessment of what is good science.

Keywords: Mobility, epistemic practice, evaluation, knowledge production

Exploring the role of researchers as active agents in the entanglement of (e)valuation and knowledge production

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Recent studies have strongly suggested that there is a connection between the (e)valuation of re search and the directions that researchers take in seeking knowledge. In this presentation, we focus on the role that researchers can play in this articulation process.
We argue that in deciding which values to consider in their epistemic work, researchers do not only, or maybe not even primarily, decide between different regimes of valuation. They also reflect the subjectivities entangled with these regimes, and to which degree they match their own ideas of what being a researcher means. Studying processes of subjectification and how they intersect with valuation practices, hence lends us a fine-grained optics for the empirical study of the smaller and larger decisions that shape the direction of researchers' work and lives.
Focusing on subjectification also helps us to address the agency of researchers in deciding between potentially conflicting principles of valuation, or to resist dominant regimes of valuation. We see researchers not just as mediators translating valuation regimes into epistemic practices. Researchers are active decision-makers with agency to allow specific values to influence their research (or not). At the same time, this agency is framed by the way researchers have been socialised into specific regimes and rituals of ascribing worth in research practices and lives in research. This means ac knowledging that subjectivities are always in the making, and that both, researchers themselves and the institutional and cultural conditions they are situated in (such as different regimes of valuation) contribute to the making of subjectivities.
We explore how studying researchers' subjectification can help understanding how different regimes of valuation are negotiated and enter decision-making in epistemic practices and how this enables us to see tacit forms of governance in cultures of knowledge production.
We conclude by discussing a few methodological cornerstones that can benefit studies of the entanglements between (e)valuation, subjectification and knowledge production: (1) a longer-term, process oriented approach that considers the role of changes of institutional and career-related conditions in time, (2) a biographical approach to get a sense for processes of longer-term processes of subjectification, (3) a relational approach that captures how far researchers actively decide which relations they maintain (e.g. such that reflect their personal values or those suggested by their research environment), and (4) a participatory approach that allows to continually reflect on findings with research participants.
Keywords: Valuation, subjectification, knowledge production, method

Good economics

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How does economics, as a discipline, work to produce facts and values? Despite their roots in laboratory ethnography and their more recent turn to the economy, STS have so far provided few analyses of economics as a fact-producing activity. Those that exist have pointed out the performativity of economics and thus underlined the peculiarity of economic facts: economics does not so much represent the world as it performs its world, so that economic knowledge and economic activities are intertwined. Yet, attention has concentrated on the making of markets and of the economies more than on that of economics and economic facts. The rise of experimental economics

makes it even more interesting to look into the making of economic facts from a STS perspective, because it potentially highlights similarities and differences in how economics and natural science use experiments to produce facts. Further, the repertoire of valuation studies enables us to ask how economics and economists value the facts they produce.
To characterise the peculiarity of economic facts and of their relations with the economy, we ask what makes a good economic fact, that is one that is worthy of investigation, publication, citations and application. Our focus is on experimental economics, which are now an established part of economics. Relying on the toolkit of laboratory ethnography and actor-network theory, we follow experimental economists in their fact-producing and value-producing activities. To do so, we start from academic papers, considered as key sites for the assembly of economic facts and values. We analyse these papers in combination with interviews with their authors, which allows us to confront the finished product with accounts of its making-of. We are particularly interested in the various forms of valuation that come into play throughout the process of conceiving an experiment, writing a paper, and publishing. How are economic papers written, published and valued? What can the study of papers tell us about the interplay between experimental practice in the lab, social organization in the discipline, and applications in the economy?
Our analysis suggests that academic economics papers do two things. First, they bring the whole discipline into the lab, along with its very structured hierarchy and well established norms, and this is a crucial part of constructing economic objectivity. Second, they translate what happens in the controlled world of the experiment – designed to provoke specific types of behaviours – to "the real world", thereby performing a move from the abstract to the concrete that makes economic knowledge (relatively) actionable. From there, we can interrogate potential tensions between those two operations (performing objectivity and performing actionability): in an academic field that highly values general findings, what is it to be good for publication and what is it to be good for application? Thus, we explore what good economics is, and how valuation-practices take part in the fact-making exercise.
Keywords: Laboratory studies, valuations, economics, performativity, experiments

Linking measurements and values in the process of knowledge production. Infrastructures of knowing in the creation of a scientific article

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Our contribution seeks to gain a more detailed insight into the entanglement of practices of value tion and practices of knowledge production. Specifically, we focus on the role of measurements as specific infrastructures of knowing in processes of valuation and evaluation. To this end, we propose a conceptual model of the interrelation of measurements, values, and evaluations, drawing on insights from semiotics and Bourdieusian theory of language. This model understands evaluations as linguistic links between values on the one hand and measurements on the other hand and specifies the three different processes of operationalization, nomination, and indetermination as forms in which these links can be constructed.
Starting from this, we will ask how knowledge practices are strung together in the production of a valued object. Empirically we will illustrate our conceptual model using the creation of a scientific article as an example of a specific practice of knowledge production. A scientific article is the product of a number of different activities that are bundled in a complex and often time-consuming process: Starting with the initial development of a research question and the design of a research project,

reading of the relevant literature, followed by data collection and analysis. In addition it is necessary to develop a structured narrative or storyline and a consistent interpretation, and write everything up in order to produce a publishable manuscript.
Putting the model to use we can view each of these activities as the forging of a value-measurement-link. For instance, in developing a research question we need to name topics, most commonly on the basis of previous measurements and results, thereby evoking contexts, stating (inter-)relations etc. This activity widely establishes linkages of preexisting valued terms, topoi, measures or measured values or objects through nomination. Conceiving and designing a study requires to link specific values (objects, questions, etc.) to specific measures or classifications. In doing so we need to operationalize which measure can tell us something about this value. Interpreting the resulting data and embedding the results in the research field then again present processes of nomination, that is, the connection of a given measurement to a label that denotes a specific value.
The process of indetermination may come to effect when a publication is reinterpreted and former interpretations and value-measurement linkages are put into question, so that the meaning of the link becomes indeterminate, which does not necessarily need to be a failure, but can also open up new perspectives.
The example thus also highlights how value-measurement-links are commonly connected in chains of linkages that oscillate between valuing and measuring, and that thereby re-create, transform and modify values and measurements. We conclude that it is the specific interplay between the interpretative openness of language connected to valuation practices and the seeming tendency of numbers to fixate meaning associated with measurement and thereby practices and infrastructures of knowing that drives these chains.
Keywords: Evaluation, measurement, value, scientific knowledge production, Peirce, Bourdieu

An oracle, pushed to the limits: Norman C. Dalkey attempt to assess the correctness of value judgments with Delphi procedures, and some reflections on the nature of knowledge in decision processes

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The early decades of the Cold War saw an increased interest amongst policy analysts in the Western part of the Iron Curtain in techniques of prospection. To them, one of the main drivers of history—and especially of the Cold War—was technological. Foreknowledge of coming innovations and breakthroughs in science and technology thus appeared to be a crucial advantage in the global confrontation of powers. To this aim, researchers at the RAND Corporation, a Californian think tank financed mainly by the US Air Force and the Pentagon, developed Delphi, a technique of prospection that pooled expert opinions in order to predict scientific, technological, and social innovations.
While the development of Delphi and its further role for and career in the field of futurology have been sufficiently analyzed in recent research (e.g. in the work of Jenny Andersson, Kaya Tolon, and myself), this paper turns to a later development: Norman C. Dalkey's attempt, in the early 1970s, to use Delphi to assess correct value judgments. Dalkey had been a collaborator on the early attempts with Delphi at RAND during the 1950s and continued to experiment with the technique. Not surprisingly, policy decisions not only required knowledge about factual issues, but also implied judgments of value. Dalkey was convinced that Delphi would be a technique that allowed for assessing "the excellence of value judgments" and thereby contribute to decisions that were both more rational and more reasoned.
Two reasons justify highlighting Dalkey's attempt to measure the correctness of value judgments. First,

the parallels he sees between estimating facts and estimating values have some crucial repercussions for understanding the notion of knowledge held by him and fellow these Cold War policy analysts, and on the role knowledge played in policy decisions. Second, Dalkey's approach is an informative source for the current debate because of his unorthodox standpoint. While we are discussing the interminglingness of practices of knowledge and valuation, he did not even assume an ontological difference between facts and values.
Keywords: History of social science, prognosis, experts, valuation, policy analysis

Value work: Doing valorisation in practice

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Within academia there has been a concerted effort to move away from the so-called 'ivory tower' image for some time. Already in the 1970s, ideas about societal relevance and impact were being put onto the agenda, with the Netherlands being considered one of the front-runners in this move (Benneworth & Zomer, 2011). The institutionalization of so-called 'third mission' activities reflected the changing relationship between science and society (Etzkowitz et al., 2000). Iterations of the 'third mission' discourse takes many forms, most notably 'societal relevance' or 'social impact', in the Netherlands it is referred to as valorisation (De Jonge & Louwaars, 2009; Shore & Mclauchlan, 2012).
Valorisation is often seen as the articulation of the societal value of scientific work. It has become an important criterion in funding applications and in the assessment of the societal impact of individual scholars. At the same time, what counts as societal value, and how this should be assessed in practice, remains unclear. Valorisation is often reduced to concrete and quantifiable forms of economic knowledge utilization, or seen as a matter of science communication, belonging to the ever-increasing marketing departments of universities. The term valorisation is often ill-defined, thereby hiding expectations and assumptions about the place, role, and ideals of the contemporary scholar in our society.
In this paper, we scrutinize practices of valorisation by showing what it actually takes for scholars to valorise their work. Based on two empirical case studies of different practices of scholars' funding applications and knowledge translations, we argue that valorisation requires specific activities:
scholars have to prepare their scientific facts in order for them to become (e)valuated and valorized as having a desirable societal impact. In doing so, scholars anticipate normative appraisal, and enact, articulate and contest different registers of value, including ideals about the role and place of the scholar in our contemporary society. We call these activities value work. We show that value work pervades the whole process of scientific knowledge formation, from decisions regarding funding and research priorities, to the choice of which theories and methods are to be used, as well as how best to communicate research findings. We argue that the notion of value work (in contrast to valorisation) helps to make visible the deliberate efforts that scholars undertake in order to attribute relevance and value to their knowledge claims at different stages of the research process. We suggest that greater attention to the actual value work in valorization practices can inform funding agencies and universities when promoting valorization and societal impact, preventing an instrumental view on valorization that is easily seen as yet another box to tick on the path to individual academic success.
Keywords: Knowledge production, valorisation, societal relevance, value work, valuation

"How many jobs has your research created?" Enacting value from Norwegian biotechnology research

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As in many countries, Norwegian science policies on biotechnology research have since many years highlighted the aim of value creation. For example, the title of the national biotechnology research strategy is "Biotechnology for the future of value creation, environment and health." Another example is the "Digital Life Norway (DLN) – Convergence for Innovation" initiative by the Research Council of Norway´s (RCN) biotechnology research funding program, which launched a national biotechnology center with the aim "to create economic, societal and environmental value for Norway from biotechnological research and innovation." We studied these kinds of documents in order to explore how these policies construct and imagine value practices in and through biotechnology.
In this presentation, we give a short summary of this document analysis before we will turn to the—in our opinion—even more interesting question which consequences this focus on the expected generation of economic value has for knowledge generated in biotechnology research projects.
Through which practices is public and economic value produced in a set of biotechnology projects like DLN? How does the policy focus relate to what researchers value in their work? To investigate into this issue, we interviewed research projects funded under the DLN-initiative.
A first finding in an early phase of our research was that the documents and the research center are just two examples of a set of heterogenous sites in which valuation is performed in biotechnology. Other sites caught our attention, such as the program board of RCN's biotechnology program, a range of peculiar intermediary actors that have emerged to drive innovation in biotechnology research, as well as tailor-suit innovation workshops. The first author of this paper did participant observations in such events to study how value is actively constructed in such spaces and whether researchers modify their research aligned to such events in order to enable economic value creation.
After presenting how value is performed and imagined at these heterogenous sites, the paper will discuss and reflect on in how far there is a tendency towards convergence of imaginations among these sites or whether friction points prevail. For example, we saw in certain sites that value is measured in terms of the number of jobs and start-up companies created. Researchers' experience with economic value creation is framed as deficient which leads to repair activities such as that they are offered courses in asset management and business development. In addition, people with experience from business and industry are recruited into research funding and performing organizations.
Our concern is that current valuation practices in biotechnology gradually narrow down research agendas. Our suggestion is that critical scholars need to further explore—and maybe even push— for broader notions of value, and for better connections between the notion of value and the public good.
Keywords: Bio-economy, innovation, value, science governance

Evaluating theology: Research impact as particular entanglement of valuation and knowledge practices

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This paper studies the entanglement of valuation and knowledge practices in the context of research evaluation in The Netherlands. Specifically, it addresses the work my Center (CWTS, Leiden University) and I were involved in assisting a protestant theological university with the preparation of their self-evaluation – a document that is required by the Dutch Standard Evaluation Protocol (SEP).

