

Designing Public Engagement with Science: Citizens, Idiots, Parasites

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It is now commonplace to recognize public engagement with science and technology as a major theme in contemporary science and technology studies. Inevitably this has been problematised on a number of counts: How representative of the public is it? Does it really contribute to policy making or is it a form of PR? In entailing ‘formalized mechanisms of voicing’, does it construct reductionist versions of citizenship? Moreover, there are concerns about the ways in which public engagement is related to forms of governance and governmentality: Are there forms of political activity or scientific citizenship that become marginalized through public engagement? The present paper takes a rather different approach by contrasting public engagement techniques typical of social science to those of speculative design. Elaborating on Stengers’ notion of ‘the idiot’ and Serres’ notion of ‘the parasite’, speculative design can be understood as an ‘idiotic parasite’. This concept aims to address how actors and activities that ‘make no sense’ in relation to a particular event (such as social scientific research project or a public engagement exercise), by virtue of being excluded, can return to haunt that event. A number of speculative design engagement projects, notably ‘Biojewellery’ and ‘Material Belief’ are treated as ‘idiotic parasites’. Though they seem to make no sense in relation to social scientific ‘formalized mechanisms of voicing’, they return to interrogate, and supplement, social scientific assumptions about, for example, the qualities of citizenship, the place of scholarly duty, the parameters of scientific controversy and the nature of engagement. The paper thus uses these projects as a way of developing more expansive and heterogeneous models of public engagement.

Speculative design and the issue of public participation

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To explore the relationships between speculative design and science and technology studies this paper will focus on overlaps between speculative design and public engagement with science and technology (PEST) practices. In the UK context PEST has developed from more didactic iterations of society and science relationships, those concerned with increasing scientific literacy and appreciation amongst a homogenous public, towards a model oriented towards participatory democracy and mutually informative discussions between heterogeneous publics and sciences (Hagendijk and Irwin 2006, Miller 2001). It is within this participatory, discursive and political space that some have sought to locate a role for speculative design alongside PEST practices (Beaver *et al.* 2009, Kerridge 2009). However, as a result of operating within the same field as PEST, speculative design practices can be explored using criticisms commonly made of PEST theories and practices, regardless of whether speculative design would or should want to fit the PEST 'mould'. This paper will highlight some concerns raised by the overlap of PEST and speculative design and will focus on where the role of publics and society/science relationships might lie in this convergence. Do speculative design projects reinforce problematic models of society/science relationships as centred on controversy and futuristic novelties? If speculative design seeks to open up socioscientific issues in a 'new' way, such that publics might participate in critical discussions, to what extent can this succeed without further developing how publics are conceptualised and involved?

Within PEST theories and practices notions of 'publics' have evolved since the days of public understanding of science rhetoric into more diverse, multiple and nuanced perspectives (Holliman *et al.* 2009). Despite these developments PEST practices remain elitist, with a tendency towards catering solely for the white, middle class family audience, with the ensuing exclusion of other publics (Dawson 2008, British Science Association 2006). Where speculative design practices overlap with PEST there is a danger that perceptions of publics may become even narrower. While some speculative design projects seek out alternatives platforms for engaging with diverse publics, for example workshops in community centres or with patient groups, there is a persistent tendency towards the exhibition as the central engagement format, often coupled with an online element. It is clear from decades of research in museums and galleries that exhibitions, both physical and online, are a fantastic way of preaching to the choir, and little else (Bennett 1995, Hood 1993, Macpherson 2006). Speculative design projects in this vein may not reach beyond an already interested audience of designers and scientists. As a result this paper argues that while aiming to foster spaces for publics to participate in, critique and explore alternatives for science and technology, speculative design projects may fall short of their mark by addressing elite audiences who are already well catered for. Consequently questions concerning how publics are conceptualised and enrolled (or not) in speculative design projects on socioscientific issues deserve further consideration.

