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Workshop

TRANSFORMING SCIENCE

24-26 April 2024

KANTL, Koningstraat 18, 9000 Gent

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DAY 1 (24 April)

Stijn Conix (UC Louvain)

Grant Writing and Grant Peer Review as Questionable Research Practices

A large part of governmental research funding is currently distributed through the peer review of project proposals. In this paper, we argue that such funding systems incentivize and even force researchers to violate five moral values, each of which is central to commonly used scientific codes of conduct. Our argument complements existing epistemic arguments against peer-review project funding systems and, accordingly, strengthens the mounting calls for reform of these systems.

Julia Hermann (University of Twente)

Enhancing Transdisciplinary Research Through Philosophy and Design

Transdisciplinarity is gaining momentum. Many researchers agree that the big problems that humanity is facing today cannot be solved by any single discipline but require an approach that transcends disciplinary boundaries and involves societal stakeholders. At the same time, attempts to address problems in a transdisciplinary way remain scattered and lack a common methodology. In this paper, I argue that transdisciplinary research is the key to enhancing the problem-solving capacities of science, and that philosophy and design can play an important role in improving the quality and success of transdisciplinary collaborations.

Transdisciplinarity needs to be distinguished from related terms, such as "interdisciplinarity", "multidisciplinarity", and "cross-disciplinarity". There is no uniform use of the term. I understand transdisciplinarity as involving the collaboration of different academic disciplines and non-academic actors, and as seeking to integrate knowledge and methods of different disciplines as well as different societal stakeholders. In her conceptual literature review, Sue McGregor (2007) identified four key challenges of transdisciplinary collaborations: managing group processes, reflexivity, common learning process, and facilitating integration and synthesis.

As Eigenbrode et al. (2007, 61) have pointed out in relation to cross-disciplinary research projects, many of the challenges faced by such projects are "fundamentally philosophical". This dimension had been "largely overlooked in the extensive literature on cross-disciplinary research and education" (ibid.). With the aim of meeting those challenges, the Toolbox Dialogue Initiative (TDI) has developed tools for "building collaborative capacity in cross-disciplinary teams" (Cwik, B. et al. 2022, 1). The toolbox contains the "toolbox dialogue method", a "philosophically grounded approach to enhancing communication" (Cwik et al. 2022, 1). As Michael O'Rourke and Stephen Crowley (2011, 1937) have argued, "philosophy can facilitate improvement in cross-disciplinary science". Being connected with a wide range of disciplines and appreciating the conceptual foundations of these disciplines, "philosophy can be systematically employed to help collaborators abstract away from specific disciplinary differences toward epistemic common ground, thereby facilitating development of the mutual understanding necessary for successful cross-

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disciplinary research" (O'Rourke and Crowley 2013, 1938). Initiatives such as the TDI are good starting points for exploring the potential role of philosophy and philosophers in transdisciplinary research projects, which pose additional challenges and require modifying and extending existing tools. In my paper, I identify those challenges and delineate ways in which philosophy as well as design can help meeting them. With its methods for making things tangible, design can stimulate out-of-the-box thinking and evoke emotions. Design can take a discussion to a different level by transforming abstract concepts and ideas into something tangible that people can relate to, that evokes emotions in them, and prompts them to see new aspects of a phenomenon, for instance new ethical issues. This, I argue, is an important element in attempts to solve societal problems.

Emma Deckers (University of Antwerp)

Including Local Ecological Knowledge in Research on Harmful Algae Blooms

A harmful algal bloom (HAB) is an excessive growth of algae in lakes, rivers, or oceans. It is harmful when the algae involved produce toxins or create "dead zones" by using up all the available oxygen in the water. As such, blooms can have negative effects on the environment, aquatic life, human health, and the economy. These blooms are often caused by the rapid proliferation of certain types of algae, typically fueled by nutrient pollution, warm temperatures, and calm water conditions. However, due to a combination of practical and conceptual challenges, scientists studying HABs struggle to understand how this phenomenon works and how to effectively monitor, predict, and manage it.
Drawing on a study by Suzana Dumitrita Blake et al. (2022) that examines fishing communities' knowledge of HABs in Florida, this presentation explores the nuanced role that LEK can play in advancing scientific understanding of HABs. I identify three distinct possible relationships between LEK and scientific knowledge: use, incorporation, and integration. Use represents the lowest level of interaction and engagement with LEK, while integration represents the highest. Although incorporation and integration are more challenging, I argue that there are good reasons – epistemic and non-epistemic – for researchers to move beyond 'use'.