The SEP understands the relation between knowledge practices and e/valuation practices in a conventional way: scientometric and research techniques from the social sciences define a version of the academic reality under study that will subsequently be valued for their academic excellence and societal value. There has been a lot of work in STS to claim that the distinction between research and results, registration and evaluation isn't a clear-cut distinction between knowledge and valuation practices. My interest lies, however, in the relation between knowing and valuing that is understood in the term impact. Impact is what evaluation protocols are after: science should work for society as scientific knowledge should produce societal value. Whereas there is currently a lot of attention for the specificity of disciplinary cultures in SSH and the ways these determine academic output and excellence, there is no attention for societal developments and the ways these impact disciplines. The discipline of theology is an interesting case as its academic organization is constantly grappling with the effects of the place of theology and religion in society. The rapidly shrinking academic community of Protestants includes several vastly different epistemological orientations which result in interesting clashes and collaborations. The case study of the evaluation of theology offers a good opportunity to think about the double understanding of impact, as science impacting society and at the same time being (open to be) impacted by society, as a particular entanglement of knowing and valuing.
Keywords: Impact, theology, research evaluation, science-society relations

Meanings of science in the valuation of research on the international space station

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The International Space Station (ISS) is the most expensive and sustained effort to put humans in space. Among its multiple goals, the station was conceived as an orbiting laboratory that promised groundbreaking discoveries offering unique conditions to diverse scientific fields. Since it became fully operational in 2011, the ISS has enabled hundreds of experiments across disciplines; however, the question of whether it has fulfilled its scientific promises remains contentious.
The ISS provides a distinctive illustration of the complex institutional embeddedness of contemporary science and of the way in which incompatible frameworks of valuation coexist in scientific institutions. The program must respond to heterogeneous participants and observers whose valuations range from the most political to the most technical, and whose criteria encompass international cooperation, commercial development, public support, educational inspiration, technological advancement, and scientific research. As a platform for science, the ISS brings together fields that diverge in their goals and logistical requirements: biomedicine, plant biology, particle physics, materials science, fluid physics, among others.
On the basis of ethnographic, interview and documentary data, this paper examines three institutional settings that make assessments of value about science on the ISS: congressional program reviews, media reports, and scientific advisory panels. In each setting, actors make claims about the scientific worth of the ISS from the standpoints of "the citizens/taxpayers," "the general public," and "the scientists." The paper addresses the following empirical questions: What are the domains under scrutiny, the evidence used, and what is the underlying understanding of discovery and science in these frameworks of valuation? How do these valuations assess ISS science in terms of its impacts on ordinary people, space exploration, and specific scientific communities? When are these impacts differentiated and when do they overlap? And, more broadly, what does it mean for science to "pay off" in these assessments? I argue that all, in their diverse approaches, there is a prevalent outcome-centered approach to science, and I explore the possibilities of an alternative processual mode of

valuation.
Keywords: Science, valuation, outcome, process, space station

Effects of indicators on knowledge production in astronomy

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Nine interviews were conducted with astronomers from Leiden University, and a document analysis was performed on relevant institutional (self-) evaluation documents, annual reports, and CVs of the interviewees. The aim was to perform a qualitative study about the relationship between the research behaviour of astronomers and how their science is being evaluated. This study encompassed the funding and publication system as well as the indicators used to measure the scientific output, its quality and the research performance. It sheds light on how astronomers define highquality research and how they think that creating knowledge of value is encouraged or hampered by the evaluation processes. The research shows that astronomers are realists who define scientific quality on the basis of "truth" and are driven by curiosity. These two factors make up their intrinsic values and motivation to perform Astronomy. Publication pressure, arising from the requirements of "the system", creates an extrinsic motivation to perform. This results in premature publications, low readability and replicability, risk aversion and a focus on quantity rather than quality. Hence, indicators do not merely represent quality, but also co-constitute what counts as good research. While such constitutive effects of indicator use on research behaviour and content are observed, there is no indication that the astronomer's intrinsic values are co-constituted. This gives rise to a discrepancy between what is being measured by indicators and what astronomers define as scientific quality; the so-called "evaluation gap". Findings on constitutive effects and the evaluation gap in Astronomy lays out the conceptual groundwork for further empirical research and for policy advice on alternative evaluation practices and innovative indicators with the aim of bridging the "evaluation gap".
Keywords: Research evaluation, knowledge production, Sociology of quantification, indicators

Indicators in the wild: contextualisation and participation for 'responsible metrics'

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The use of indicators in research policy and evaluation is widely perceived as problematic. Responding to demands of explicit normative framings in STI governance such as transformative innovation, I propose an agenda for transforming the place and role of indicators in policy. Given that expert advice should not separate knowledge formation from decision-making under conditions of uncertainty and lack of value consensus, I argue that current S&T indicators are too focused on technical issues, too reductionist and isolated from the contexts and values of its use.
Using Callon's analytical framework of 'secluded research' vs. 'research in the wild' I propose three moves for improving design and use of STI indicators. First, to continue ongoing trends towards pluralising the data sources, processing and visualisations techniques, and expand the research communities involved in scientometrics. Second, to develop forms of quantitative evidence that can be contextualised with the participation of a more diverse set of stakeholders. Third, to open up the policy framings implicit in measurement, and use quantitative analyses to reveal more balance

perspectives of existing and alternative STI options. I conclude by arguing that these shifts are necessary to preserve epistemic diversity and pluralism in the face of ongoing managerial push for standardisation via 'platforms' run by commercial oligopolies.
Keywords: Evaluation, responsible metrics, indicators

Architectural artefacts and peer-reviewed papers. Some reflections on the co-production of architectural research and science evaluations in the UK

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Within the last decades, an increased economization and standardization of higher education has been taking place in Western societies. These developments are not just restructuring scientific disciplines; they are also leading to more research activities in fields such as architecture, whose long standing tradition is one of a professional education, rather than that of a research based science.
One particularly interesting example in this regard is the United Kingdome. Since the 1980s, the British government has regularly evaluated the research performance of its universities and university departments, in order to distribute funding for research according the outcome of this assessment. The rationale of the evaluations is a competitive one: The higher a university(department) is ranked, the more money it receives from the government. Taking a co-productionist approach, I describe how these evaluations contributed to an increased research orientation at British architecture schools as well as how architects shaped the way how research in architecture is measured in these evaluations. To do so, I will present results of interviews and a document analysis, that I conducted at an architecture school located in London. In particular, I will describe how faculty and university administrators managed to achieve a better ranking in these evaluations, by restructuring the school from an institution based on professional design education to one of design research. Furthermore, I will describe how members of this school changed the way how research performance in architecture is measured in the evaluations. Critiquing evaluators for putting too much emphasis on science based indicators in the calculation of research performance (eg. papers in peer-reviewed journals), and highlighting the epistemic dimension of architectural design, they successfully lobbyied for the acceptance of architectural drawings and models as research outputs.
Additionally, I will reflect on the question what the transformation from being a place of design to one of design research means from an epistemological perspective. Drawing on materials from my ethnographic research on the practice of design research at the London based architecture school, I will show that architectural design and design research are not necessarily the same. Does the first put emphasis on the production of drawings and models which could potentially be built, the latter is more interested in reflections on various aspects of spatiality, which are expressed in a combination of architectural drawings, models and texts.
Keywords: Architectural research, design, science evaluation, knowledge production

On time: How temporalities matter when reviewers evaluate CVs and proposals for the ERC

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In this presentation, we explore valuation practices in academia by highlighting how time matters

when reviewers evaluate academic achievements in peer-review processes. We do this by exploring peer-reviewers' negotiations of scientific excellence in a set of 18 interviews with reviewers for the European Research Council (ERC). Taking on an actor-centered approach, these interviews focused on the reviewers' perceptions and understandings of notions of scientific quality. The ERC is one of the most prestigious funding organizations in Europe and obtaining an ERC grant has become a symbol of academic excellence that can have great significance for the career development of researchers. Our interviews were conducted with peer-reviewers for ERC Starting and Consolidator Grants – both aimed at researchers in a career phase were they still have to establish themselves. The reviewers in our sample both evaluate application documents remotely and meet with other panel members to discuss evaluations and make decisions.

In the proposed talk, we argue that, in peer-review processes, time and temporalities form important points of reference when reviewers must decide on who is excellent and who is not. We explore time hereby not only in form of time spans for achieving certain career goals, but also in understandings of a right timing to take certain career-relevant steps or, for example, the frequency in which articles are published. Importantly, we hereby understand peer-reviews as social processes that construct rather than apply notions of excellence and in which reviewers need to negotiate multiple, possibly contradicting, understandings of scientific merit.

Engaging with interviews about how to evaluate both project proposals and academic CVs, we find rich narratives about questions of time, pace, and timing: Is a candidate advancing fast enough in their career? How long have they taken to finish their PhD? When did they first publish as first, last, or single author? Do they publish 'frequently enough' within the context of their specific discipline? How does this ERC project fit into the timeline of their career development? Are they applying 'too late' or 'too early' or 'just at the right time'? Our research offers insights into how reviewers try to make sense of and assess the merits of the specific temporal choreographies of researchers' pasts and futures. While we find highly normative sentiments and discussions about ideal timelines of academic careers, we also find critical debates regarding their effects of streamlining academic work and life. In our talk, we also want to look at how this relates to critical debates about the temporalities of academic peer-review itself and the question of what constitutes good peer-reviewing if the time for fulfilling these tasks is more than limited. Thus, investigating how time matters in academic peer-review also touches upon larger contemporary concerns about the politics and ethics of competitive research funding. Highlighting the role of time in academic valuation practices allows us to look at inherent normativities in a different way and contributes to a larger discussion on how knowledge and valuation practices are intertwined.

Keywords: Valuation practices, peer review, time in academia, normativities

A formula for recognition: organisational knowledge practices involved in the evaluation of researchers in LHC collaborations

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Collaborative knowledge production implicates knowledge practices that address the organisational challenges of distributed and highly specialised work. In experimental particle physics, the increasing size and complexity of the apparatus is accompanied by the increase in size of multi-national and multi-institutional collaborations. Experiments at CERN's Large Hadron Collider (LHC), currently involve 3,000 people working together over a projected timeframe of several decades. These circumstances give rise to novel organisational challenges surpassing and transforming the "communitarian practices" (Knorr Cetina, 1999) that have sustained collaborative epistemic practices in particle physics research so far.

