

## Panel 80. Interventionist STS and Futures: Reflecting on and Renewing Forward-Looking Approaches, Methods, and Practices for 'Better' Socio-Technical Governance

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### Keywords: foresight, futures, governance, intervention, participation, methods, anticipation

Science and Technology Studies (STS) embrace three primary approaches to the creation and mobilization of future-oriented representations: descriptive or analytical, normative, and interventive. Descriptive and analytical approaches aim to identify and trace the influence of anticipatory artifacts—such as visions, expectations, and imaginaries—on the co-production and governance of science, technology, and innovation (STI). Normative approaches, by contrast, critically assess these anticipatory artifacts, proposing alternative futures that are considered more desirable. Interventive approaches aim to go a step further, employing anticipatory practices to actively create more inclusive arenas for STI co-production, enhance distributed capacities, and promote a 'better' socio-technical governance (e.g., Foresight, Responsible Research and Innovation (RRI), Responsible Innovation, Technology Assessment, and Anticipatory Governance).

This analytical, normative, and formal interventionist concern with futures can be traced back to the very origins of STS and its roots in political activism. Its potential also derives from STS's critical capabilities to "look around rather than ahead" (Tsing, 2015), which entails problematizing the predefining boundaries for participation (e.g., Felt & Fochler, 2010), the 'hegemonic and dominatory pretensions' around methods (e.g., Law, 2004), or the lack of diversity in public engagement approaches (e.g., Davies et al. 2012). This perspective highlights the ways in which futures are actively designed, (un)cared for, and contextually and relationally (re)configured in the present, always in tension with past agential entrenchments, lock-ins, and socio-technical closures.

This panel invites exploration of how we can better "look around" by designing, renewing, (re)configuring, and/or caring for the ways we "look ahead"—and vice versa. As such, it brings together STS contributions that critically engage with, explore, renew, or (re)assess forward-looking approaches and anticipatory practices as they are (re)designed, curated, and (un)mobilized in the present to foster a 'better' governance of technoscience.

Key questions for (interventionist) consideration include (but are not limited to):

- Which spaces for reflexivity and critique are being opened and foreclosed by forward-looking designs and practices?
- How can these approaches foster a more inclusive approach to STI governance? In what ways can these methods be diversified or reassessed to serve the purpose better?
- What are the ethical, political and epistemological challenges associated with deploying anticipatory dynamics in STI settings?
- To what extent do these practices enable or constrain the involvement of marginalized groups in the co-production of STI?
- What transformations do (or do not) forward-looking exercises enable or inhibit?
- How does STS position itself within the politics 'of' and 'by' anticipations through engaging with such interventions?



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## ID 886 - Delphi-Based Interventive Futuring for the Energy Transition: A Formative Evaluation Approach for the future of energy research

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*Wenzel Mehnert, Austrian Institute of Technology*

**Keywords: Delphi Method, Anticipatory Governance, Transformative Innovation Policy, Energy Research Policy, Formative Evaluation**

Governments increasingly rely on research, technology, and innovation (RTI) programmes to drive transformative change, yet traditional evaluation methods often prioritize short-term effectiveness and efficiency over long-term systemic impacts. In response, this study presents an interventive futuring approach within the framework of the accompanying and ex-post evaluation of Germany's 7th Energy Research Programme – Innovations for the Energy Transition (7th EFP). This four-year, mixed-methods evaluation moves beyond conventional result-oriented assessments by integrating formative evaluation with anticipatory governance, improving the programme's reflexivity, adaptability, and transformative potential (Vito & Taffoni 2023).

A key component of this approach is the Delphi method, which has evolved from its origins in technological forecasting (Helmer-Hirschberg 1967) into a participatory foresight tool that facilitates expert-driven scenario analysis and policy learning (Dinges et al. 2020). The Delphi method's structured iterative feedback, controlled anonymity, and expert engagement enable the validation of existing evidence while incorporating future-oriented perspectives into policy evaluation (Rowe & Wright 1999). Unlike traditional foresight exercises such as roadmapping applied predominantly in agenda setting and policy formulation (De Vito & Taffoni, 2023), this study applies Delphi within an ex-post and formative evaluation framework, demonstrating its potential to bridge policy evaluation and strategic foresight for mission-oriented innovation policy (Mazzucato 2018) and seeks to generate actionable insights on thematic priorities, inform strategic direction of the 8th EFP and transformation processes.