***Circulating speculative design – public engagement and practitioner
promotion***

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In this paper I provide an account of the circulation of speculative design as it relates to recent science and society activity in the UK¹. Empirically, I focus on three public settings: online publications (including blogs and design practitioner websites), a Café Scientifique event², and an interdisciplinary exhibition. I will focus on the construction of the public within these settings, drawing upon sociological accounts of Public Understanding of Science (PUS) and Public Engagement of Science (PES), including notions of publics as publics-in-general and publics-in-particular³. Additionally I will explore the extents to which these settings provide occasions for lay and expert conceptions of technoscience to become interleaved⁴. A key issue with regards the making of publics in these settings is to what extent speculative design occasions *debate*⁵, along with a series of interrelated questions including: who is having a debate, what are the terms of the debate, and what are the effects of the debate? In doing so, I address how literature concerning practitioner accounts of speculative design is underdeveloped, and provide some form of accountability for these practices.

¹ Science and Society is used as an umbrella term to describe a range of public engagement practices initiated by policy groups, funding councils and scientific institutions.

² See <http://www.cafescientifique.org/> accessed 22/3/10

³ See Michael, M. (2009). Publics performing publics: of PiGs, PiPs and politics. *Public Understanding of Science*, 18(5), 617-631.

⁴ See Callon, M., & Rabeharisoa, V. (2008). The Growing Engagement of Emergent Concerned Groups in Political and Economic Life: Lessons from the French Association of Neuromuscular Disease Patients. *Science Technology Human Values*, 33(2), 230-261.

⁵ See Antonelli, P. (2008). *Design and the elastic mind*. New York: Museum of Modern Art; London: Thames & Hudson

Chasing the Carrot or The Not-Implications of STS for Design

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The description of social situations as networks of human and nonhuman actors in STS is systematic and grounded. It provides a robust language and methodology to describe designing as an inscription of social relationships into material artefacts. Therefore it appears to provide designers a framework for analysis of design situations. However, whether STS really delivers more or better information for designers than the casual observations they normally do is not clear. At present we have found that those who employ STS theories and models for design projects often do so rather superficially. What STS is contributing to design now is far more limited than what we hope it might. We cannot help but wonder whether STS is used merely as buzzwords to sound impressive, or whether STS is difficult to implement in practice.

In our experiences of employing Actor-Network-Theory (ANT), the most beloved STS account in Design, we have encountered difficulties that make us rethink the potential contribution ANT can make to Design. Although there is a possibility that the problem lies with us rather than with ANT, we would still like to share our thoughts here to open up discussion. We notice that there is a gap between social relationships as described in ANT – although they include material artefacts – and how these very relationships change due to a design intervention. We have found that

ANT merely describes the social and material relationships that designers need to change

ANT does not say what kind of change will have what kind of effect

ANT therefore only has negative implications for design (we can learn what not to do)

The basic dilemma for any (social) scientific theory in and for Design is that knowledge about an existing situation will lose its currency at the very moment when the situation is changed by design. An idea or projection does not have the same agency as a materialized object.

By designing a new artefact, designers make information about the situation partly obsolete. ANT can describe how artefacts make part of social networks post facto. It can only run after design.

In other words, ANT is a social account and therefore mainly meant to observe and describe. Design, in contrast, needs to intervene. While analysis is nowadays usually an integral part of design (research) projects, the gap between explaining a situation and trying to change it remains. Therefore ANT faces the same difficulties in informing design as any other (descriptive or explanatory) theory that came before it.

We therefore find it particularly problematic to use ANT as an informative source for Speculative Design proposals; although it might serve as a profound and useful perspective where and when an extensive analysis of socio-material relationships for design is needed.

Fabricating futures

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Since 2004, the Design Led Futures industrial design programme at Victoria University of Wellington's School of Design has been exploring different approaches to creating the future. This paper assembles a critical and creative narrative to examine the programme from both theoretical and empirical perspectives. A complex and dynamic history of industry sponsorship, government partnership and public exposure raises productive questions about the politics of the programme, and compels close consideration of the ways in which speculative design projects perform particular publics and how these relations have shaped both pedagogical approaches and student outputs. Bringing together actor-network theory and a sociology of expectations, particular attention is given to the way that each year's design briefs have operated to articulate issues, and how students have both complied with and resisted the given constraints. A comprehensive analysis of the types of products designed over the years presents a typology of fabricated futures that offers one means to evaluate the possibilities and limitations of combining STS concepts and methodologies with future-oriented design practice.