In interviews with researchers working at the LHC, we have come across the physicists' concern that it has become increasingly difficult to identify individual contributions and give researchers proper credit for their work. This perceived "problem of recognition" is attributed to the sheer number of collaboration members and projects done in parallel. The established convention of publishing all results of individual analyses under the collective authorship of all collaboration members makes members of the same collaboration practically indistinguishable in terms of their authorship credits. Addressing the resulting difficulty of "properly evaluating" experimental particle physicists, a sub-division of the European Physical Society (2015) provided a list of criteria for assessing a candidate's scientific merit. Among these criteria, conference talks delivered on behalf of the collaboration figure prominently. But how, in fact, are speakers assigned – who is responsible for this task and which criteria are used for the assessment of comparable candidates?

In our case study, we focus on the assignment of conference talks in the ATLAS collaboration to investigate the organisational knowledge practices involved in establishing publicly recognizable markers of excellence and recognition.

Conference talks are considered to be of particular importance for researchers at early or critical stages in their careers. Physicists set up the considered case as a problem of optimisation: How should the collaboration distribute 600-700 conference talks annually among its members to ensure, both, a fair distribution and a competent representation of the collaboration? In the ATLAS collaboration, two dedicated committees are attending to the task of selecting speakers. Their practices of identifying who is qualified to speak, and what distribution of talks is fair, nowadays build on an extensive internal knowledge infrastructure. A crucial element in the selection process is a formula that, based on a database documenting the research and service contributions of all active collaboration members, assigns each researcher a numerical rank corresponding to their eligibility.

We argue that the practices involved in selecting conference speakers can be interpreted as an institutional response to the "problem of recognition", which aims to sustain collaborative research practices while addressing individual needs for recognition and career advancement. Based on an analysis of interviews with members of the selection committees and a variety of documents, we analyse how notions of adequate recognition, representation and visibility, and the value of contributions are negotiated and sustained in these practices and the corresponding knowledge infrastructures.

Keywords: Organisational knowledge practices, particle physics, collaborations, evaluation

What a difference a date makes – value, knowledge and the expiration date of food

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How do you evaluate an industrialized or imported food product if you lack the knowledge to do so? What if you cannot look inside the package, cannot smell or taste – how do you know if a product is still safe and/or pleasant to eat? Due to a growing distance between "field and fork" consumers found themselves increasingly lacking knowledge and practical ability to judge the quality, value or safety of food. In many countries, this dilemma has been "solved" by the legal obligation to print expiration dates on food products, informing consumers until when a product should keep the promised quality and value. With the act of printing the date on a package the product inside changes from being an "anonymous, timeless entity" to a "traceable commodity" with a limited shelf life, set by the producer. At this particular moment, a whole set of other intrinsic qualities is rendered invisible and henceforth the product is valued to a great extent by its remaining shelf life with far reaching consequences for

the food chain and consumer. The expiration date has become such a mundane, commonplace yet successful label that many follow its recommendation without further questioning its origins or consequences. Most people have lost the knowledge and/or the will to use their senses for evaluating food and rather rely on the simple message of the date label. By using the Norwegian milk industry as a practical example, I will present how the valuation of and (lack of) knowledge about food (quality) are entangled, determine each other and manifest themselves in the date label with far reaching practical and normative consequences.
Following Norwegian milk from the udder to the gutter we will explore this relation of valuation and knowledge processes that lie underneath the "little date on a package.
Keywords: Expiration date, food, knowledge, evaluation, quality

Seeing like a startup: How field knowledge is produced at the site of an agricultural high-tech company

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This article will study the production of field knowledge, a type of knowledge that is supposed to record and explain the particularities of specific places in the field, at the site of an agricultural high-tech startup. It thus aims at improving our understanding of how knowledge practices that are historically rooted in acts of collecting and examining site-specific information are carried out within the confined spaces of a startup company.
Over the last years, scholars working at the nexus of science and technology studies and economic sociology have emphasized the importance of studying startups not only as spaces that create new products and services, but as spaces that simultaneously give rise to new cultures of knowledge production, and new valuation practices (e.g. Doganova & Eyquem-Renault, 2009; Fochler, 2016). In pointing out this co-production of academia and business, scholars have closely examined biotechnology startups, and the important role that laboratory knowledge holds in these companies. To add to this scholarly tradition, while shifting it from an inquiry with laboratory knowledge to an inquiry with field knowledge, this article investigates how practices that are rooted in field sciences such as taxonomy, botany, phytopathology, or agroecology unfold in the context of a startup company. As an empirical case, my analysis draws on data that I collected during an ethnography at a startup developing a mobile application to help farmers around the globe with the detection and the treatment of plant diseases. To develop and maintain this emerging technology, the team of the startup is composed of different communities of practice some of which are closely affiliated with field sciences, while others are not (e.g. modelling ecologists, computer scientists, marketing staff, or accountants).
By investigating the interplay of these communities, my article will show that the production of field knowledge at the site of the startup is accompanied by multiple trade-offs. On the one hand, the field scientists have to reduce their theoretical and methodological analysis of specific field sites to binary acts of matching user generated pictures with pre-established bodies of knowledge about plant diseases. On the other hand, this very reduction renders the knowledge claims that are made by the field scientists legitimate, because it allows for their translation into actors that visibly circulate within and beyond the institutional boundaries of the company (e.g. models, graphics, statistics).
Keywords: Communities of practice, field sciences, knowledge production, valuation, startup

The freedom to choose between regimes of valuation – does it exist?

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For about a decade, the extraction of secondary resources from dumped materials has been considered as an option for generating a supply of critical minerals in European countries. Due to increasing prizes for metals and metalloids of strategic importance in high technology, research projects have been initiated in order to estimate the raw material potential of different types of dump sites and to develop technologies for exploration and exploitation. This research has so far not resulted in commercial projects for the recovery of critical metals. One major reason is that decreasing raw material prizes make the recovery of metals from dump sites is not economically profitable due to decreasing raw material prizes. In this situation, scientists have to find other justifications if they want to continue research in this field.
Within this presentation we will focus on the flexibility that researchers have (or don't have) to choose the context and the valuation regime in which the knowledge they created is (e)valuated.
Focusing on technology development for mining heap recycling in Germany we show the dynamics of the entanglement of valuation and knowledge practices in research and innovation projects.
Theoretically, we take inspirations from Boltanski's and Thévenot's notion of worlds of justification (2006). We will show how individual researchers actively link justifications to (specific) valuation regimes and, at the same time, seek to avoid alternative (e)valuation regimes. Thus, in order to carry out research on raw material potential of mining residues, scientists highlight the potential of their research to minimize impacts from environmental legacies. Hence, the shift between valuation regimes also affects knowledge practices: environmental administrations require justifications and data that prove environmental harmlessness and risk reduction instead of economic benefit.
Literature: Boltanski L, Thévenot L, 2006 On Justification. Economies of Worth (Princeton University Press, Princeton, NJ)
Keywords: Valuation regimes, flexibility, technology development, critical raw materials and recycling

The cut-off problem: epistemic controversy and the justification of healthcare rationing

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As biomedical innovations put healthcare budgets under strain, debates ensue over what constitutes an acceptable basis for the rationing of scarce resources (Moreira 2010). Vividly demonstrating the entanglement of valuation and knowledge practices, these debates tend to unfold as controversies about the simultaneous settling of what constitutes proper value and how it is to be properly established (Kjellberg & Helgesson 2013; Sjögren & Helgesson 2007). This paper analyses a recent controversy about the rationing of medical resources in the publicly funded Danish healthcare system. The controversy concerned a newly marketed pharmaceutical approved by the European Medicines Agency (EMA) as the first disease-modifying treatment of the rare disease 5q spinal muscular atrophy (SMA), which causes severe muscle degeneration in children. A very costly treatment, this pharmaceutical was also the first to be formally restricted in clinical use in Danish hospitals based on arguments about costs in relation to demonstrated effects. Accordingly, a line was drawn between the children, who were granted access to the costly treatment, and the ones who were not. In this paper, we trace the 'career' of the cut-off resulting from the rationing process. Building on ongoing fieldwork (May 2018-), we explore how the cut-off clashed and altered in interaction with diverse evaluative

repertoires (Moreira 2005). We demonstrate how the cutoff evolved over time from a controversial demarcation to a rather stabilized boundary, as it incorporated forms knowledge and value esteemed in different domains. We suggest that the durability of rationing decisions such as cutoffs are closely related to the ways in which they acknowledge, weigh and combine the diverse repertories of evaluation enacted by the actors on which their implementation depends.
Keywords: Biomedical innovations, evidence, healthcare rationing, valuation

Session 28: The uptake of open science

Chair: WIESER, Bernhard[1], ROSS-Hellauer, Tony[2]

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Communicating scientific results in a ”post-truth” era

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“Alternative facts are lies” - said Rolf Dieter Heuer, president of the European Committee scientific advisory board, former director general for CERN on the World Science Forum in Jordan at the thematic session called “Science based advice to policy makers” in November 2017. He explained the reason for their spread that we cannot verify the reliability of the huge amount of data which we encounter on a regular basis.
William Sutherland, a research biologist of Cambridge University explained on the same session that according to a 2014 research, individuals altered their decisions almost half of the time after being fed precise scientific facts through experts.
In the last few years several discussions centered on this phenomenon, which deeply influences the way we use the different forms of science communication. (According to Michael Nielsen) Open Science deals with the idea of scientific knowledge, where all the information is openly shared with the scientific community and lay people as early as it is practical in the research processes. We can talk about a kind of “new type of scientists” agreeing with this philosophy and being consistent with that movement. Scientific facts are spreading even faster than before in the online media. Regarding to recent surveys for the people primary source of scientific and technological information is the Internet (instead of the printed press or television). Scientists themselves are also even more active on social media sites that initiated the idea of the implementation a special, so called “Kardashian index” to measure their social media profile and scientific activity.
These phenomena consist several uncertainties. I try to approach this question from two aspects.
On the one hand there is the nature of the information provider and the scientific facts themselves.
Can we talk about the change of the characteristic of science from “normal” to “post normal”?
Where is the limit of the responsibility of scientists using the social media?
In conjunction with the rise of Open Science movement the philosophy of science communication has been changed as well. We can talk about the “deficit model of science communication” where instead of science popularization the emphasis is shifted to the engagement and on the participation in science. On the other hand, there is the responsibility of the recipient (lay people, politician etc.), what do they believe they receive, where do they get the information from, or what do they use the received information for?

With my presentation I would like to show some ideas as best practices to handle the above mentioned uncertainties.

Keywords: Science communication, post-truth, open science

Living labs as co-creation spaces between academia, industry and the public: Insights from two Swiss case studies

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Living labs have become an important element of the innovation landscape in the early 21st century, particularly within the paradigm of open innovation (Chesbrough, 2012) and as part of the broader smart city concept (Ruijsink and Smith, 2016). Focusing on co-creation processes enacted by multiple stakeholders from various sectors, connecting research and practice, a key element of living labs is the capability to manage, transfer and translate knowledge across sectoral and professional boundaries, and to enable actor communication and collaboration. Living labs can also be conceptualised as open innovation networks, which may be steered by one or more actors providing a direction for the lab's development and the goals of its activities (Leminen et al., 2012). Furthermore, actors within a living lab can take different roles supporting innovative and experimentation processes (Nyström et al., 2014). The authors of this paper are focusing on the knowledge management function of living labs, particularly concerning the codification, translation and transfer of tacit knowledge, which is seen as key element of innovation processes (du Plessis, 2007). Another element is added by investigating the internal structure of living labs as-networks, gaining insight into the presence (or absence) of communication and collaboration ties across disciplinary and institutional boundaries. Further, lab-internal actors' expectations are explored, focusing on how they affect internal collaboration and knowledge exchange. Labs are visualized as social networks, with actors connected through communication and collaboration processes.