Lara Kristina Sabatier (University of Copenhagen)

The Spectre of Incommensurability is Haunting Transdisciplinary Research

This presentation is about how philosophers can help address the challenges of knowledge co-production in transdisciplinary research settings; by becoming "mediators." Practice oriented approaches to philosophy of science are multiplying, and scholars such as Nancy Tuna, Lisa Gannett, Kristin Shrader-Frechette are responding to contemporary demands for more accurate, actionable and equitable philosophical approaches to wicked, real-world problems. In continuation of such critical, practice oriented traditions the field must address increasingly international research settings and institutional calls for equity, diversity, and respect for local knowledge systems. Of particular interest to me, is that taking these calls seriously, seems to require taking disagreement seriously, and consequently to explore its productive potential.
I hold that there is an opening in the expanding realm of applied and practice oriented philosophy of science for something that I tentatively dub knowledge mediation. I rely on three premises. One, that disagreement or divergence between knowledge systems is epistemically valuable (as opposed to a mere hinderance). Two, that philosophers of science already utilises many conceptual tools particularly well suited for clarifying disagreement, for example, conceptual analysis. Three, that conflict mediation offers a useful framework within which conflict-sensitive philosophy of science can operate. It is in this sense, that I propose philosophers should become mediators.

The approach draws on the field of conflict mediation. While perhaps most well known as informing applied branches of psychology and international relations, conflict mediation is increasingly reaching into scientific practice itself. In the field, practitioners operate under a variety of titles and address conflicts at varying points in knowledge production and use. Research mediators, for example, translate knowledges back and forth between different epistemic communities in order to reduce science-practice gaps. While integrated knowledge translation is an approach that inserts knowledge users into the research process itself. Here, they help to guide research questions and advocate for the interests of those most affected by the results of said research. While philosophers are well-equipped theoretically to address many of these issues, they require more arenas and tools to explore them in practice.

The final goal of this presentation is thus twofold. On the one hand, I aim to show that the philosopher as a mediator is well positioned to help navigate disagreements in transdisciplinary knowledge production and use. This expands on the pioneering work by Ludwig and El Hani (forthcoming), which highlights the conceptual priority of epistemic, ontological and axiological divergence between knowledge systems. On the other, I hope to orient professional philosophers with a desire for impact and extra-academic engagement in the field towards scientific mediation as a possible arena of practice.

DAY 2 (25 April)

Emma Moormann & Jo Bervoets (University of Antwerp)

Risk in and Resilience of Autism Research

This talk reflects on the involvement of philosophers in a large, multidisciplinary European research consortium called R2D2-MH which aims to identify risk and resilience factors associated with neurodevelopmental diversity. We discuss the importance and necessity of engaging in such 'field philosophy', in which philosophers engage in fieldwork to find scientific or societal problems outside of their discipline that can benefit from philosophical contributions. However, our talk also investigates the practical and theoretical difficulties that may arise in such collaborations.

In the first part of the talk, one of us will discuss the research opportunities and challenges in her project to study the concept of resilience within R2D2. We will report on a pragmatic analysis of the uses of 'resilience 'in the consortium. Since it brings together researchers from genetics, neuroscience, psychology and philosophy, along with neurodivergent individuals in two co-creation groups, many different employments of 'resilience' exist within this project. This is an example of how philosophers can provide contributions to scientific projects by engaging in what Mary Midgley called 'philosophical plumbing'. We will also share how this mapping exercise contributes to a normative philosophical project: a neurodiversity-inspired ameliorative analysis of resilience in mental health. We discuss the possibility of engaging in conceptual engineering to formulate an improved account of resilience that fits within a neurodiversity paradigm. Special attention is paid to the tensions that may arise between trying to combine descriptive and normative approaches within one project.