As part of this process, we identified six key thematic areas (co-developed with the German Federal Ministry for Economic Affairs and Climate Action, BMWK) that reflect the most pressing challenges and opportunities for energy research policy. These themes – ranging from the integration of end-use or consumption sectors and regulatory learning to international cooperation and knowledge transfer – were developed and refined collaboratively within the evaluation consortium during a dedicated workshop. This approach ensured a structured and targeted formulation of open and closed questions, guiding the Delphi rounds and expert consultations. Through two iterative rounds, stakeholders from research, industry, and policy engaged with impulse statements and provided structured assessments. This iterative approach allows for the co-construction of future scenarios, fostering reflexivity and policy learning (Dinges et al., 2020).

By integrating the transformative outcomes framework (Ghosh et al. 2021) and a theory of change perspective, this evaluation links ex-post evaluation with strategic foresight, using evidence from the evaluation to inform future energy research policy (Wiener & Ribeiro 2016). Rather than a retrospective assessment, this approach enables adaptive policymaking, aligning funding instruments and governance mechanisms with transformative innovation goals while enhancing BMWK's deliberative capacity.

This work situates the Delphi-based evaluation within the broader discourse on STS-driven interventive futuring, contributing to the question of how anticipatory methods can enhance the inclusivity and reflexivity of RTI governance in mission-oriented energy research policy.



12 JUNE 2025 09.00 - 11.00

SESSION 1

## ID 834 - Re-configuring forward-looking devices that influence technoscience governance in the energy transition

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*Tom Cronin, Danmarks Tekniske Universitet*

**Keywords:** Intervention, participation, device, energy transition, Power-to-X

The question of when, how, and even if, critical research should intervene in activities is of increasing interest to STS scholarship. Inspired by the panel's call for 'looking around before engaging in the forward-looking activity itself', we use the case of energy scenarios that play a dominant role in the empirical field of energy policy and planning. Scenarios are forward-looking tools that model what a future energy system might look like and what alternatives there could be – how things could be otherwise – but which also constitute, we argue, tools that contribute to the 'institutional confinement' and 'predefining boundaries for participation'. We use the case of Power-to-X technology (PtX) to explore the role of forward-looking devices such as energy scenarios used in developing energy and technology futures. PtX technology uses renewable energy which, when combined with Carbon Capture, provides feedstock to produce fuels, fertilisers and plastics, amongst other products, that replace those made from fossil sources. These processes promise sector coupling through the conversion of green electrons to green (first hydrogen and then other) molecules, and has produced a powerful imaginary for a decarbonised energy future. We use preliminary findings from two research projects (the ERC-project Good-by-Devising and the Expertise-of-Expectations project funded by Independent Research Fund Denmark), to discuss how the device of energy modelling and scenario-making provides a useful site for STS scholars to 'look around' before intervening in future-making. Based on document studies and interviews with the Danish Energy Agency and its PtX taskforce, we show how energy scenarios take shape, and how they influence not only who is partaking in the governance of technoscience and shaping our common energy future, but also who is marginalised from it. As energy scenarios incorporate expert decisions on what concerns to include and exclude in the design of the energy transition, we consider that they constitute 'distinctive opportunities for interventionist work'. Our approach is, however, that before intervening, it is important to first look around and explore the key devices that are at play to see what they do, as they co-configure who has a 'stake' and can participate. Only then can we reflect on when, how, and if, our research should intervene, potentially engaging in the re-design of energy scenarios and modelling devices.

12 JUNE 2025 09.00 - 11.00

SESSION 1

## ID 232 - Experiments in Anticipation: Learning from Responsible Research and Innovation in the Human Brain Project

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*Tara Mahfoud, Essex University*

**Keywords:** Foresight, Responsible Research & Innovation, Anticipation, Anticipatory Governance, Futures Studies

Responsible Research and Innovation (RRI) has emerged for over a decade as an engaged, practice-based strand of STS with interventive objectives for futures and emerging technologies. Foresight and other futuring methods are key to facilitating RRI, which aims to go 'upstream' in the development process, to enable anticipatory action that can shape that process in ways deemed to be socially desirable and to help build capacity to cope with perceived concerns and potential risks. In this paper, we discuss our experience of conducting futures studies of emerging science and technology, in practice, as part of an overall RRI strategy in the context of the Human Brain Project, a Future and Emerging Technology Flagship of the European Commission, between 2014 and 2020. We demonstrate and analyse the value, limitations, and constraints of framing anticipation work within a RRI approach and outline the range of experiments and activities that the Foresight Lab of the Human Brain Project pursued over 7 years, and the experience and lessons that followed.