In this paper, the authors are focusing on two Swiss living labs, both focused on the built environment and both overwhelmingly comprised of academic actors. In the first case study, in-depth interviews with research group leaders are combined with a survey-based social network analysis in order to investigate leaders' expectations from other research groups and the lab as a whole, and the overall collaboration and communication network in the living lab. The second case study focuses on knowledge management inside the living lab, again combining in-depth interviews with key actors with a survey on knowledge management perception and procedures in the lab.

Findings indicate the importance of clear and shared expectations, which can be drivers for collaborative processes, as they create a shared "common ground" for knowledge transfers, and indicate a number of barriers respectively challenges for knowledge sharing across disciplinary, linguistic and institutional boundaries. Further, the importance of structured knowledge management in living labs is highlighted.

Keywords: Living labs, open innovation, knowledge transfer, collaboration networks

Citizen expertise in the controversy surrounding the monitoring of former uranium mines

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This paper aims to continue a strong track that emerged from our doctoral thesis and which focused on the citizen consultation in the frame of environmental monitoring of former uranium mines. This work has highlighted, in one of its conclusions, the role of the Gamma Prospecting Detector (DG5) in citizen claims for the decontamination of radioactive areas in the commune of Piriac-sur-Mer (Loire-Atlantique, France). The democratization of measuring instruments, and the transmission of a methodology for measuring radioactivity by CRIIRAD have enabled a group of citizens to detect contaminated areas in Piriac-sur-Mer. Another group of citizen activists also against the effects of radioactivity in a neighbouring town, but lacking the same human and technical resources as the first group, opted for a litigation strategy. It did not produce the results expected by the activists. Based on the analysis of two controversies, we propose to understand how "laymen" do to appropriate instruments that are initially limited to "experts". We are therefore interested in research fill still under-studied in Science and Technology Studies, that of the role of instruments in the production of technical knowledge (Knorr-Cetina, 1981, Latour, 1987).
Keywords: Controversy, environment, radioactivity, uranium mine, citizen expertise

Replication, reproducibility, and the end of theory: implications of data-centric research practice

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The presentation will investigate the recent interest in emerging data-centric research practices in the context of changing expectations of transparency, accessibility, and reproducibility of research. It will probe and aim to reconstruct the recent wave of interest in data (as opposed to other aspects of scientific research) to develop an in-depth understanding of how data are produced, stored, shared and preserved across domains along with recent movements and current trends towards "FAIR data" and "Open Science", and the role of social processes in shaping these emergent paradigms. Following Leonelli (2016), this is interpreted, not as the "end of theory" in scientific research (which arguably never played the eminent role in research practice it was accorded by generations of philosophers of science), but rather a reordering of priorities of practice with significant implications for what counts as scientific knowledge.
The presentation seeks to contribute to our understanding of how research fields form, in this case, the emerging field of "data philosophy", and how they impinge on the way research is done. The contribution will aim to broaden understanding an important aspect of digitisation and how this stirred interest in an aspect of research (data) absent from many classic philosophical and STS accounts of scientific practice. The contribution will defend the claim that data as an aspect of science have largely been absent from STS and other accounts of science before the "digitisation" of research. I consider and discuss more recent reflections on the role of data in research to try to understand why this aspect of research has remained under-theorized for such a long time. I propose that the "crises" concerning reproducibility diagnosed in recent years by practitioners of many hard science fields (psychology for instance) must be interpreted in light of a broader underlying shift towards data-centric research.
References:
Leonelli, Sabina. (2016). Data-centric Biology. A Philosophical Study. Chicago, London: The University

of Chicago Press.
Keywords: Data-centric research, reproducibility

The uptake of open science in policy-making

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In this paper, we focus on the uptake of Open Science outputs in policy making. Scientific knowledge is recognized as an important basis for policy-making. Beyond this general point, we aim to answer how Open Science practices change the relationship between scientific knowledge and policy-making. More specifically, we explore the ways in which Open Science practices facilitate inclusive governance. To this end, we distinguish three perspectives on Open Science: a) the ways in which scientific knowledge is being produced. How do Open Science practices lead to higher degrees of participation in the production of knowledge intended to aid policy-making? b) the ways in which scientific knowledge is made available. How do Open Science practices facilitate the dissemination of scientific knowledge. Beyond the precondition of Open Access, we discuss how different actors vary in relation to their ability (including resources, infrastructure and training) to provide and circulate scientific knowledge. c) the ways in which policymaker use scientific knowledge made available to them. What can be done to engage policy-makers and enhance uptake of Open Science outputs.
Against the backdrop of this analytical distinction, we explore different degrees of agency in the realization of Open Science goals to advance policy-making by making it more inclusive, participatory, accessible, understandable, (re-)usable), transparent and accountable. Wider implications for RRI will be addressed.
Keywords: Open Science, uptake, policy-making, RRI

Session 29: Institutionalizing Responsible Research and Innovation (RRI): structural change as a means to institutionalize RRI

Chair: KARNER, Sandra[1], PATAKI, György[2], BAJMÒCY, Zoltán[3]

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Science shop as a surprise - The institutionalization of an RRI project

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Our paper reports on the dynamics of the institutionalization of a science shop driven by Responsible Research and Innovation (RRI) in a higher education institution in Hungary. It shares the story of a new unit in a business school aiming at opening up the university to local communities and civil society

organisations (CSOs) and implementing RRI keys in teaching and research.
The interplay of various processes, discourses and resources leading to the establishment of the science shop are discussed as well as the barriers and limitations of its expansion and RRI-driven interventions. In this abstract, we provide certain insights into this story.
We have engaged ourselves in a Horizon 2020 project aiming to explore, develop and pilot promising practices regarding RRI policy agendas and process requirements. As an unforeseen milestone, the science shop at our school was established. By that move, the temporary feature of the RRI focused 30-months project turned into a permanent institution embedded in the organizational structure of the school, i.e. the Dean's Office.
When entering the project we expected to experiment with educational resources in a consortium including established science shops. To join their circles with our 'own' science shop both initiated and set up during the project was not in our wildest dreams. Some of the supporting turning points are:
the international conference of science shops made this concept/institution real and appealing to a wider group of colleagues, who formulated a team of promoters, and proved to be the critical mass to actually draw up the initiative; and the identification of a window of opportunity, i.e. the school's international accreditation.
The latter in itself contributed in various ways, e.g. allowed for argumentation connected to the language and discourses of accreditation; relied on our multiple roles both in academic and administrative functions, etc. Certainly, the legitimation provided by the prestigious international project consortium, and the fact that this was the first ever H2020 project of the university were doing their shares too.
A key achievement - perceived as a structural change - is the door now formally and actively opened to society. Besides the extensive corporate and municipal, policymaker connections as external stakeholders, now local communities, CSOs, nonprofits have access to the school. The very same door is, of course, also open to students and teaching and research faculty providing a space for e.g. inclusion and reflection. Although mainstreaming two new phenomena (RRI and science shop) at the same time is a challenge, the activities of the science shop team include faculty development workshops to introduce RRI to teaching and research. Both working with CSOs (as the key outreach, third mission activity of the school) and faculty development with RRI (to pave the way to achieve the school's mission of educating responsible leaders) have become flagship elements of the school's strategy. Although funding for the key personnel (one full-time staff member) is available, our efforts to embed RRI and science shop work in the academic performance evaluation system have not succeeded yet.
Keywords: Science shop, RRI, higher education, institutionalization, civil society

RRI from the bottom-up. The case of a service learning course and its spill-over effects

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Present paper addresses responsible research and innovation (RRI) as a bottom-up practice. We argue that that there may be more than one way for the uptake / mainstreaming of the RRI principles. It is very often asked what kind of support structures, funding schemes, rewarding systems etc. could foster the uptake of RRI. But we may also ask how the "spirit" of RRI may find its way within the present (basically hostile) structures and start to transform them from the bottom-up.
The paper introduces the case of a service learning course at the University of Szeged, Hungary. Service learning is a method, where learning is combined with the meeting of community needs. Students do

volunteering at civil society organizations and reflect on these activities with the assistance of their teachers as part of the curriculum.
At the University of Szeged, the introduction of the service learning course was the bottom-up ini tiative of a handful of committed lecturers, in line with their aim to enhance the social responsibility of the university. The course contributed to the forming of a strong network of civil society and academic actors. This network and its activities become more and more institutionalised. Beside the service learning course, science shop-like activities, joint research endeavours, participatory action research projects have been initiated, amongst others. This led to the emergence and to some extent the consolidation of the RRI principles within the university (or at least some institutes and faculties of the university), without any explicit policies, rewarding schemes or funding from the managerial level.
Keywords: RRI, structural change, bottom-up, service learning

Institutionalisation of RRI in research technology organisations - (How) Is change measurable?

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“How will you see and measure that the culture has changed?” “That´s a good question!” (Quotes from a common dialogue within the evaluation and monitoring process that was accompanying the EU funded project JERRI.)
Following the theoretical framework of deep institutionalisation (Randles 2017), JERRI (Joining Efforts for Responsible Research and Innovation) aimed to contribute over the last two and a half years to deeply institutionalizing practices and attitudes of Responsible Research and Innovation (RRI) in the European Research Area. Within the two largest European Research Technology Organisations (Fraunhofer in Germany and TNO in the Netherlands), pilot activities on the five key areas of RRI were implemented, taking actions in Gender Equality and Gender in Research and Innovation Content, Science Education, Societal Engagement, Open Access and Ethics. Actions were developed on the basis of an analysis of barriers and enablers and according to the specific organisational prerequisites. Facing very different conditions regarding (not only) the organizational structure – TNO very centralised, Fraunhofer having a very decentralised structure – activities turned out to be very much tailored for each of the two organisations.
The implementation of the activities showed, that the dimensions are very much interlinked and cannot be seen separated from each other. Further on, besides the degree of centralisation, the size of the organisation and the style and conditions to communicate within the organisation are having an impact on the effectiveness of RRI related actions and their acceptance.
The organisational change process was accompanied by an evaluation and impact monitoring process, which was on behalf of an external organisation that was not involved in the implementation of the pilot activities. The presentation will give an overview on the perception of this outsiders view and elaborate future scenarios on the impact of the pilots and actions of institutionalising RRI in organisational settings. A focus in the talk will be laid on the difficulty of measuring (short-term also, but mainly long-term) impacts of RRI. The latter are a means to secure structural change – especially for having an instrument for knowledge sharing and to communicate about it.
Keywords: RRI, organisational change, deep institutionalisation, impact measurement, evaluation

Towards RRI as professionalised practice at a Norwegian biotechnology research centre

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In Norway, Responsible Research and Innovation (RRI) has become a central feature in the governance of emerging technosciences, such as ICT, biotechnology and nanotechnology. The Research Council of Norway (RCN) is a key driver in these developments. While the RCN's efforts to implement RRI in research governance has primary targeted individual research projects thus far, it recently began experimenting with integrating RRI as a constituent component into a new distributed centre for digital biotechnology – the Centre for Digital Life Norway (DLN). The RCN mandates that all research activities within DLN are to be underpinned by the principles of RRI. DLN now comprises 17 research projects that address topics like aquaculture, environmental toxicology, neuroscience, novel antibiotics and several more. What makes DLN relevant to this panel is that it also comprises a support umbrella of six workgroups that coordinate aspects like data infrastructure, innovation and RRI across the centre. In this presentation I draw on my role as coordinator for RRI in DLN. This coordinator position is a unique setup and focuses more on establishing RRI as a cross-cutting aspect of research governance within the centre than on the more established role of helping research projects fulfil their RRI deliverables. I shall use different vignettes from everyday professional interactions with my coordinator peers, members of the research projects, and the institutional environment of DLN to reflect on how coordination work relates to promoting and anchoring a reflexive and societally responsive research culture. I shall pay particular attention to the different types of activities performed, what kinds of knowledge are at stake, and how coordination work itself can develop from an ad hoc arrangement to a professionalised practice.