In the second part of the talk, the other author (who is an autistic scholar coordinating R2D2 co-creation efforts) reflects on the philosophy of science of talking about something like "a neurodiversity paradigm". Suggestions have already been made in the literature that such a paradigm has replaced 'the biomedical paradigm' previously employed in autism research. To some extent there is real change in projects like R2D2 by involving lived experience via the co-creation groups, but the question is whether this change can (or could ever) be labeled a paradigm switch in the Kuhnian sense of changing the discipline of biomedical science (the text books, the questions asked, etc.). Another question is whether 'neurodiversity paradigm' is precise enough a notion to direct such changes and whether neurodiversity does not have to give up some of its own tenets (in the way biomedical sciences have to give the notion of autism as a pathology)

in order to be able to productively work together with the biomedical science. The talk will conclude that to really move beyond the neurodiversity crisis in autism research both disciplines need to give something up in order to allow truly complementary interdisciplinary progress.

We conclude that, despite the obstacles they face, interdisciplinary and participatory approaches to autism research are of crucial importance for a field which has a big societal impact. Because of the prominence of autism research, the integration of such approaches can and should also have a signaling effect towards other biomedical research strands

Hans Radder (VU University Amsterdam)

Medical Research without Big Pharma: it's Preferable, it's Profitable, and it's Practicable

This paper addresses the patent practices for prescription drugs by big pharmaceutical companies. We argue that medical research without such patents is scientifically, socially and morally preferable, economically and financially profitable, and socio-politically and organizationally practicable. Along the way, we emphasize the importance of a broad approach to the relevant issues; that is, an approach that takes into account the stages of research, development, manufacture, marketing and sale of drugs (for brevity's sake, we refer to the collection of these stages as the 'production' of drugs).

The following four facts demonstrate the urgency of constructing a substantially different system of drug production and, at the same time, which direction such a change should take. First, there is the unsustainable growth of the costs of prescription medicines. Second, high drug prices provide an enormous incentive for continuing corruption and abuses in the form of misrepresenting the safety and effectiveness of drugs and encouraging their use in situations where they may not be appropriate. Third, the current system is one in which the (mostly big) pharmaceutical industries make excessive profits (much larger than what is usual in other commercial businesses), while they pay hardly any tax on their profits. Fourth, a substantial part of the entire system of drug production is paid by public tax money, through various contributions of national governments and governmental institutions. The latter fact, however, does not have a mitigating effect on the excessive drug prices the public has to pay in their hospitals and pharmacies. The result is that the public pays twice for its medicines: first, via its significant financial contributions to the various stages of the drug production system and, second, for generally overpriced and often excessively expensive medicines.

Our conclusion is that these facts require and justify a shift in our policies for drug production: from privatization through patents to medical research in the public interest. In the first section we demonstrate that abolishing medical patents is scientifically, socially and morally preferable. The second section argues that it is also economically and financially profitable. In the final section we introduce and explain a concrete model of how to do medical research without patents in a way that is socio-politically and organizationally practicable.

In this paper, our primary focus is on medical research in wealthier countries. But of course, the far greater affordability of generic prescription drugs in a system without patents will also be to the advantage of low and middle-income countries. After all, it is the people of these countries who suffer most from the current monopolistic system.

Valentine Delrue (Ghent University)

Useful or Useless? The French Public as an Actor in Constructing Credibility for Atmospheric Tides Meteorology (1799-1811)

Starting in 1775, the French naturalist Jean-Baptiste de Lamarck (1744-1829) tried to understand the weather by studying the influences that the varying positions of the moon and the sun had on the atmosphere. Using Newtonian celestial mechanics, he hoped to make meteorology into a scientific discipline that could be useful for society as a whole and agriculture, medicine, and navigation on the sea in particular.

From 1799-1810, he published eleven Annuaires météorologiques. These yearly publications for the general public contained a weather calendar of the previous year, weather probabilities for the next year, and additional small treatises on different aspects of meteorology. The inclusion of these probabilities quickly led Lamarck's work to be criticized and compared to astrological almanacs. He constantly had to advocate for the legitimacy of his work and therefore adopted a wide range of changing strategies throughout his Annuaires.