Enacting Users, Mediating Publics

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Each approach to design presents and deploys a particular conception of the user: whether scripted into artefacts, configured in discourse or constructed in use. In this paper we compare two contrasting approaches to user involvement in the design process and examine how each constructs its publics. Rather than taking the theories, discourse and history of designers or designed artefacts as entry points into sociotechnical networks, we focus on how, in practice, users are brought into play in order to link up situated persons, technologies and collectives. Here, we draw upon Deleuze and Guattari's notion of 'assemblage' to understand how user enactments synthesize and mediate the relations between technologies and publics. Furthermore, we consider how the related notion of the 'virtual' can work to characterize the various temporalities that are at play between mediations of the user and the public. Empirically, we explore the relations and mediations between users, collectives and publics through two contrasting case studies involving the commercial application of user-centered design and the work of a university based design research group. First, we consider how a persona of a housewife acts to define the prospective sociotechnical context for a novel ICT technology for the kitchen. We draw upon a six-month ethnographic study of how users resource the everyday practices of designers in a commercial context. Second, we trace the various user-enactments involved in the design, deployment and field trial of the 'Prayer Companion', an electronic device to resource the prayer practices and associated activities of a community of contemplative Nuns in York, England. In drawing out such a comparison, we demonstrate how users variously function to bind technologies, publics and practices. How, for example, users in the corporate application of user-centered design act as virtual platforms for sociotechnical propositions by prospecting economic and demographic scales, thus constituting particular socio-economic models of publics. On the other hand, we demonstrate how users enacted as part of design research engagements constitute different kinds of publics through electronically supported spiritual practice. As such, this paper explores contrasting user assemblages that mobilize and constitute very different innovation temporalities, practices and publics.

***Democratising technology and innovation: the role of the “participant” in
Living Labs***

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Particularly in the last decade, democratisation has been presented as a near *panacea* for better aligning technologies to the wishes of citizens, and for giving them greater influence on processes of technology development or innovation. In this paper, we use the case of Living Labs as a means of exploring various approaches and attitudes to participation and democratisation. Very briefly put, they are conceived as environments where potential innovations can be experimentally tried out with and adapted to users. Since their official launch in 2006, 129 Living Labs have been established and networked to tackle Europe’s declining economic competitiveness and societal challenges. Currently, a fourth wave is in preparation, involving another 118 applicants. The innovative potential of Living Labs is based on new social configurations for organising innovation. We untangle and describe the three main configurations of the Living Lab concept as follows: (i) a setting for in vivo experimentation on social systems, (ii) an innovation and product development approach involving users, and (iii) a type of innovation system. We analyse the different approaches to participation and democratisation in these configurations, with a particular emphasis on the subjectivity of the citizen “participant”.

When it comes to the understanding of democratisation and participation, there are strong differences in the way it is framed in the political discourse on Living Labs. Ranging from describing a focus on societal involvement in innovation to boosting the competitiveness targets of the Lisbon strategy, a whole set of motivations is offered for citizen participation. We analyse how such approaches are translated into practices for the three Living Lab configuration mentioned above.

We confront the practical use of these concepts with theoretical approaches to democratisation. The Living Lab movement explicitly refers to Von Hippel’s *Democratising Innovation* (2005), to Scharmer’s work on co-creation and to the Scandinavian tradition of participatory design. We juxtapose the argumentation about these approaches, to confront this with Andrew Feenberg’s ideas about democratising technology. We particularly discuss the opposition between democratisation theories that place the citizen in the role of a co-producer or lead user (Von Hippel) and those that focus on the strategic participation of subordinate actors (Feenberg).

Based on an analysis of cognitive and motivational asymmetries in the three configurations, we argue that there is in fact a risk that participants are placed in a subordinate role, rather than in a strategic participatory role. This has major implications for the subjectivity of the participant: a subjugated actor has a very different place in a development process than a collaborator has.

Combining engineering design and STS: designing technology and society

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Design is the work of engineers. Engineers and their designs are object of study in Science and Technology Studies (STS). STS has shown that engineering design is a thoroughly social process and that technology and society are indissolubly connected and interwoven. However, during the design process engineering designers deliberately disconnect the intended design from its context in order to develop it. Once the technology is developed, it will be given back to the social context. This context – the society – is rather unpredictable and has often fuzzy and ever-changing needs. Several engineering design methods are developed that should help engineering designers to deal with this unpredictability. Since STS has gained a lot of insights on the two-foldness of technology and society, STS could be of help for engineering designers.