Keywords: Responsible research and innovation; Norway; professionalisation; biotechnology

Integrating RRI on an institutional level -experiences from NewHoRRIzon pilot actions

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The EC funded project NewHoRRIzon aims at supporting RRI through a broader uptake in funding programme lines mainly through the implementation of so called "Social Labs". All over Europe 19 Social Labs have been established to address the implementation of RRI in the diverse topics of the Horizon 2020 Working Programme of the EC. Within those labs 59 pilot activities implementing RRI and testing formats have been developed so far; most of them are currently under way and will be evaluated in May 2019.The formats and goals of these pilot activities vary, encompassing analysis and assessment tools, case studies, workshops, trainings, dissemination and awareness activities, or document analysis. Some of them explicitly have institutional change in focus.

In this session, ZSI will present few of the pilots mainly targeting at an integration of RRI at an institutional and strategic level. One of these processes for example is an intervention at the Natural History Museum (NHM) in Vienna, where ZSI is strongly involved. The NHM is not only a genuine home for science communication but also represents a huge research infrastructure. This process, which is supported by the general directorate of the museum, intends a clear commitment to RRI as part of the museum's modernisation and educational mission. It encompasses all departments of the museum and aims at an intensification of internal communication, awareness-raising within the museum, building up new alliances between science and society and thus, making projects and opportunities for

interaction more visible inside and outside of the museum. Within the pilot activity a series of three workshops with internal and external participants and an experimental implementation of initial activities are taking place. The new practices that are being developed in these multi-stakeholder workshops and tested in practice are to be sustainably internalised within the NHM and transferable to other research infrastructures.
We will also have a look at the other pilot activities which focus on institutional change that will be carried out until then. Pilots to be expected are amongst others: an open science career assessment, a patient centred hospital concept, or an engaging citizens reward.
Additionally, after giving detailed insight in the processes of these selected pilot activities, ZSI will present how the pilots generally look like, which specific problems they address, and which objectives they are pursuing. We investigate which actors are being involved in relationship to their institutional levels, how they have experienced the pilot and what they deemed relevant in the activity. And finally, we will have a look at the relevance and the impact towards the intended 'responsibilisation' of the institution and research and innovation system, meaning, promoting the uptake of RRI, taking into account lessons learnt of successful or non-successful examples.
Keywords: RRI, social lab, pilot activity, institutional change

Structural challenges and potential openings for RRI in basic research (funding). Experiences from a multi-stakeholder forum

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The integration of RRI into existing structures and practices is a main challenge for implementing the concept in the research and innovation. In the areas of basic research and its funding, RRI is facing obstacles not only because of structural impediments (= the way junior and senior researcher today live science as particular practices including, e.g., the pressure of academic life and its reward system) but also – and interlinked with the former because of the particular understanding and demarcation of basic science as "excellence only". Based on preliminary experiences gained in a multi-stakeholder forum ("Social Lab") within the H2020 Coordination and Support Action "Excellence in science and innovation for Europe by adopting the concept of Responsible Research and Innovation (NewHoRRIzon)" the presentation provides an overview on the uptake of RRI in the European Research Council and identifies structural obstacles as well as potential openings for implementing RRI in basic research (funding organizations).
Keywords: RRI, basic research, structural obstacles, openings, social lab, co-creation

Food for degrowth in the Budapest food city lab initiatives

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Observing some of the megatrends, like climate change or rapid population growth, scholarly, governmental, civic and economic stakeholders alike stress the necessity of a radical transformation of the dominant agri-food regime. Only in the last decade several high-level reports – including the 2008 IAASTD world agriculture report "Agriculture at a Crossroads" and the 2014 Report by the Special Rapporteur on the Right to Food - emphasized the urgency of such transformation.
While food system focused degrowth promises to provide a viable pathway and is gaining more

traction as a movement, a slogan and in the scientific community alike (Dombi, 2015; Salzer & Fehlinger, 2017; Weiss & Cattaneo, 2017), primary research about the initiatives that aim to achieve the principles of degrowth in the urban food scene in Hungary is lacking. As the local food system in the region of Budapest is highly fragmented, there are several innovative niche activities and alternative approaches that strive to transform the system, however, they are struggling among the few large-scale regime actors that dominate the market. The transformative potential of the mentioned initiatives is often low since the pressure for financial sustainability is very high and they have to focus on creating economically viable solutions (Balázs, 2015; Balázs et al., 2015).

In the framework of the Fit4Food2030 project (https://fit4food2030.eu/), we aim to bridge the previously mentioned gaps by analyzing the alternative trajectories of changemakers in the Budapest region around food and nutrition security. Simultaneously we saw the seeds of a learning community of degrowth oriented initiatives by creating a new knowledge network of scholars, practitioners, and activist committed to solve wicked sustainability issues in our food system.

We have organized three workshops with stakeholders to assess how food provisioning is experienced in the city and its surroundings. This aimed at collecting a range of initiatives that produce, consume and preserve food for degrowth in Budapest. All actions press for a more localized food system through the redesign of urban food provisioning towards food sufficiency and resilience by the following means:

- introducing sustainable and healthy diets, ethical eating
- food waste and redistribution, such as re-using surplus food
- solidarity with small-scale farmers
- doing better public food procurement

The variety of individual visions, as well as the differences in perception and understanding of the stakeholders regarding certain concepts like ‘community’ or ‘food quality’, became apparent during the interactive process. Several topics surfaced during the conversation which is worthy of further deliberation and action both in the development of research and innovation agendas and as starting points for grassroots initiatives and new cooperation. Overall, the initiatives greatly differ in their relation to the framework of the current system. Some are more radical in their approach and are more clearly showcasing degrowth principles in their operation. However, the majority are building on the system, aiming to create alternative trajectories and thus, support the transition to a ‘hybridised system’ (Boonstra & Joosse, 2013).

Keywords: Food system transformation, co-creation, degrowth

The sustainability of RRI ‘transition experiments’: reflections and participants’ perspectives

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Our contribution refers to experiments, which were implemented in Austria, Belgium, Hungary, Italy and Spain in the scope of the H2020 project FoTRRIS (http://fotrris-h2020.eu). There we facilitated the implementation of so called ‘transition experiments’, which brought together people interested in co-solving a glocal challenge with a systemic approach. The experiment engaged various types of knowledge actors (quadruple-helix) in the thematic fields of sustainable food systems, material

scarcity, transition town movement, refugee crisis, women with disabilities, and renewable energies through a series of facilitated workshops. The aim of these activities was to jointly explore the most pressing problems to be tackled, and to elaborate on ideas for collective efforts how to solve related challenges. Based on these ideas, project concepts for community-oriented, collaborative and co-creative 'responsible' innovations were elaborated. The very specific aspect of our transition experiments was, that they operated within a conceptual framework of 'Co-created Responsible Research and Innovation' (Co-RRI, see D'Haese et al. 2018,http://fotrris-h2020.eu/wp-content/uploads/2018/09/FoTRRIS-conceptual-framework-FINAL.pdf), which aims at contributing to a transition towards more sustainable socio-economic systems by means of:

- understanding the root causes of the challenges to be addressed by means of a systemic analysis
- responding to historical lock-ins by exploring innovative niches and strengthening the capacity to upscale resilient (niche) initiatives
- exploring alternative economic models and concepts of value, which are compatible with responsibility for human and planetary wellbeing (in contrary to the current prevailing understanding of value, which mainly refers to monetary value and financial growth).
- promoting socio-economic practices that respect planetary boundaries and guarantee access to a quality of life for all people and restore planetary ecosystems
- decentralising and democratising knowledge (co-creation and free accessibility of knowledge).

In the scope of Session S29 we will draw on experiences from our transition experiments, one elaborated on strategies for making the food supply system in the city region of Graz more sustainable and just, the other dealt with local economic development in the context of a Transition Town movement in Budapest. We would like to share our experiences with the specific 'Co-RRI' conceptual approach (and applied methods), and we would be happy to discuss and particularly critically reflect on challenges in institutionalising such experiments beyond the project lifetime.
We will pay special attention to tell the stories of the transition experiments from the point of view of diverse actors.
Keywords: Responsible Research and Innovation, transition experiments, sustainability

E-mobility through RRI to achieve the social sustainability: A case study of women commuters of Delhi

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Technology comes and operate in a social context therefore, get influenced and in turn influences the socio-cultural system of that particular context. Aim of technological innovations in developing countries is to end poverty and improve quality of life by enhancing social inclusivity which is corner stone of the social sustainability. Accessible, affordable and environmentally sustainable, Public Transportation System (PTS) is an important area of governance intervention to increase the people's participation in various spheres of life by increasing the mobility. This is even more important in the cultural context of developing country like India where failure of PTS has translated into the systemic exclusion of the women at various levels. But, currently due to various external and internal factors like Sustainable Development Goals, rising public awareness regarding quality of air in the cities etc. the PTS is at the cusp of transition in Indian cities. In the current socio-technical landscape, the big question is how this transition should be guided towards social sustainability along with environmental and economical sustainability. For this purpose, the innovation process starting from the ideation level

should have certain identified desirable values at its core. How to embed these values in the innovation process, is the main focus of this research work. Though, it is widely accepted that ethos of the RRI tailored to the needs of different local contexts, are best suited to address the need of guiding innovation process responsibly. Yet, such approaches inevitably involve the complex web of not only policy, economy, environmental concerns, technological capabilities, but also the subtler nuances of the adoption and mainstreaming of such technological innovations. Further, how to ensure the meaningful participation of stakeholders also remains a big issue. To address these questions this research paper has considered both primary and secondary data. To navigate systematically through these issues this research paper has been divided into four parts. Part one is focused on introducing the main issues and hurdles in the way of achieving social sustainability of the E-Mobility PTS by inculcating the women's own perspective on "safety" aspect of the E-Mobility. This part brought forward the contextual background of the policy, economy, technology and cultural aspect to pave the way for the field study. Part two has discussed in detail the RRI as theoretical frame work along with rationale for selecting this framework and need of further developing this framework to suit the need of the different social, cultural and economic contexts. Part three has discussed the field study which is done in the city of Delhi (India). Primary data has been collected through in-depth face to face interviews with women commuters of the PTS in Delhi. Part four has brought forward the insights from the field study and policy suggestions which can make adoption of E-Mobility more socially sustainable along with providing a pathway for smooth transition from the current environmentally unsustainable fossil fuel based technology used in the PTS.

Keywords: E-Mobility, social sustainability, public transport system, RRI, innovation

Towards a global Responsible Research and Innovation (RRI): research and innovation practitioners on global experiences with RRI-like dimensions

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The research is undertaken within the EU Horizon 2020 project 'Responsible Research and Innovation Networking Globally' (http://www.rring.eu/) which is seeking to contribute to the development of global networks of Research & Innovation. The research is focused on a series of interviews with research and innovation practitioners in over 20 countries around the world. These interviews will be gathering insights into research and innovation practices – including e.g. governance and regulation frameworks, the roles and interaction of the stakeholders, as well as views on responsibility in various contexts – in the context of digital (ICT), energy, bio-economy, and/or waste management fields. Participants are selected from various stakeholder categories: researchers, industry, policy-makers, NGOs, working in various hierarchical positions. The project also has a strong gender and diversity focus, aiming for a minimum of 40% of respondents to be from women and underrepresented social categories. AS RRI is a mainly European concept we have devised a possible framework for a global RRI, based on previous research in EU projects, which incorporates the EU RRI pillars, AIRR dimensions and Sustainable Development Goals. The analysis will be guided by a social constructivist grounded theory approach and will mainly seek to identify commonalities as well as differences in experiences and perceptions regarding research and innovation practices as they relate to our global RRI framework.