Looking for a way to add credibility to his project, Lamarck insisted that the public could play a significant role in the advancement of meteorology not only as beneficiaries but also as witnesses and as cooperators. This public is never singular; he calls upon savans, laymen, members of agricultural societies, seamen, physicists, and meteorologists with different demands and expectations. Throughout his Annuaires, he communicates his work and weather probabilities to them in very different ways in his search for a willing audience who will participate in the making and authorizing of his weather knowledge. Thus, more than offering a weather forecast, Lamarck's aim with these publications was to foster the creation of a network of observers, which we can consider an early project of citizen science. To encourage his readers to join his meteorological project, he constantly emphasized the many useful benefits that would come from knowing what the weather will be.

I argue that Lamarck initially used the mobilizing potential of the ideal of utilité for creating a network of meteorological observers. However, while usefulness was a shared epistemic value, his readers applied his meteorological theory and methodology in a flexible way. This led Lamarck to not consider most of their contributions as part of useful meteorology and, therefore, from the eighth volume onwards a change takes place in his rhetoric of persuasion. Lamarck instead argues for the importance of having a devotion and love of nature, especially for its atmospheric phenomena, as the main driving force that will propel meteorology forward.

Cecilie Hilmer (University College London)

Mission-critical Mission-oriented Innovation and its Discontents

Research and innovation policies in Europe are increasingly oriented towards societal challenges (e.g. Grand Societal Challenges) or social benefit. This can for example be seen in the current framework programme of the European Commission, Horizon Europe. Its Mission Programme, which is highlighted as is most distinctive new feature, aims to steer research and innovation in the direction of five ambitious EU Missions (e.g. "Adaptation to Climate Change: Support at least 150 European regions and communities to become climate resilient by 2030"). These missions are to drive societal transformation, by asserting the dedication to socio-ethical value as funding condition for research and innovation. But what kinds of omnipotent imaginaries of governance and control do these mission discourses bring to the management of scientific research and technoscientific innovation? Directing research and innovation towards societal goals includes a shift in roles and responsibilities, or at least putting these into renewed question. What is the 'new role' that is assigned to research and innovation for society - what is actually transformed in the process? And, what happens to democratic politics in the name of complete transformation?

The practice of EU Missions is still in its early stages, is evoking many questions and a new discourse as well as newly forming communities of practice. By critically exploring the emergence of mission-oriented innovation imaginaries within these communities, I would like to discuss how discourse and practice around missions by policymakers involves (an attempt of) a powerful shift in focus in technoscientific governance from responsibility as individual moral decision-making (assigned to the scientific practitioner) to missions as the undeniable trajectory that technoscience must take to meet plantery-scale challenges such as climate change. Through the discourse of missions – including all of the connotations connecting missions to white Christian saviourism and the military – Europe's position as an "innovation leader" through large-scale infrastructural projects, is justified. In the process, local politics with its layered conflicts and ambiguities is neglected in favour of omnipotent visions of the greater universal good. Mission-oriented innovation threatens to obscure the subjective and tacit conditions and processes that bring about collective decisions through an idealised and universally understood "common good". Through the study of policy documents, interviews with policymakers, and grey literature on mission-oriented innovation in Europe, I will explore how the totalising fantasies of missions are produced via forms of speech and legitimation, tacit value decisions about the common good, the articulation of challenges, questions, and conflicts. I argue that by placing the sites in which political decisions in the name of a common good are to be taken within science and innovation projects, possible political questions and decisions are decentralised while positioned within a context from whose epistemic authority is still widely accepted – making consensus more likely.

Sacha Ferrari (KU Leuven) & Massimiliano Simons (Maastricht University)

The Autonomy of Non-institutional Science

In recent decades, a number of prominent non-institutional scientific movements have emerged. First, there is the DIY biology movement, which seeks to conduct and disseminate biological research outside the university, often in so-called community labs (Delfanti 2013; Simons 2022). Second, there is the Quantified Self movement, which brings together individuals interested in using new digital technologies to study their own behaviour and environment (Lupton 2016) in order to develop 'personal science' (Wolf and De Groot 2020) to improve their lives. Finally, there are numerous new forms of 'evidence-based activism' (Rabesharisoa, Moreira and Akrich 2014), often linked to patient organisations, in which individuals struggling with disease self-organise and develop their own epistemic procedures to develop the science of their disease, often through forms of 'collective self-experimentation' (Kempner and Bailey 2019).