To find out whether STS insights can contribute to a more contextualized design, a project is followed that uses a Reflexive Interactive Design (RIO) method for the design of integrally sustainable pig housing systems.

Reflexive Interactive Design (RIO) is an attempt to deal with ever-changing needs in the highly contested area of animal production systems by combining a particular methodical engineering design method with insights from Science and Technology Studies (STS).

The designs RIO delivers are not meant to be blueprints for future animal husbandry, but rather vehicles for sustainable development. RIO differs from a problem solving design method in the sense that it tries to actively contribute to the formation of a new sustainable future for animal production systems.

The RIO project, called *Porkunities* (pork opportunities), organized three consecutive design workshops with an increasing heterogeneity of participant groups. Among the participants were researchers, farmers, policy makers, advisors, and farm equipment manufacturers. During these design workshops tools were developed and tested that motivated participants to critically reflect upon present day pig production from the perspectives of different stakeholders.

Analyses of the RIO project and the testing of the reflection tools in the project, show that RIO as such, and the tools in particular adapt the engineering design method and open up the design process for reflection. The RIO approach, and particularly the tools enabled the design teams to actively keep the connection between technology and society alive during the design process.

In this paper I will try to show how these adaptations can be translated into design tools that enable engineering designers to incorporate STS notions.

Performing future waste practices in a shopping center

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In a recent pilot project about reducing the amount of waste that is incinerated instead of recycled, my fellow design researchers and I were commissioned to challenge existing methods and approaches to waste handling by establishing new design-oriented dialogues in which citizens, together with professional stakeholders explore and unfold innovation potentials.

Our initial inquiry into the networks of waste professionals revealed that while much has been tried out over the years, there is hardly any tradition of exploring possibilities before having a fully endorsed and specified plan for change. Two important objectives of the project became to: re-think waste innovation activities as temporary experimental setups, and generating a renewed image of motivations and practices of the citizens served.

In one particular event, where a caretaker, two citizens, and a shop owner are exploring possible future waste handling systems together with a municipal waste planner and four design researchers, these two objectives effectively intersected.

In this paper we will recount in detail how this diverse range of stakeholders was mobilized, how their everyday environment was articulated as a stage for trying out new opportunities, how they were actively articulating their stakes, and finally how they engaged in three collective performances of possible futures.

We will discuss this interventionist formation of publics and futures in the shopping center with a special attention to engagement and power in that it entails obvious negotiations of claims to what is real, what could be real, and what is desirable.

How can we talk about the performativity of such interventions? This paper will explore the notions of parliament (Latour 2005) and theater (Schechner 1988) as two different metaphors for understanding the transformative dynamics of what takes place during this three hour event in the shopping center.

The metaphor of the parliament directs our attention to the inherently political negotiations implied by the participants' diverse concerns; it raises questions about who our constituencies are, and how our different stakes in the topic are played out – democratically or otherwise?

The metaphor of the theater directs our attention to how embodied practices around imagined artifacts may allow us to collectively redefine the situation at hand, and thus allow us to rehearse how future practices might play out. It raises a question of reality and fiction: how far is the distance from a successful rehearsal to a new robust practice?

We will provide tentative answers to these questions, and end the paper with a suggestion for continued convergence between STS and exploratory design research; in particular it seems that exploratory design researchers can immediately benefit from a constructivist approach to how things come into being, and conversely, a new breed of socially aware designers are increasingly turning design interventions into interesting ethnographic questions of relevance to scholars of STS.

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The Agency of Design in the Innovation Process

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The main issue of this abstract is the crucial role of design in the innovation process. On the basis of a case study about the user-centered development of two robot assistants for the integration in a care facility for seniors the agency of design should be demonstrated. By adopting the scenario-based design (Rosson/Carroll 2003) to ensure a user-developer exchange the designed scenarios of the planned applications of the robots turns out to be more than just 'boundary objects' (Star/Griesemer 1989). To characterize the dynamic that the designed scenarios unfold the concept of the obligatory passage point of the Actor-Network-Theory (ANT) is quite more fruitful (Callon 1986).