Keywords: global RRI, bioeconomy, energy, waste, ICT

Looking forward, looking Back: The case for a history of responsible research and innovation

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When we try to imagine what might happen in the future, we often create stories and scenarios. We imagine what might happen depending on the choices that we make in the present. In order to envisage these different outcomes however, we are largely dependent on our experiences in the past, as our past experiences condition our sense of which narratives of the future are plausible.
As a result, our historical knowledge is a crucial part of how we try to anticipate what the future holds in store.
'Responsible research and innovation' (RRI) is one way through which we can think about our relationship with science and technology, including its impacts and effects on society. RRI offers a particular way for imagining the future through narratives and scenarios. Champions of RRI envisage a future where these practices are widely adopted; indeed, since its emergence around 2010, RRI has seen unprecedented growth, becoming a pervasive concept across the European research landscape. In order to practice RRI well, it is important to reflect on past developments in science and technology. In order to imagine the future of RRI itself, we necessarily need to think about its own past to understand how plausible its imagined future actually is.
In this presentation I look at the role of history within RRI. I first look at how anticipatory practices are often criticized for neglecting the importance of historical knowledge. I then turn to an analysis of eighteen qualitative interviews with key actors in the field, in order to map the different ways in which RRI's own history is being articulated (or not). I explore the role of history in explaining the development of RRI, looking at how different histories are foregrounded or backgrounded, absent or present. I argue that greater attention to the heritage of RRI is essential if the added value of RRI is to be articulated sufficiently. Finally, I suggest that the history of RRI could provide a fertile stomping ground for anticipating the future of RRI itself.
Keywords: RRI, science-society interface, anticipation, history, narratives

Responsible research into the lives of older people: a multi-level analysis of care opportunities and challenges

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Across Europe the number of older people with multiple needs is increasing. At the same time, pressures on public budgets persist. This situation implies tensions in the provision of suitable care, and realising principles of 'responsible innovation' will be hard in many cases. While health care for older people, and how to do organise and implement care appropriately, is a long-standing interdisciplinary research field, the multi-level perspective taken in this talk might yield additional useful insights. The talk will be developed from an ongoing research project in which various (institutional) members of the 'RRI Plattform Österreich' (https://www.rri-plattform.at/) discuss RRI and other ethical challenges in the provision of care with a variety of stakeholders, including representatives from different formal organisations investigating and developing care solutions for older people. Through a series of joint workshops, as well as a process of collective self-reflection among the members of the RRI platform, the project explores opportunities and challenges in the 'responsible' conduct of research and technology development for older people. The idea is to discover all sorts of interlinked issues as well as already existing forms of RRI ('de facto RRI'; Randles et al. 2016)

by moving back and forth across multiple levels of analysis (Fisher/Rip 2013). To be more precise, any issues emerging at the level of microsocial interactions (including care interactions as well as the interactions during the workshop) are considered in relation to broader organisational, national and possibly even global structures. Ultimately, this multi-level analysis will hopefully contribute to a better understanding of the problems of institutionalising RRI.

'Institution' and 'institutionalising' are rich, classic sociological concepts, which will be useful in grounding the talk academically.

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Keywords: Healthcare, care ethics, responsibility, institutions

Postersession

Energy in the global south: Green or grey transition?

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The transition towards sustainable energy system will require the phase-out of carbon-intense generation technologies and the phase-in of renewables, especially in the light of ambitious climate change mitigation targets. In several European countries, we see an increased uptake of solar PV, hydro and wind energy; exnovation or the complete removal of fossil fuels nonetheless appears rather slow. Particularly, the predominant use of coal as incumbent technology in electricity generation in several European countries (e.g. Germany and Poland) provokes transition debates. Due to the path-dependent nature and inertia of existing systems, the active phase-out of carbon intense energy carriers represents a major challenge for sustainability transitions.

Emerging economies on the other hand are just about to build up and to extend their electricity grids, and it has been argued that "leapfrogging", i.e. installing renewable energy technology in the first place, is feasible and even a necessity in efforts to mitigate climate change (Delina, 2018, p.5). Recent developments however indicate a massive resurgence of coal, especially in the global south (IEA, 2018), while the potential diffusion and integration of renewable technologies into the existing systems remains limited.

In this paper we analyze renewable and fossil energy investments between 2013 and 2017 and contextualize the financial flows in terms of relational geographies of sustainability transitions. Based on a database available from the National Resource Defense Council (NRDC) we focus on energy projects announced in developing countries of Asia and Africa. We apply bipartite network analyses to determine the most influential players in financing different types of energy projects. Our analysis shows that the main actors in green energy projects are the World Bank Group, European Investment Bank and the continental development banks (Asian Development Bank, African Development Bank). In contrast, coal projects in Africa and Asia are mainly financed by the foreign donors China, Japan and South Korea.

From a political perspective, these cross-country coal investments are highly problematic and reveal the weaknesses of the Paris agreement. Countries which agreed to cut down emissions massively at national levels contribute to soaring emissions in developing countries, and label respective investments as 'development cooperation' or 'climate finance'; in this way, fossil fuel industries successfully exploit new markets. Feasible governance mechanisms to inhibit such developments are currently non-existent.

From an academic perspective, the coal resurgence reveals the weakness of existing transition frameworks, including understudied spatial geographies and geopolitical perspectives: Exnovating the coal regime in one country is meaningless from a global perspective (Markard, 2018), if the technology is just shifted to different countries. While emphasizing historical and on-going transformation process, the MLP lacks relational or telecoupling perspectives across distant systems.

TIS is likewise blind on geopolitical aspects. Based on the limited explanatory power of existing transition frameworks, the formulation of a "grey transitions" framework, coupling with spatial, financial and geopolitical aspects, is proposed.

Keywords: Energy transition, energy security, energy investments, energy trillema

Open bioLab Graz Austria - The local biohackspace

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The term biohacking is getting more and more popular these days. Original concepts of biohacking derive from the hacker ethics and are based on the idea that sharing and having access to information is a beneficial good for society. Biohacking, also known as “Do-it-yourself Biology” (DIY Bio), is a social movement that involves people who are interested in the field of life sciences, like students or any kind of individual, forming their own communities. There is no single definition of the term biohacking because different communities try to accomplish different goals. This abstract wants to give an overview about the philosophy of the biohacker community in Graz. For us, biohacking is the idea of finding alternatives to conventional and expensive working methods used in laboratories and strives to make applied science accessible to more people. Typical biohackers are interested in life sciences and are highly motivated to work with biological material, using innovative technologies and work on their own projects, by themselves or forming an interdisciplinary team. To do that in a safe environment, some students of molecular biology founded their own laboratory in 2013, the “Open bioLab Graz Austria”, short O.L.G.A.

As an open biolab, the main focus lies on molecular biology, but the laboratory is also equipped for other fields of life sciences like microbiology, biotechnology, biochemistry, biology, organic chemistry, analytical chemistry and even genetic engineering. Everybody who is interested in doing science and creative research as a hobby, is invited to do so here. You are also welcome if you are just curious about life sciences and biohacking itself or want to connect with the biohacker community. The O.L.G.A. is part of the non-profit association “realraum” (r3), an open hacker and maker space, which is independent from other institutions and financed by membership fees and received funding. We share the same idea of a safe place, where people have access to tools and equipment. In the case of O.L.G.A., these are chemicals, reagents, glassware, lab devices, microorganisms, genes and enzymes. Also the learning, making (the “actual doing”) and talking about science and technology as a part of society is important for the open hacker space community.

Our goal is to enable free and creative research on a free time basis by providing the basic working material and a safe place to put theory into practice. We stand for an exchange of knowledge and for thinking about alternatives for expensive devices and methods used in common laboratories. We also think it is important to learn how to discuss specific topics with others, how to develop reasoned opinions based on scientific facts and how to reflect our own work. These are good qualities which we need as we bear a certain responsibility because we got the permission for genetic engineering on biosafety level 1 (BSL1) from the Austrian Federal Ministry of Health in 2014. We wanted to work with genetic material and genetically modified organisms for several reasons, first of all because they are essential tools in molecular biology. 2017 we started to work with CRISPR/Cas9 and discussed about genome editing, potentials and possible risks within the biohacker community, in a greater context (events, ORF broadcast). Another project we established this year was the basic research with Bacteriophages. We want to express our interest for raising the awareness of antibiotic resistant bacteria, with the main focus on accelerating the growing interest and acceptance, for the promising Phagetherapy, in Austrian society, politics and healthcare.

Responsible biohacking, in the mind of the biohacker community in Graz, stands for a way of thinking beyond your own level of knowledge and looking at things from different perspectives. Furthermore it stands for getting the information one needs in advance and planning to work with the minimum of risks. It is important to think about the consequences of your actions before you start your projects in order to keep things safe. Having fun with science does not mean to work on everything you can, but with everything you want. And what we want is a safe place used by society and future generations.

Keywords: Biohacking, open science, open bioLab, Graz, responsible biohacking

Evaluation project STEM-3D-printing aspects and considerations on the development of an evaluation design

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3D printing is a possibility to digitally embody and understand creative and experimental ideas. In addition to inventing, developing and manufacturing students are able to create prototypes, which can be improved independently if necessary (Fastermann, P., 2014, p.8). Motivation and interest are important aspects of teaching. Hartinger and Fölling-Albers (2002, p. 46) show that interest is characterized by voluntariness, positive emotions, intrinsic motivation and an orientation towards knowledge.

Opportunities for self-determined learning are significant as well as experiencing one's own competence and social inclusion (Deci & Ryan, 1993).

The Project

A team of experts headed by Ing. Mag. Christian Schrack1 picks up on these aspects and develops 3D print sequences that promote students' interest and creative potential.

The aim of the project is to develop learning opportunities in the field of science, technology, engineering and mathematics (STEM), which take into account the interests of girls and boys, promote curiosity and offer perspectives and options for action.

The Study

The monitoring focusses on the statements of the experts, pupils and teachers involved in the project regarding the lesson sequences. The evaluation accompanies processes of development, design and testing of lesson sequences at several pilot schools (secondary education, technical and vocational schools and higher vocational colleges in upper secondary education) throughout Austria.

Based on a mixed methods approach, the following questions are guiding:

- Which contents and thematic aspects create incentives for students to engage in STEM topics?
- What is the background knowledge of teachers and students with 3D printing, and what are their beliefs and attitudes?
- Which creative possibilities and alternative solutions in the implementation of the tasks are offered to pupils?
- What possibilities do teachers have in their lesson design (goal setting, structuring, methods, setting)?

Significant aspects of the evaluation are the previous experiences, the interest and the motivation of the students, as well as opportunities for knowledge networking, technical problem solving and creative design. Findings support the further development of lesson sequences in terms of the project's objective to engage girls and boys with STEM topics.

Keywords: 3D printing, STEM, interest, creativity, gender

Circular economy strategies for adaptive reuse of cultural heritage buildings to reduce environmental impacts

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Circular economy strategies seek to reduce the total resources extracted from the environment and reduce the wastes that human activities generate in pursuit of human wellbeing.