In this paper we will explore how and to what extent these and other forms of non-institutional science embody values associated with a shift in science towards greater societal impact. We will then map the three dominant narratives about these forms of non-institutional science. Non-institutional science, also called citizen science or lay expertise, is seen as either a form of democratisation, medicalisation or neoliberalisation of science. And while each of these narratives raises interesting questions about non-institutional science, in the final part we would like to add a new narrative centred around the notion of 'autonomy' (Ehrenberg 1995; Boltanski and Chiapello 2018). We argue that non-institutional science, and similar calls for science to become more socially relevant, embodies a particular understanding of how modern individuals should be 'autonomous'. Health and well-being are seen as intrinsic parts of the autonomous sphere of the individual, who is therefore conceived as someone who should be able to decide on these matters for themselves. When these epistemic tools are not available, individuals are called upon to produce them themselves.

Qianru Wang (Ghent University)

Counteractive Mechanisms and Effect Indeterminacy in Evidence-based Policy

Evidence-based approaches to policymaking have been growing in popularity over the last decades, covering a variety of domains: health, education, criminal justice, poverty, etc. The special focus of EBP on the effectiveness of policy – revealed by its central slogan 'what matters is what works', has initiated reflection of philosophers (especially philosophers of science). However, this focus on policy effectiveness often overlooks the complex interplay of mechanisms that influence policy outcomes. Drawing from the philosophy of science, this paper delves into the concept of 'counteractive' mechanisms to the analysis of policy effectiveness prediction (PEP).

The philosophical inquiry into 'counteractive' mechanisms examines how opposing mechanisms can coexist and influence outcomes. For instance, as described by Steel (2008), exercise promotes weight loss by burning calories but also potentially increases weight by stimulating appetite. This example illustrates two mechanisms that are activated by the same action but have opposing effects. Similarly, in the realm of EBP, policies can trigger mechanisms that both support and undermine the intended outcomes.

An optimal PEP should address two questions: 'Will the policy work?', and 'To what extent will it work?'. To illustrate, consider the Plastic Shopping Bags Ban Act implemented by the Australian Capital Territory (ACT) in 2011. The policy aimed to reduce the usage and environmental impact of plastic bags. However, a study in 2020 indicated mixed results: a notable decrease in single-use high density PE bag consumption was offset by an increase in other plastic bags, leading to a modest overall reduction. This case illustrates the nuanced difficulties of assessing policy outcomes quantitatively.

In this paper, I argue that such failure in policymaking underscores an epistemic oversight in evidence-based policymaking: the predominant focus on the 'constructive' mechanisms a policy might trigger, while ignoring the potential for 'destructive' mechanisms that could counteract or even negate the intended effects. I explore the failures in PEP through two case studies: the ACT's plastic bag ban and Cochrane's review of bicycle helmet legislation. I contend that understanding these 'counteractive' mechanisms is crucial for diagnosing reasoning errors that frequently result in suboptimal PEPs, where practitioners fail to accurately assess both the qualitative and quantitative impacts of policies.

Moreover, the acknowledgment of destructive mechanisms introduces a further complication -- the challenge of determining the net effect of counteractive mechanisms that a policy might trigger. This pertains to the difficulty policymakers face in making a reliable PEP when constructive and destructive mechanisms coexist. To overcome this difficulty, the paper advocates for a pluralistic and comparative approach, the Collection-Analysis-Synthesis Scheme (CASS), which enhances methodology of making PEP by integrating both mechanistic and difference-making evidence. I contend that a deeper appreciation of the interplay between constructive and destructive mechanisms provides guidance not only for optimizing PEP but also for improving the overall design and implementation of policies.

Ultimately, this paper examines the practical implications of evidential pluralism in evidence-based policymaking. It argues that adopting an evidential pluralistic stance aids in diagnosing reasoning errors in policy effectiveness predictions and provides guidance for enhancing PEP.