## ID 422 - Hypothetical enrolment - an anticipatory and situated approach to assess the integration of AI diagnostic tools in clinical settings

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Claudia Montanaro, Università di Bologna

Annalisa Pelizza, Università di Bologna

**Keywords: expectations, AI diagnostic tools, implementation gap, anticipatory methods**

Despite the supposed potentialities of AI tools in the healthcare sector, their adoption is a slow and troubled process. The difficulties and challenges to apply these tools into clinical, real-world settings have been described as "implementation gap" (Seneviratne et al. 2019) or as "the last mile of implementation" (Coiera 2019, Cabitza et al. 2020). More recently, empirical studies have stressed the misalignment between the narratives of policy makers and researchers and how AI systems work in clinical settings (Carboni et al. 2023, Kusta et al 2024); or, they have emphasised the process of social learning (Williams et al 2024) and coevolution (Faric et al 2024) shaping their integrations. Overall, these studies suggest that the adoption of AI diagnostic tools reshapes and transforms the organizational workflows, professional competences and epistemic practices in the clinical settings in which they are deployed. However, there is a substantial lack of research frameworks and methods for addressing the prospects of integrating AI diagnostic tools into real-world settings (Williams et al. 2024).

To assess the organizational and epistemic consequences and challenges of adopting AI tools, we propose "hypothetical enrolment" as a methodological framework. We conceive of "hypothetical enrolment" as a situated, anticipatory and performative approach. It is anticipatory because it focuses on actors' expectations and on the potential consequences brought by AI diagnostic tools in clinical practices. It is situated because such expectations are analysed contextually, hence by paying attention to the organizational workflows and knowledge infrastructures in which the tools would be implemented, to the temporal rationale underpinning their use, to the possible practices of domestication. It is performative since it prompts actors to reflect on the possible implications of the innovation for their daily diagnostic tasks, to imagine further applications and hence to trigger reflection about new modalities of knowledge production.

We test the validity of our method against an empirical case, the company Quanta Brain (QB). QB applies machine learning models for the early detection of autism-spectrum-disorder on children below two years of age. AI tools for psychiatric diseases might be especially relevant to analyse, since they are expected to advance the psychiatric field by re-defining mental illnesses in more objective ways than the current DSM-5 (Graham et al. 2019). We conducted interviews with QB developers and with three neuropsychiatrists, exploring the "hypothetical enrolment", or implementation, of QB in clinical settings. Notwithstanding a generally positive attitude, several organizational and professional challenges emerged thanks to our method, such as the integration of the tool into hospital workflows and the effects on the professional identity of neuropsychiatry.

The notion of "hypothetical enrolment" aims to offer a methodological contribute to scholarship at the crossroads of science and technology studies and the sociology of expectations by combining two interrelated dimensions: first, actors' narratives and expectations about AI tools; second, the infrastructural and organizational features shaping the settings in which those tools would be adopted.



## ID 214 - Look around before looking ahead: better healthcare governance through potentiation

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Katherine Carroll, The Australian National University

**Keywords:** potentiation, transformation, exnovation, video-reflexive ethnography,

Today's healthcare practice has to deal with many factors destabilising its practices, such as staff shortages, tight deadlines, hyper-complex patient trajectories, incompatible procedures, and imperfect systems. These frictions and flaws result in non-stop innovations geared towards re-stabilization. In addition to these innovative transformations, healthcare transforms to stay in sync with societal changes, like digitalisation and sustainability.

Several scholars identify a logic of potentialisation that goes in tandem with these innovative transformations (Andersen and Stenner, 2020). Such logic has a 'forward-looking' approach and aims to increase potentiality rather than 'looking-around' to realise existing possibilities. Merely chasing new possibilities bears the risk of further destabilising healthcare. Moreover, these changes turn healthcare into 'a state of continuous transformation' (Andersen & Pors 2023). When a constant transformation is the only constancy in practice, it becomes part of the mundane habitat of healthcare staff.