Circular Economy concepts are well suited to the building and construction sector in cities. For

example, refurbishing and adaptively reusing underutilized or abandoned buildings can revitalize neighborhoods whilst achieving environmental benefits. Cultural heritage buildings hold a unique niche in the urban landscape. In addition to shelter, they embody the local cultural and historic characteristics that define communities. Therefore, extending their useful lifespan has multiple benefits that extend beyond the project itself to the surrounding area, contributing to economic and social development. To explore this complex issue, the research applies systematic literature review and synthesis methods. Decision makers lack knowledge of the environmental benefits of adaptive reuse of cultural heritage buildings and lack tools to implement these projects. A new comprehensive circular economy framework for the adaptive reuse of cultural heritage buildings to reduce environmental impacts intends to meet these needs. The framework integrates methods and techniques from the building and construction literature that aim to reduce lifecycle environmental impact of buildings with a circular product supply chain approach.

Keywords: Circular Economy, adaptive reuse, cultural heritage, sustainability, urban planning, buildings

Bioenergy in Kazakhstan in a water-land-energy nexus perspective

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Kazakhstan is naturally rich in fossil fuels and its economy is strongly linked to oil and gas exports. Significant coal reserves have led to an energy mix that is dominated by aging and polluting thermal power plants. Yet Kazakhstan comprises mainly grassland steppe where agriculture and livestock pastoralism dominate offering the potential for cleaner, renewable energy production from a range of agricultural and forestry wastes. Here we analyse the spatial distribution and bioenergy generation potential of different feedstocks using an ArcGIS platform and demonstrate a significant opportunity for a range of bioenergy technologies. In considering the ways bioenergy feedstock production and conversion can impact water and land resources, we also assess the potential risks associated with bioenergy feedstock production.

Keywords: Bioenergy, energy policy, energy resource, renewable resource, spatial analysis

CfP: Applying artificial intelligence on vulnerable target groups: chances and challenges

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„the ethical issues raised by.... feats of human engineering are qualitatively no different from those we shall have to face in future. The difference will be quantitative: in scale and rate. Even so, the individual steps may still go on being to small that none of them singly will bring those issues forcibly to light but the sum total is likely to be tremendous. That is why we have to look for those issue now ...." (Aldous Huxley).

The text of this abstract / lecture deals with the question in which way and to what extent it can succeed in the foreseeable future to improve humans with the help of neuroscientific knowledge. The focus is on neuroenhancement, the "optimization" of humans with neuroscientific knowledge. New technologies offer new possibilities and awaken new fantasies. Only the pervasive possibilities of

realization promote the need for social discussion and orientation. But often the wishes, which find an expression, are much older. Similarly, the idea of improving humans through scientific and technological intervention is much older than the neuroscience itself. This assumption is a source of cultural debate, it is about nothing less than the question of what evolution human culture takes, which pictures lead to the successful life. Thus, at the beginning of the following considerations, we have the conjecture that what we are negotiating and arguing about, when discussing neuroenhancement, is not just the application of a particular technical possibility, but also the way in which how we understand ourselves as human beings. Are we selfimposed as natural beings, or do we have the freedom to selfdetermine to such an extent that we are allowed to override the core of our nature? If you take a look at history, it shows that the purposeful and far-reaching manipulation of human nature has been discussed again and again since the advent of scientific research and communicated in symbolically condensed images. The study of the topic is reflected in the literature, but also in the fine arts and in film. At the beginning of the 19th century, one of the most famous

precursors of this debate, the novel "Frankenstein" by Mary Shelley, that sad narrative that impressively illustrates its ambivalence as well as the possibility of creating human life. In the 19th century, there are always literary references that reflect a rapidly increasing creative power in modern societies. The novels of Jules Verne discuss early and visionary on the horizon emerging technical possibilities. The books mentioned are testimonies of cultural reflection of new knowledge and possibilities for action. At the time of Shelley, electroplating and magnetism were newly discovered and much discussed forces. Has not man discovered the forces that make up the very essence of the life force with them? Can man now create himself? Jules Verne responded to the successes of heavy industry and the ability to build increasingly complex mechanical systems. In the twentieth century, not only did the pace of development of the natural sciences increase, but cultural reflections on man's ability to rise above his own natural resources also intensified. Keywords are just a few examples: At the beginning of the century, the art movement of Futurism became popular. A quotation from the manifesto of the author influenced by Nietzsche Filippo Tommaso Marinetti: "A howling car is more beautiful than the Nike of Samothrace". Marinetti glorifies the speed, but also the war. Sculptures of this art direction often show a person who is approaching a machine realization strongly. The art of Soviet communism depicts man as a creature to be reshaped. In the 1930s, the new literary topos of science fiction developed in the USA. The literary preoccupation with the topic of technical controllability and manipulability always deals with the ambivalences that come with the new possibilities. This is also shown in such novels as "1984" by George Orwell or "Brave New World" by Aldous Huxley. The further development of science fiction after the Second World War, in turn, is closely linked to technological developments, in particular the development of increasingly powerful computers and space travel, in the 1960s with the preparations for a manned space flight to the moon. Now, the genre of the film gets a greater weight. The stories are characterized by the technical design possibilities of man, which allows him to advance to previously unknown spheres. "2001 - A Space

Odyssey" by Stanley Kubrick focuses on the problem of artificial intelligence and how it relates to the identity of man. In the 1960s, the term cyborg was first used. Cyborgs is a hybrid of humans and machines, a new form of human being designed to make this possible, as the original idea was to travel far in space. The film "Blade Runner" from 1982 thematizes completely artificial beings, which are hardly distinguishable from humans any more. Finally, the advances in gene technology make it conceivable that humans are genetically manipulated right from the start. The movie "Gattaca" picks up on this notion and critically portrays manipulation fantasies. At the end of the last century, the American government proclaims the Decade of the Brain and thus promotes neuroscience on a large scale. The basis for this developmental boost is previously developed ways of making the activities of the brain at least indirectly visible through new, noninvasive methods (magnetic resonance

tomography). As a result, a host of new findings can be obtained, which makes the hitherto highly speculative possibility of a human-machine coupling more feasible. Again, in the US, a programmatic conference will be held in 2003 entitled Converging Technologies for Improving Human Performance. Nanotechnology, Biotechnology, Information Technology and Cognitive Science ". (Convergence of technologies to improve human performance: nanotechnology, biotechnology, information technology and cognitive sciences, which are closely linked to the neurosciences). Obviously, all new cutting-edge technologies should be summarized here, explicitly to the goal of increasing human performance. At the same time, in the Anglo-Saxon world, the movement of transhumanism, which aims to improve people's lives by making use of all technological possibilities and creating better living conditions, is emerging. The short and certainly in many ways incomplete list shows three things: Firstly, the idea of improving the human being, i.e. the enhancement, is not really new. Especially during the twentieth century, there were always variants of the basic idea that man could be improved with the newest means of science and technology. Secondly, the review shows that the enhancement conceptions may be both visionary and non-arbitrary, but are mostly closely related to specific scientific and technological discoveries and inventions. Finally, the survey shows, thirdly, that the technical possibilities are discussed from the beginning in their ambivalence: is the improvement of man a promise or is it a threat?

Keywords: Human Dignity, Diversity, Post- und Prehumanius, Artificial Intelligence, Heidegger

Reinforcing intersectional inequality via the AMS algorithm in Austria

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Starting in 2019, the Arbeitsmarktservice Österreich (AMS) has been using the so-called "Labour Market Opportunity Model" ("Arbeitsmarkt-Chancen-Modell") to segregate job-seekers into groups with different eligibility for support according to their predicted "opportunity" on the labour market. This model was developed especially for this purpose under the leitmotif of efficiency, and it became known in the media primarily with the publication of its accompanying method paper: It can be inferred from the paper that the personal data entry "Gender: Female" results in an automatic "deduction of points", which means that a woman can be assigned to a less "eligible" group solely on the basis of her gender. Further potential "point deductions" according to personal data, such as age or nationality, lead to an intersectionally compounded disadvantage.

This is just one example of a worrying trend to legitimize socio-political decisions with highly intersectional discriminatory implications and effects using technological means that appear objective and neutral. For example, already since 1999, in some US states, an algorithm has been used to calculate prisoners' risk of recidivism - again according to the prisoners' personal history and personal data. Measures such as probation or the length of a prison sentence are being adapted in accordance with the calculated risk of recidivism.

Both examples can be regarded as "self-fulfilling prophecies" which, in a first step, depict the reality of discrimination in the digital sphere, then, in a second step, normatively reinforce it as a supposedly objective fact and finally, in a third step, return it to the social sphere by means of the resulting measures.

Using the "AMS algorithm" as an example, this talk aims to investigate the conceptual structure and the two basic building blocks of such predictive models from a mathematical perspective, and to illustrate how these algorithms in their current use reproduce discriminatory realities and thus generate so-called feedback loops. Both basic building blocks are based on human decisions, so that

such an algorithm can be neither objective nor neutral. Finally, this talk will explore the question of whether such models might, after all, have an emancipatory potential - and concludes by answering this question with a cautious "yes".
Keywords: algorithmic bias, governance, intersectional discrimination

Autonomous driving: safety, but only for the western hemisphere

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In this paper, I want to stress the importance of integrated research in technology development using the example of autonomous driving. This instance shows, how technical development strengthens unjust systems, when social factors are not considered. It seems to be a good thing, when driverless cars are promoted with a “vision zero”- the expectation to reduce casualties to nothing in motorized traffic. Simply achieved by adding robotics and AI to driving. While this utopian idea seems to be feasible in Europe or the US, the reality of autonomous vehicles, is developed without considering the reality of people living in rural, less-developed countries.
Prototypes demonstrate the progress, when they drive from one US coast to the other. Nevertheless, they also show the boundaries in which these systems can operate, when the road marking disappears. Hence, how can a technology bring safety to all regions of the world, when basic functioning cannot be provided without perfectly marked and mapped roads? It is out of question, that in most regions of the world, street conditions quite alternate from the German Autobahn or the US motorways. Besides the specific challenges infrastructure in non-western countries poses to autonomous vehicles, developers do not anticipate cultural differences in everyday road situations.
While traffic in Germany or the US is more regulated and follows rules, the system of traffic rules of e.g. East Asian countries is customary law. Something AI is not (yet) able to deal with. Thus, the regions in which people are most affected by unsafe traffic will not profit from these innovations.
Furthermore, taking into account that the pedestrian recognition is based on machine learning with known biases, autonomous driving is not free from discrimination and injustice.
Therefore, I argue that this problem occurs, when technology development is not orientated on the real worlds needs, but only on the developers own interest to develop a technology for its own ends instead of trying to find a solution for the problems of road safety. With this in mind, I call for an integrated approach, in which open discussion is possible and autonomous driving must not be the only answer. It is of uttermost importance to address social and ethical questions in the development process and not afterwards, if technology should not be responsible for stabilizing unfair conditions.
Keywords: Autonomous driving, AI, cultural difference, social injustice

Digital governance of labour market: the building of an informative infrastructure for labour market policy in Italy

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The increasing pervasivity of digital technologies in society has led some scholars to talk about platform society and digital governance, where the policy instrumentations are made operative by softwares, algorithms, data and data infrastructures and we can observe the emergence of new sociomaterialities. In this paper, it will be investigated the issue of digital governance of labour market

and in particular, “the experiment” in progress in Italy concerning the construction of an informative infrastructure that should enable a connection among the actors involved in labour market governance will be described. This is configured as a complex assembly project among actors, policies and technologies, which outcome is anything but taken for granted, since the goal of making database interoperable clashes with difficulties made of technical, organizational and political nature. These information systems are not mere technical tools or neutral data collectors, but they are socially built, with agency capacity and with a political content due to their taxonomies. The issues that will be investigate are linked to: a) European employment guidelines on Public Employment Services and the attempts for their standardization and digitalization; b) the effort to build an informative infrastructure in Italy for labour market policy; c) the digital solutions adopted (or about to be adopted) by Public Employment Services (PES) in Italy.