Merve Burnazoglu (Utrecht University)

Identity in Models, Measurement, and Machines

In standard economic examination of societal problems such as inequalities, the question of identity --who people are, is often neglected. When explicitly mentioned, its exclusionary impact is expected to disappear in competitive markets. However, critical political economy accounts have long argued that this view comes from a specific understanding of market mechanisms where persons are viewed as 'individuals,' and inequalities as 'accidental' events. Moreover, increasing number of studies in methodology and 'science-in-practice' trace this view back to economists' modeling and measurement thus science-making practices that carry out a 'built-in-normativity' characteristic.

Technology and digitalization add an interesting dimension to the knowledge problems about identity and economists' understanding and way of dealing with societal problems such as inequalities. Automated decision-making systems (ADMs), or algorithms in general, are increasingly used in mediating social, economic, and political processes, with control over who people are and what they can do and become. These mediations operate with clustering and categorization that tend to shape and homogenize persons' identities into profiles, and matching these profiles with different opportunities. Thus, how identities are processed by not only classical models but algorithmic tools has a systematic connection with what individuals receive out of scientific sense-making as well as in real-world markets and policy. In other words, the scientific practice and algorithmic mediation may now lead to combined transformative effects by re-ontologizing identities and, thereby, society.

This talk aims to present a fresh perspective on the structural link between identity and exclusion in models, measurement and machines. Conceptualizing the treatment of identity in normatively built models, measurement and algorithms, it asks: Can the machine learn to tackle normativities in data and design or only transform them to reproduce similar outcomes with classical modeling and measurement practices? The approach involves critical methodology and philosophy of economics combined with political economy accounts to address the link between methodological practices in economics and the role of technological tools in potentially carrying out the 'built-in-normativity,' thus classical knowledge problems in transforming forms.

DAY 3 (26 April)

David Ludwig (Wageningen University)

Transformative Transdisciplinarity. Aligning Science and Society Through Community-Based Research?

Transdisciplinarity promises to align scientific and societal concerns through inclusive research practices that are co-produced with local communities. Based on fieldwork in fishing villages in the Northeast of Brazil and farming communities in Ghana, this talk explores transformative promises and challenging realities of transdisciplinary research. Transdisciplinarity often fails to live up to its promises by assimilating local knowledge into agendas that are dominated by the interests of academia and its funders. To realize transformative ambitions, transdisciplinary research needs to establish procedures that do not only co-produce knowledge but also agendas and frameworks through the interests of local communities.

Julie Mennes (Ghent University)

Science and Societal Problems

Science is supposed to produce knowledge that is empirically verifiable, reproducible, and allows for the explanation of regularities and the prediction of events in the world. Because of its reliability, scientific knowledge holds great potential for addressing societal problems.

In the past decades, this potential is increasingly recognized. There has been a growing expectation, or even pressure, for science to contribute to solutions for societal problems. At the same time, examples have been surfacing where scientists tried to contribute to real-world problem-solving, or others use their findings to do so, and the results were disappointing.

For example, in 2006, commercially kept bee hives started to die off at alarmingly high rates. Toxicologists were asked to determine whether 'imidacloprid', a pesticide that had recently been brought on the market, could be responsible for the collapsing beehives. The scientists performed a randomized control experiment where hives were kept in a controlled environment for three weeks, and then observed for several months (Dively et al., 2015). The study found no significant correlation between exposure to imidacloprid and beehive collapse. However, beekeepers argued that the results were useless. First, because the study did not account for cross-reactions with other synthetic chemicals and pathogens, and second, because the natural living conditions had been distorted by replacing the natural diet of the bees with artificial pollen and housing them in combs coated with chemicals (Suryanarayanan & Kleinman, 2017).

In this talk, I reflect on what it means for science to contribute to societal problem-solving and how it can do so. The case of beehive collapse is used as a working example.

First, I explore different ways in which science can contribute to real-world problem-solving.

Next, I outline a strategy for formulating scientific research questions that are geared towards producing useful answers. The strategy builds on the 'PICO' model, which is used to guide the formulation of research questions in evidence-based medicine. The acronym points to different variables that need to be specified in research questions: 'Population', 'Intervention', 'Control' and 'Outcome' (Richardson et al., 2002). Depending on the societal problem being addressed, variants of PICO can be used to mediate the production of useful knowledge via strategically formulated research questions.