When the everyday life of healthcare staff is characterised by a steady flow of new ideas about what is possible, potentialisation technologies should make way for potentiation technologies. Whereas potentialisation lost interest in existing possibilities, potentiation aims to activate further or effectuate more what already exists. Moving from innovation and potentialisation technologies to exnovation and potentiation technologies, we strive to make a case for what already exists (Iedema, 2019).

Using potentiation, engagement and transformation, we look ahead from another angle: the here and now. This implies, first and foremost, to look around. We will do so through the two visual participatory methods that foster discursive engagement with multi-disciplinary health professionals, one moving and one still. Uniting these visual methods is an empirical focus on healthcare delivery relating to women. In one case, we engage video-reflexive ethnography with surgeons and pathologists to optimise the surgical interventions for breast cancer, and the other case draws on workshops with midwives, lactation consultants, and nurses using a textile artefact featuring patient knowledge to improve hospital-based lactation care for bereaved mothers following stillbirth and infant loss.

In both methods and empirical cases, we consider engaging the overlooked, the marginalised, and the sidelined as an act of reigniting the mundane present as a resource for better healthcare governance.

## ID 621 - Gender Awareness Training as a Feminist STS Intervention?

Cansu Güner, Technische Universität München

Prof. Ruth Müller, Technische Universität München

**Keywords:** Feminist STS intervention, Peer Review Cultures, Gender Awareness

Moments of selection for hiring and promotion are critical instances where gender bias can alter decision processes and consequently the assemblage of academic research institutions. A broad spectrum of studies indicates that the unconscious gender bias co-shapes decisions about who appears qualified for a position in academia (Moss-Racusin et al. 2012; Wenneras & Wold, 1997). Scholars often point out the existence of a leaky pipeline, in which women scholars drop out of academia during the transition period from postdoctoral positions to tenure positions (Greska, 2023). As Nielsen (2021) argues, even when women stay in academia, the way the logic of promotion is designed seems to contribute to the gender inequality among senior academic positions.



In this context, our paper mobilizes Gender Awareness Training as a feminist intervention in academic settings. As Woolgar et al. (2009) suggests, the tool of STS intervention increasingly implies an epistemic shift in knowledge production processes, where science is framed with its link to the social. Various approaches to intervention exist in Science and Technology Studies (STS). On the one hand, action-oriented STS research targets intentional intervention in the situations under study (Zuiderent-Jerak and Bruun Jensen, 2007). On the other hand, scholars like Law (2004) and Barad (2007) argue that research practices already interfere with the world(s), regardless of the presence of an intention.

In this paper, our aim is to address and reduce gender bias in recruitment and tenure processes through the intervention of Gender Awareness Training and to maintain gender bias in academic selection processes as a central topic of scientific discussion. To do so, we draw on the scholarship in Feminist STS (Law 2010; Barad 2007), and (e)valuation studies (Brunet & Müller, 2022; Lamont 2009; Derrick 2018; Hesselmann & Hartstein, 2024). Furthermore, we analyse the insights from 28 in-depth interviews with the members of academic hiring committees in one of the German-speaking countries, using the Constructivist Grounded Theory approach (Charmaz, 2006). In the end, we argue that peer review is a practice that could be co-shaped with STS-informed interventions to create a path toward a more gender-aware reviewing process.

In short, in this paper, we ask how reviewers engage with gender awareness criteria in the evaluation and assessment of academic hiring committees? By asking this question, our aim is to examine the enactment of gender intervention in the peer review process through new theoretical lenses.



## ID 154 - Recentring-on-Reversal: Method for Identifying Blind Spots in Technology Assessments and Futuring

Harmeet Sawhney, Indiana University Bloomington

**Keywords:** unforeseen consequences, blind spots, new foresight method

We have a long history of scholarship on technology assessment and forecasting, which has a mixed record in anticipating long-term impacts of technological implements. The "unforeseen consequences" continue to blindside us. On the other hand, we have almost no scholarship on the blind spots in our efforts to anticipate these consequences. In this presentation we will share a method we employed, recentring-on-reversal, in our book (Universal Access and its Asymmetries, MIT Press), which identified blind spots in the development of seven socio-technical systems in the US: postal system, education, electrification, telephony, public libraries, broadcasting, and the internet. In a nutshell, this 3-step method, works as follows: Signs of the hidden dot the edges of our field of vision. However, we gloss over them or dismiss them as oddities because they do not fit in with our view of things. Instead we should deliberately look for them. Furthermore, on identifying them, we should switch perspectives and understand the alternate view wherein the "hidden" is fully visible and normal. It calls for decentring the entrenched metaphor that bounds our current intellectual system and centre staging the "difficult bits of intellectual systems" at the margins to release us from our settled mentalité and open up new vistas. This panel will give us occasion to take recentring-on-reversal beyond universal access, the subject of our book, to issues of technology implementation broadly.