In the mentioned case study a knowledge transfer loop between the users (care-workers and seniors of a stationary care facility) and the developers of robot assistants was established. Based on a requirement analysis in the facility (adopting qualitative methods and including all relevant parties, e.g. the inhabitants, the care workers and the management of the facility), first scenarios were drafted. After discussing the first scenarios with the developers and adjusting them because of the technical feasibility the scenarios were presented in the care facility anew and adjusted again due to the recommendations got by the potential users. These adjusting loops were repeated until every party was satisfied with the planned scenarios. At this point one can finally assume that the designed scenarios fit with the socially desirable and the technically possible.

At first glance the scenarios could be described as boundary objects that create a link between heterogeneous groups like seniors, care-workers and developers of robot assistants. But this concept does not fit with a distinguishing mark of the scenarios: The meaning of the scenarios as well as the objects and the action that are part of the scenarios changes constantly for all participants of the knowledge transfer loop during the whole adjusting process. A second thought could be to characterize them by taking a social constructivism perspective in mind; e.g. describing them as a bargaining field for the redefinition of approaches for different purposes (Pinch/Bijker 1999). But also this perspective misses one important attribute: By mediating through the scenarios also the purposes of the participating parties changed.

Adopting the ANT framework - especially focused on the concept of translation and obligatory passage point - the agency of the scenarios could be captured properly. A major incitement for the observed reciprocal alignment between the scenarios and each different party could be described as a stabilization strategy. This again could be described by melting some main thoughts of "Identity and Control" (White 2008) with the ANT-Inventory. At last, to bring the humans back in as focal actors of the user-centered innovation process, the causal loop concept of the structuration theory (Giddens 1984) is able to describe how by non-intended effects of the human actors the knowledge transfer loop - which is mainly focused on the designed Scenarios - generates a firm environment for a fruitful developer-user-exchange. Instead of transfusing the symmetrical assumption of the ANT over the whole process, the agency should be conceptualized by a mode of temporality and in such a way as

a 'dance of agency' (Pickering 1995).

Experimental Processes – A Study of Design for ‘Future Digital Manners’

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In this paper I will explore the notion of ‘innovation’ as it is deployed in the practice of ‘critical design’. In this practice design is used as a medium to foster critical awareness of social and ethical implications of new and emerging technologies. This is part of my ongoing research on innovation management viewed as a practice between design, art and business. In relation to this study I will trace the concept of ‘innovation’ through participatory observation of a 4-week design brief. The brief is set by an international Tele company and responded by a group of master students being taught to practice critical design. The brief investigates the future of digital manners, which addresses the emergence of etiquettes modeled around the invention of new digital technologies. The project was organised as a pedagogical experiment taking place at an academic institution in London. From this array of the design process I will examine the use of ‘design for research’ focusing on provocation as a research method for social experimentation. In doing so I will draw upon Deleuze and Guattari’s concepts of ‘deterritorialization’ and ‘reterritorialization’ to understand how critical design entails a process of social ordering mediated through the design of ‘poetic’ objects. First I will present a specific event from the design project: ‘The Berlin Street experiment’, which was conducted as an artistic intervention. The approach for this intervention were characterised as ‘confrontational techniques’, that is, encounters and situations the designer sets in motion that challenge social behaviour and render the practices of everyday life visible. Second, I will account for the object invented as a response to the brief. The data gained from the intervention was used to produce poetic objects, which are meant to provoke a ‘fictional’ reality. The design object is produced to test an experimental situation: i.e. to destroy our common sense experience of reality enacting a process of deconstruction in order to reconfigure the world differently. In conducting the design project of ‘Future Digital Manners’ the design practice claims to use fine-art means to provoke debate in order to question how users cohabit with electronic technology. As such, my analysis of design for ‘Future Digital Manners’ draws attention to an aesthetic approach to the study of innovation.