Branwen Peddi (Ghent University)

Epistemic Justice in Agricultural Development in Forikrom, Ghana

While the transformation of traditional scientific practice is needed to ensure better societal problem-solving, it requires a repositioning of the role of science and academic knowledge within a society that is

increasingly pluralistic. Academic institutions often claim a dominant position when it comes to expertise and knowledge production. Yet, in a move for more decolonial approaches to science, it is essential to also engage with, for instance, Indigenous and local sciences. These knowledges and scientific practices are adapted to specific localities and rooted in cultural traditions, but have often been sidelined by academics. Notwithstanding, Indigenous and local communities are best placed to envision scientific practices that are on their own terms and in service of their own needs. This is in line with the principles of endogenous development, which is locally driven development based on local resources and knowledges, but it maintains the openness to engage with external resources where necessary. The knowledge politics that come into play in these processes have a significant impact on how scientific practice and the perception of expertise are shaped, and showcases why democratic and just involvement of Indigenous-local actors is key. What is important here, is not only that participatory decision-making spaces for communities are enabled and reinforced, but that these spaces also provide a legitimate basis for diverse knowledges. We discuss a case study about the agrifood system of a community in the transition zone of Ghana, Forikrom. In Forikrom, different ecologies and social groups meet and it is also where a community-based organization (the Abrono Organic Farming Project) has managed to successfully leverage a position for Indigenous and local knowledges alongside other knowledges. Using critical ethnography, we explore leverage points for epistemic justice in agricultural development projects within the community and we focus on three distinct cases: the creation of a local seedbank for farmers, the farmer-led development of organic weedicides in agriculture and a series of co-creative workshops organized with farmers. Epistemic justice as a guiding concept in these cases allows us to focus on a positive account of what is transpiring and how Indigenous and local farmer knowledges are being revitalized, despite wider systemic challenges. Furthermore, we gained insight into hierarchies of expertise and the different levels of epistemic justice (at the individual, structural or systemic level), as well as ways of facilitating endogenous development. Finally, we provide recommendations into creating more inclusive and epistemically just environments for knowledge exchanges and reflections about producing a more locally relevant – or even ethical – way of doing science.

Karen François (Vrije Universiteit Brussel)

Transforming (Educational) Science: the Case of Math (Education)

In alignment with Latour's (1991) notion that 'We never have been Modern,' this presentation endeavours to assert that 'Transforming Science' is not as novel as commonly perceived. Firstly, we will delve into the philosophical underpinnings of transforming science. Secondly, we will elucidate an exemplar of transformed science through the case study of mathematics education.

The central idea of Latour's (1991) 'We never have been Modern' is that Modernity has not fully realized its aspirations of separating nature and society, facts and values, science and politics. In 'Politics of Mathematics' (François, 2008), it was contended that this holds true even within mathematics (education), a realm unexplored by Latour. Drawing from Haraway's (1985) 'Cyborg Manifesto,' Latour gleaned that traditional dichotomies are artificial constructs that do not accurately reflect the complexities of the world. Latour suggests that modernity's attempt to establish a clear boundary between nature and culture has failed, as everything is intertwined and interconnected. Over thirty years since Latour proposed a "networked" perspective of reality, we are now encouraged to investigate the notion of transforming science. This entails further exploration into a 'new mission' for sciences, 'how scientific practice can contribute to societal problem-solving, and how science could be transformed to increase its problem-solving potential.' This endeavour necessitates a more nuanced comprehension of the relationship between humans, nature, and society and a collaboration beyond traditional boarders of scientific disciplines. An illustrative example will elucidate how the process of transforming science can unfold.