Especially to the PES, it has been requested to adopt digital solution to perform their task, no more limited just to the placement of workers, but aimed to be the cornerstone of flexicurity strategies, as foreseen by the European Employment Strategy: in a context where the labour market is even more flexible and with high turnover, it is considered necessary to build a security net through a mix between passive policy, like the subsidies, and active policy, the one targeted to direct workers to specific training in order to bring them back into labour market as quickly as possible. PES need to manage large quantities and various types of data (such as data on the profile of workers and firms, the conditions of local labour markets, or administrative data) in order to effectively carry this task out and to network with multiple actors.

In Italy, the new neocentralist plant expected by the legislative decree 150/2015 planned the establishment of a new public body, called ANPAL (National Association for Labour Active Policy), with the purpose of coordinating a network of many public and private actors and realizing a unit information system on the basis of which releasing the electronic worker’s file, that should contain information about educational and training paths, working periods, the use of public funds and the payment of contributions.

This project, aimed to built an informative infrastructure, is observed during its making and it’s still far from stabilizing since many actors still need to be aligned and it will probably take several deviation due to the establishment of the new government which has bring forward new policy proposals to be adopted in excessively short time.

Keywords: Digital governance, labour market policy, flexicurity, informative infrastructures, public employment service

Gender equality within the Max Planck Society: Stories from the road

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The Max Planck Society (MPS) is one of the largest and most prominent research organizations within Germany. In terms of equal opportunities there is the central gender equality officer, located at the society’s headquarter, who supports the Max Planck Society in the implementation and advancement of its gender equality objectives. On a daily basis, however, the realization of gender equality is conducted by the equal opportunity officer at the respective institutes. Although they are often very enthusiastic and active, the actual impact of the institute’s officers is in fact rather limited. This is caused by several reasons, mostly of structural nature:

- The overarching aims of the MPS hardy play a role in the every-day activities, as they only provide guidelines.
- There is no review of the individual institute’s progress.

• The individual officers work independently of each other and are concerned only about their individual institute (Harnack principle).
• Overarching guidelines are not up-to-date with current topics (e.g. diversity).
• The position of the equal opportunity officer is uncompensated and needs to be done "on top".
• Access to internal procedures (e.g. taking part in job interviews) is not enforceable.
• The position of the equal opportunity officer cannot be filled by a male person, creating extra work for the female officers and making the case seem to concern only a certain group of people.

This list is by no means complete or unbiased, instead it is intended to serve as a basis for discussion. Practices and examples will be presented from the Max Planck Institute for Meteorology, Hamburg.
Keywords: Research institution, gender equality, structural challenges

Embodied Artificial Intelligence: Applying social robots on children

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The current technology push is based on the assumption that digitalization, especially artificial intelligence, can detect, prevent and solve social problems like the demographic change, the shortage of qualified professionals, and the demand for concepts, that meet the diversity of children within an inclusive, educational system (e.g. Hebesberger et al., 2017). By developing artificial intelligence (AI), machines such as robots shall become not only intelligent but also social. "Now and in future there will be more similarities between human-human and human-machine interactions than differences" (Krämer, von der Pütten & Eimler, 2012, p. 234). This might support the conception of robots as social actors (Fogg, 2002) and makes them even more interesting for human-centered services as delivered in the context of education and therapy. Indeed, a tremendous amount of social robotics focuses on vulnerable target groups like children arguing that by the use of these technologies they might learn easier due to the robot's embodiment (e.g. Wainer et al., 2007; Bainbridge et al., 2011).
In early childhood education, for instance, social robots take on different roles – teacher, peer or learner (Belpaeme et al., 2018) – connected to diverse instruction styles (Reigeluth, 2012) to teach children e.g. languages. Many studies point to the potential of robots teaching children foreign languages (e.g. Movellan et al., 2009; Gordon et al., 2016; Alemi et al., 2014) and narrative skills better than e-books (Westlund et al., 2015). In therapeutic settings, on the other hand, robots serve as mediators between humans (e.g. Werry et al., 2001; Dautenhahn et al., 2009). Many robotic systems have been developed especially for the treatment of children with autism spectrum disorder (Yumakulov, Yergens & Wolbring, 2012), that comes along with challenges in social interaction and imaginative skills. Through the interaction with a robot children should learn patterns of human communication like turn-taking or imitation (Wainer et al., 2014). It is argued that the interaction with robots might be easier for these children because robots have fewer social cues that could be misinterpreted (e.g. Kim et al., 2013).
Educational and therapeutic staff, however, has concerns regarding the application of robots in their working environment arguing that it is impossible to build a meaningful relationship with technologies (Serholt et al., 2014; Wolbring & Yumakulov, 2014). On the other hand, children's learning outcomes might improve when the data produced during child-robot interaction is used for learning analytics (Ahmad, Mubin & Orlando, 2016; Westlund et al., 2016). For instance, robots can adapt the level of a task according to children's individual performance (e.g. Leyzberg, Spaulding & Scassellati, 2014;

Schodde, Bergmann & Kopp, 2017).
Therefore, this contribution aims at the discussion of chances and challenges of the application of "social" robots on children with respect to perspectives of developmental psychology (children's understanding of robots; children's caring nature; children's sensitivity to peer pressure), media and communication studies (embodiment, multimodality, social presence), and ethics (sociability of robots; learning analytics).
Keywords: Artificial intelligence, social robots, child-robot interaction

Towards a low-carbon energy transition of urban mobility from a consumer perspective

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A sustainable energy transition towards a low-carbon system is one of the main goals and challenges to support and enhance successful climate change mitigation. As the latest IPCC special report illustrates once again, immediate and extensive climate action is necessary to be able to fulfil the 1.5 degree goal and prevent severe and irreversible damages (IPCC, 2018). Besides electricity and heating, especially also the mobility sector is of special interest in the regard of a sustainable energy transition for Austria, as it forms one of the sectors with the highest greenhouse gas emissions and is largely dominated by fossil forms of energy (Anderl et al., 2018; Heinfellner et al., 2018). The existing passenger transport system therefore is subject to severe carbon lock-in and automobile dependency, where individual, emission-intensive car travel forms the main mode of transport and at the same time locks out more sustainable, low-carbon choices (Erickson et al., 2015; Seto et al., 2016). To enable a transition towards a more sustainable and decarbonized energy system, besides changes in technology far more also a change in consumer behavior is necessary (O'Rourke & Lollo, 2015). Although there exist different approaches trying to increase more sustainable consumer behavior, often the logic of "simple and painless steps" is followed, leading to incremental improvements with often limited impact only (Thøgersen & Crompton, 2009). In contrast to this, wide reaching, radical and immediate behavior changes will be necessary to be successful in reaching significant reductions of greenhouse gas emissions (Shay & Khattak, 2010).
Therefore, this paper deals with the topic of "disruptive consumer policies" for urban mobility to reach the needed changes in consumer behavior. In a first step of this study, an extensive literature review is conducted to define a selection of suitable disruptive consumer policies based on a set of structuring criteria. Depending on the outcome of this review and potential remaining gaps, qualitative expert interviews are used in the following to close these gaps and validate the quality of the listed policies and their disruptive potential. The output will then have the form of a list of different policies indicating their impact level and will subsequently serve as the baseline for a quantitative empirical investigation of the public acceptance of these policies. The expected outcome of this second step of the research process is a ranking of policies in regards to their effectiveness in reducing greenhouse gas emissions as well as in regards to their practicability in terms of public support. Furthermore, in cases of low acceptance, consumers are asked to indicate changes and incentives necessary for them to be able to still support a certain policy. The findings of this study shall inform policymakers which set of policies seems to be the most promising in terms of mitigation impact and public acceptance and shall therefore accelerate and enhance climate action.
Keywords: Sustainable mobility transition, disruptive policy, behavior change, consumers, public acceptance

Evolution of biotechnology in India: (Re) emergent form of

governance

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Scientists often introduce metaphors, entities, carve out spaces and bring forth new technologies that either disrupt or exist outside the realms of existing structures of governance and statecraft.
This paper examines the process of historical evolution of the forms and structures of governance for biological entities with the emergence of 'biotechnology' program in India. By engaging with the materiality of archival documents from the mid-60s' to mid-80s', the paper explores how scientists construct the metaphor of 'biotechnology' that becomes central to set the tone of bureaucratic interactions, formulating narrative of the futuristic growth, setting the agenda for development and forging ties with international agencies.
Paper engages with different forms of archival material such as research reports from leading scientific institutes, records of their international collaborations, keynotes addresses of a major international conference, communication exchange between scientists and government institutions and records of an emerging form of governance structure for biotechnology. These records utilize biotechnology as a techno-scientific trope for creating meaning and urgencies for the interaction between various actors such as scientists, national and international governing bodies. By engaging with the textural nature of these interactions, the paper attempts to articulate the formalization of the structure of governance for biotechnology in India.
Keywords: Biotechnology, history of science, governance, institutions of science

Gender equality in marine sciences. Best practices on structural change

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As a structural change project financed by the European Commission Baltic Gender aims at reducing gender segregation and gender inequalities in marine sciences and technology. Baltic Gender is a consortium of research organizations and higher education institutions from the Baltic Sea Region. The diversity of the consortium members (from Nordic, Continental and Eastern countries) with regard to gender equality policies and practices provides an excellent basis for exchange, collaborative learning and transfer of knowledge. The action works towards the establishment and implementation of Gender Equality Plans (GEPs) as instruments that support institutional change.
GEP implementation activities are supported by established approaches and innovative strategies developed in the four core work packages on (1) career advancement, (2) work and family, (3) structural changes, and (4) gender dimension in marine research.
Work package 3, led by Kiel University, strives to make formal procedures and internal processes in the Baltic Gender partner institutions more transparent and gender-fair. In our understanding, necessary structural changes include the equal representation of women and men at all levels of the institution, fair and transparent career development opportunities and the fair distribution of resources. In a wider sense, change includes the removal of often-unconscious barriers and the reduction of the influence of implicit stereotypes on decisions and developments. After evaluating the gender equality measures running at our partner institutions with the help of six self-developed quality criteria, we compiled a collection of best practice measures supporting gender equality. The thirteen measures are clustered in five categories focusing on specific fields of action. One goal is to give inspiration to stakeholders, who plan to implement effective gender equality measures in their

institution and to define conditions of a successful execution.
The poster exemplifies three major aspects of our best practice collection. First, it introduces the content-related categories: (i) equal representation in decision-making processes, (ii) allocation of resources based on gender proportions, (iii) gender-fair recruitment procedures, (iv) gender-fair staff development and career advancement, and (v) gender awareness raising. Second, in order to be considered as a best practice the gender measures have to meet at least four out of the following six quality criteria: (1) relation to marine sciences, (2) identified need and defined goal of the measure, (3) secured long-term funding and sustainable structures, (4) monitoring, (5) measure is well-known at the institution, and (6) the establishment of the measure exceeds the legal requirements and statutory duties. Third, based on these premises, the poster introduces exemplary
best-practices.
Amongst these best practices are the mentoring programme via: mento_ocean for female postdocs in marine sciences (category “staff development”) and a multi-stage procedure to recruit postdocs (category “recruitment”), coordinated within the Cluster of Excellence “The Future Ocean” at Kiel University. The Women’s Executive Board representing female scientists at GEOMAR Helmholtz Centre for Ocean Research in Kiel is an example of the category “decision-making”. Further best practice measures are for example awareness-trainings at Lund University (category “awareness”) or the indicator-based funding system of Kiel University including performance indicators on gender equality (category “resources”).
Keywords: Gender equality, structural change, marine sciences, best practices