## ID 488 - What is 'counter' in the 'counter-imaginary'? A critical review of research on resistance and alternatives to dominant AI imaginaries

Zak Lakota-baldwin, University College London

**Keywords:** AI, counter-imaginaries, methods, resistance, alternative futures

Looking beyond dominant sociotechnical imaginaries, many scholars have recognised the importance of also identifying alternative visions with less institutional or financial power behind them, particularly those that seek to challenge the dominant imaginaries of governments or tech corporations and foreground questions of social and ecological justice. A term often used for these dissident visions and narratives is "counter-imaginaries". While some studies of counter-imaginaries remain at the level of analytical or normative, others offer strategies for materialising these counter-imaginaries and intervening on possible sociotechnical futures. "Counter-imaginaries" (under this name or similar terms) appear across various areas of STS scholarship, on topics including search engines (Mager 2023), energy sovereignty (Torres and Niewöhner 2023), carbon capture and storage (Lefstad et al. 2024), and gene editing in agriculture (Das et al. 2024).

The concept is becoming particularly prominent in both academic and civil society discussions around desirable or undesirable futures for AI, which is the focus of my PhD research. Yet as this term is deployed in the fight for more just and equitable AI futures, it is worth asking what precisely is 'counter' in the counter-imaginary. Throughout the numerous uses of the term there is no clear consensus on what is meant by a counter-imaginary. Moreover, despite various distinct and at times contradictory applications of this concept, it is surprisingly difficult to find any debate over its proper scope or sustained dialogue between scholars who have made use of it.

In this paper I argue that inconsistency around the meaning of counter-imaginaries reflects often unacknowledged divisions among political actors over how best to tackle the insidious encroachment of algorithmic technologies in so many different domains of life. From my review of the literature on AI counter-imaginaries, I identify two diverging senses in which the term is being used. For some scholars



(e.g. Kazansky and Milan 2021, Schopmans and Tuncer-Ebetürk 2024), counter-imaginaries are ways of mobilising civil society against harmful dominant imaginaries, and scoping out aesthetics and methods of resistance; for others (e.g. Mager and Katzenbach 2021, Toupin 2021), counter-imaginaries are about dreaming up alternative, positive futures based on reappropriating a technology that might otherwise be used in ways that harm marginalised groups.

In other words, the counter-imaginary can be 'counter' in the sense of a counterattack, or 'counter' in the sense of a counterculture. These senses need not be mutually exclusive, but their differences reflect a tension inherent to questions over how to usefully proceed beyond critique of dominant imaginaries. Is it important to also provide an alternative future vision of technology for good, or are there instances in which the focus should be on the politics of refusal rather than reimagining, where mobilising against a given technology is the entire point? Further, what tactics and methods are necessary to support these distinct goals? I argue that this distinction is obscured by the diffuseness of a term like "counter-imaginaries", and that the extent to which research into counter-imaginaries can be effective as an interventive futuring tool depends in part on answering these questions.

13 JUNE 2025 09.00 - 11.00

SESSION 2

## ID 778 - Unpacking Design Futures: Mapping Boundaries and Dimensions to Enhance Reliability

*Francesca Maria Mauri, Technische Universiteit Delft*

*Sara Colombo, Technische Universiteit Delft*

**Keywords: Design Futures, Anticipatory Governance, Critical Design, Design Futures for tech governance,**

How can a practice such as Design Futures, often dismissed as too artistic and subjective be recognised as a reliable method for anticipating the risks, ethical dilemmas, and societal tensions of emerging technologies? At the same time, why attempt to structure and define an approach that thrives on flexibility and is inherently shaped by its context of use? This tension – between the blurred definition of Design Futures and the need for a structured framework – remains a fundamental challenge in employing design futuring within Science and Technology Studies (STS) and anticipatory governance.