The second part of the presentation will concentrate on the domain of mathematics education research, aiming to discern the achievements and shortcomings of theories that emphasize the social, cultural, and philosophical dimensions over the psychological. In recent decades, significant shifts have transpired within the scientific study of mathematics education (Francois et al., 2016). Initial approaches predominantly centred on the individual, rooted in psychology. However, a paradigm shift occurred with a focus on group dynamics, elevating the social dimension as a pivotal aspect of understanding, thereby garnering interest from the realm of sociology. Subsequent transformations witnessed the involvement of anthropology, cultural studies, and philosophy in this research domain. Whereas mathematics education was initially thought of from a singular and individual perspective, today it is now recognized as a multifaceted process situated within specific contexts and perspectives. Through this example, we want to argue that the research field of mathematics education has to provide knowledge that is context-sensitive, problem-oriented and actionable and thus crossdisciplinary

Koen Lefever (BELSPO)

Belgian Marine Science Policy: an Interdisciplinary Approach in an International Context

Belgium has a federal science policy since 1895, which is currently executed by the Belgian Federal Ministry of Science Policy (BELSPO, Belgian Science Policy Office). For over a century, marine and oceanographic research has played an important role in this.

Since the sea borders several countries, this is by definition an international affair: Belgium plays an active role in several European (e.g. the Joint Programming Initiative Healthy and Productive Seas and Oceans, the European Marine Biology Resource Centre, the Sustainable Blue Economy Partnership, and the Mission Restore our Oceans and Waters of Horizon Europe) and United Nations (e.g. the Intergovernmental Oceanographic Commission of UNESCO and the International Seabed Authority) organizations concerning marine and oceanographic research, in the North Sea but also in other seas and oceans – for example, Belgium has a contract area for deep sea mining at the Clarion Clipperton Fracture Zone in the Pacific Ocean, and is active in polar research in both the Arctic and Antarctic regions.

Given the Belgian federal state structure, the North Sea is a national federal responsibility, while the coast and rivers are a Flemish regional responsibility. The province of West Flanders as well as coastal cities also have relevant responsibilities. Moreover, while science policy is a national federal responsibility, the regions are responsible for education, including research at the universities. This means that marine research is organized in cooperation among the several Belgian governance levels.

Marine and oceanographic research involves many sciences, such as physics, chemistry, biology (ecology, genetics), civil engineering, palaeontology, heritage sciences, economics, and sociology. The seas and oceans also play an important role in for the climate as it generates 50% of the oxygen we need, absorbs 25% to 30% of all carbon dioxide emissions and captures about 90% of the excess heat generated by those emissions. Moreover, there are many different stakeholders: from the inhabitants of coastal areas over industries (fishing, aquaculture, transport, communication, tourism, deep sea mining, sand extraction and storage, wind/solar/tidal energy…), environmental NGOs, and the military to the general public at large worldwide. This makes an interdisciplinary approach an unavoidable necessity. The many uses of the sea are illustrated by the complex Marine Spatial Plan of the North Sea where Belgium has historically played an ongoing pioneering role.

In this talk, the role played by Belgian science policy in this multi-faceted seascape will be discussed.

Jasper Debrabander (Ghent University)

On the normative validity of measures of decision quality in medicine: a case study

Anna Alexandrova has recently argued that the "normative validity" of measurement in the health sciences might be endangered by the theory avoidant tendencies of validation research. In this talk I will further investigate which role normative theories should play in validation research in the health sciences. I will do so by applying Alexandrova's threefold Implicit Logic of validation to the Breast Cancer Surgery Decision Quality Instrument (BCS-DQI).

Many patients face preference-sensitive decisions (i.e. decisions for which no medically superior option can be identified). These patients are invited to actively participate in decision-making. Given the complexity of the decisions they face, however, most patients can only be meaningfully involved in decision-making when appropriate support is offered. Patient Decision Aids (PDAs) range from patient brochures to web-based tools and aim at supporting patients by offering comprehensible information about their medical treatment options and stimulate reflection about which treatment they prefer. Measures of decision quality figure as outcome measures in effectiveness research on PDAs. For example, the BCS-DQI was used as primary outcome measure in a Randomized Clinical Trial (RCT) on a PDA for early stage breast cancer patients who face the preference-sensitive decision between two types of surgery (i.e. mastectomy or lumpectomy).

By applying Alexandrova's Implicit Logic of validation to the BCS-DQI, I will obtain three findings. First, normative theories (i.c. theories of authenticity) might challenge the construct one wishes to operationalize. Second, normative theories (i.c. relational theories of autonomy) might challenge decisions regarding who should have a say in how the construct is operationalized. Third, normative frames can inform choices regarding which correlations should be traced between a measurement instrument (i.c. BCS-DQI) and other constructs for validation purposes.