Design Futures practices – such as Design Fiction, Speculative Design and Experiential Futures – have been increasingly applied in these fields for their ability to spark discourse on risks, benefits, and value tensions (Brey, 2012a; Lindley & Coulton, 2015) and is gaining traction in anticipatory policymaking, where it helps explore potential technological consequences proactively. By combining storytelling techniques, speculative scenarios, and design artefacts, Design Futures translates abstract futures into tangible experiences, making them accessible beyond expert circles. However, its very adaptability contributes to its lack of recognition as a structured methodological approach.

Its fluid nature manifests in multiple dimensions: from timeframes of speculation (ranging from near-future scenarios to centuries ahead) to techniques used (foresight methods, weak signals, trend-based projections) and narrative framing (dystopian, utopian, or ambiguous scenarios) among others. The process itself varies widely, from one-day participatory workshops to months-long design research. The combinations are infinite. While this flexibility is their strength, it also prevents Design Futures practices from being recognised as a systematic approach within STI governance (Lindley, 2015).

Despite its effectiveness, Design Futures remains methodologically underrecognised (Harb, 2023) in policy and governance contexts. How can a practice that thrives in indeterminacy gain legitimacy? How can it be structured without losing its critical and speculative nature? Rather than imposing top-down rigid definitions, the challenge is to delineate its boundaries from within – mapping its dimensions and nuances.

This work proposes an inside-out approach to critically unpack Design Futures, combining systematic inquiry of literature with Research through Design (RtD) to establish intermediate-level knowledge – a structured yet flexible understanding of how Design Futures can be reliably applied to anticipate risks, ethical



concerns, and value tensions (Markussen & Knutz, 2013; Hales, 2013). The research will systematically investigate into Design Futures practices to explore their dimensions, strategies and nuances to understand how these practices can be used to support anticipation of negative consequences to inform anticipatory governance. By clarifying how these practices operate, we seek to enhance their credibility while maintaining their speculative and exploratory potential.

At the conference, we will present the first results of our attempt at this inside-out exploration in the form of a visual representation. We invite a collective discussion on what are the dimensions that constitute Design Futures as well as how to navigate its blurred boundaries. Moreover, we hope this space can be used as a moment to reflect on how to best approach future iterations of this exploration and anticipate together the challenges and opportunities this process entails.

13 JUNE 2025 09.00 - 11.00

SESSION 2

## ID 571 - Speculative practices for envisioning community-led futures of mobile networks

*Leona Huang, University of Bristol*

*Laurene Cheilan, University of Bristol*

*Matt Dowse, University of Bristol*

*Marisela Gutierrez Lopez, University of Bristol*

**Keywords: high-performance networks, public engagement, speculative futures**

From 2G to 5G and beyond, mobile networks have become pervasive infrastructures, yet their development and rollout remain largely opaque, engineered without significant public engagement. In general imaginaries, their ubiquitous and evanescent qualities make them difficult to comprehend, while their sociotechnical implications are seldom discussed. However, these technologies have massive implications for futures-in-the-making, not only because the development of these networks is entangled with other cutting-edge technologies such as generative AI and immersive technologies (Lu and Zheng, 2020), but also because their affordances contribute to the shaping of sociodigital practices.

We are an interdisciplinary group of academics deploying approaches from technical, participatory, organizing, and creative disciplines. We are committed to collaborative approaches that imagine alternative and reparative futures. We explore the possibilities that arise from an encounter between futuring methods, speculation, future network infrastructures, and coproduction.

Starting from a material and temporal understanding of high-performance networks (Lynch, 2020; Slager, 2018), our intervention draw on creative writing methods (Watson, 2022) to imagine "otherwise" (Olufemi, 2021) in terms of material and social existence for future mobile networks. Through this collaborative imagining, we create terrains of engagement for challenging the modes of discursive closure that often characterize conversations and interventions in sociodigital futures (Markham, 2021).

Our approach to intervention is situated on the critical and experimental side of futuring (Mangnus et al., 2021). By making hidden technological infrastructures visible, we aim at empowering non-expert communities to envision futures that challenge prevailing technocratic paradigms. These speculative practices serve not only as tools for imagination but as interventions to reshape public engagement with technoscientific development. Ultimately, we argue that embedding community-led imaginaries into the anticipatory landscape of mobile networks can foster more inclusive and ethical technoscientific trajectories.

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13 JUNE 2025 09.00 - 11.00

SESSION 2

## ID 573 - Technologically Mediated Phronesis: A Foundation for Technomoral Change

Andrew Zelny, University College London

**Keywords: technomoral change, phronesis, practical wisdom, technological assessment, postphenomenology**

As we develop new and emerging sciences and technologies (NESTs) that promise to radically shift paradigms and drive us towards previously unimagined futures, it is important that we move forward mindful of how the development and use of these innovations reshape our foundational moral assumptions and landscapes (Swierstra, Stemerding, & Boenick, 2009). Philosophers working on technomoral change like Tsjalling Swierstra advocate for the development of our moral imaginations, aiming to speculate and anticipate how NESTs change our moral perspectives and to guide these developments in positive directions (Swierstra 2013). Other perspectives, like Ibo van de Poel's, advocate for regulative strategies in order to curb the dangers these new and emerging technologies might pose to our normative landscapes (van de Poel, 2013). These two views encapsulate important elements of the descriptive, normative, and interventive approaches found in STI governance: striking a balance between evaluation and speculation aimed at effectively governing and directing innovation.

Although multiple strategies have been developed to hopefully steer NESTs in positive directions, I argue an essential capacity is missing from the discussion. I argue that the Aristotelian moral metavirtue of phronesis, or practical wisdom, is needed to critically reflect on how these new technologies might facilitate technomoral change and how we might steer the course towards a flourishing future with those technologies. Phronesis is an essential capacity that is concerned with identifying and actualizing flourishing lives; without it, we cannot hope to successfully direct technomoral change in ways that would promote our collective flourishing. If we have an interest in promoting good technoscience, we must first establish practical wisdom's role in the process of evaluating and intervening in the design and development of these new technologies, and understand how phronesis itself is shaped by these technologies.

Drawing from the work of postphenomenological philosophers, STS sociologists, and psychologists of wisdom (Idhe 1979; Verbeek 2011; Kudina 2024; Latour 1994; Grossmann, Dorfman, & Oakes 2020), I argue that phronesis is a technologically mediated capacity in of itself. Instead of conceptualizing phronesis as the intellectual virtue of a radically detached rational agent using neutral artefacts as means to satisfy their own ends, it is necessary to understand the mutually constitutive relationship technology has to play in the development and character of practical wisdom. A strong foundational understanding of the technological mediation of phronesis is primary and antecedent speculating about and directing technomoral change; without it, anticipatory practices and governance of STI lacks a solid foundation. In order to understand how technology reshapes our values and goals, we must first understand how technologies reshape the faculties by which we evaluate those values and goals. By understanding the interdependencies between technologies and practical wisdom, we then may begin to understand how to develop NESTs and our faculties of phronesis in order to drive technomoral change towards positive futures.



## ID 169 - Interactions with 'the Future' in STS: Modal Power in the Co-construction of the Directionality of Sociotechnical Systems

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**Keywords:** Intervention, Futuring, Modal Power, STS, Directionality

Within the field of Science and Technology Studies (STS), three distinct approaches have been delineated to conceptualize the role of "futures" in shaping the present dynamics of sociotechnical systems: descriptive, normative, and interventive. In this context, visions, expectations, and imaginaries are conceived as anticipatory artefacts that influence the directionality and momentum of scientific, technological, and innovative activity, rendering them objects of analysis and critical scrutiny. At the same time, interventive techniques that co-construct and mobilize representations of the future, such as foresight or "futuring" exercises, are recognised as key tools for expanding the range of alternatives and fostering reflexivity in co-production processes.

This paper presentation provides a comprehensive review of recent STS advancements concerning the performativity of anticipatory practices, emphasizing their role in shaping the directionality and momentum of sociotechnical systems. In particular, attention is given to the concept of modal power, understood as the dynamics that structure perceptions of what is (im)plausible and (un)desirable. The analysis positions modal power as a critical locus for understanding how futures are enacted, contested, and constrained. It is argued that the efforts of STS practitioners to trace, critique, and intervene in the anticipatory governance of sociotechnical systems can be interpreted as deliberate strategies for engaging with – and making visible – the mechanisms through which modal power is generated and exercised. Finally, the presentation critically examines the limitations and challenges inherent in STS-led futuring practices, particularly in addressing the entrenched dynamics of hegemonic modal power. By highlighting these tensions, the analysis seeks to contribute to a more nuanced and reflexive understanding of how anticipatory practices can be leveraged to foster responsible sociotechnical futures.