Attending to the Objects of Speculative Design

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Through the practices of speculative design, we have come to witness spectacular objects, which purportedly act as provocations for reflection and debate, and promise new forms of public engagement with science and technology. Paradoxically, although speculative design is object-oriented, in that it depends upon the construction of artefacts, there is little discussion about the particularities of these objects themselves. The exhibitions and discourses of speculative design tend to emphasize the conceptual aspects of the objects. Such an approach to the objects of speculative design is limiting and problematic because it elides the materialities of these objects and the media through which they are presented. These factors are important, because if we are to claim that the objects of speculative design act in particular ways, then attention to the particular media and materiality of these objects is necessary, for they play a constitutive role in any affordances and effects these objects might have.

For example, the objects of speculative design span images, video and physically instantiated artefacts, ranging from robotic dogs to jewellery made from bone. Clearly, these objects are not all of the same kind. They are produced, circulated, and consumed quite differently. But these differences are rarely attended to in the discussions surrounding speculative design. In overlooking or eschewing these differences, we miss an opportunity for more exacting description and analysis, and we may advance an undiscerning perspective of the object-world, in which all objects are seemingly cast as equivalent.

In this paper I will draw from recent work in science and technology studies (Latour, Marres), digital media studies (Bogost), and political theory (Bennett), to bring the material and media qualities of the objects of speculative design into relief and discuss their significance. As all of these authors have all drawn attention to, media and materiality plays a important role in public life, in politics, and, of course, in technoscience. If the goal of speculative design is to prompt reflection and debate, and enable new forms of public engagement with science and technology, then both designers and scholars need to develop a critical perspective on the media and materiality of objects of speculative design. This paper will attempt to be a first step in that direction.

***Communication-Mediated Computation: The 'Hmmm' Environment as an
engine for Participatory Speculative Design***

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Processes of ‘becoming’ must be directly engaged within design practice. This research contributes to developing ‘frameworks for becoming’. In particular, I argue that we must shift focus to real-time interaction support systems, interrogating how such systems can structure shared meanings, generate various forms of reflexivity, and mediate power relationships involved in interaction.

The paper presents a prototype interaction environment called ‘Hmmm’, the result of ongoing informal design collaboration led by the author [e.g., 5] that is specifically designed to address this problematic. Currently instantiated as a pen, paper, and token-based system for co-located users, the ‘Hmmm’ interface represents an offline starting point for articulation of design requirements to be incorporated into an complex computational infrastructure for localized intervention in what Latour clarifies as ‘political ecology’ [3].

Using this system, end users can model physical and conceptual structures or ‘spaces’ and map relationships of these structures to emerging situations, negotiating dynamic relational constraints among them. The system enforces the interdependence of users’ actions by subjecting users to responsive ‘structures of engagement’, rules and resources which themselves can be directly modified by users, that constrain the interaction process in particular ways. Actions and decisions recorded in the ‘Hmmm’ environment serve as subsequent inputs in reconstituting the system according to user thematizations of recorded content captured automatically on dimensions of ‘sustained attention’ and ‘intensity’. The paper will walk through brief usage scenarios of ‘Hmmm’ in action, demonstrating how structures and modes of engagement within ‘Hmmm’ can transform over time through the process of interaction.

By focusing on supporting context-specific communication and interaction patterns implicit in all forms of situated ‘knowledge-production’, we can ground new mediation systems at the real-time, interactional level. This enables ontology-modeling and active inter-mediation of systems themselves ‘from the ground up’, by end-users. It is this communicational grounding, I argue, that opens up design processes to participatory, heterogeneous *underspecified* infrastructures called for in literature on ‘design for ongoing re-design’ [e.g. 1, 2, 6]. From a foundational intelligibility of interaction, emergent patterns provide the structural content for various forms of ‘coordination mechanisms’. Herein, I argue, lies the promise and challenge for design as a mode of intervention in technoscience, re-orienting the traditional STS analytic of intervention to see ambiguous structuring and contextualizing effects of micro-processes of interaction, grounded in ‘world-presenting’ communicative actions that are already relationally responsive.

Speculative design as proposed here both supplements and destabilizes existing ‘information ecologies’ [4], moving the focus to a radically de-centered *interaction* ecology that re-situates all existing information systems and infrastructures, insofar as they are relevant to

participants, within ‘contested spaces’ of negotiated becoming and being. This re-situating is captured by inverting the phrase ‘computer-mediated communication’ to ‘communication-mediated computation’. Studying interaction carried out via ‘Hmmm’, including user inquiries clarifying and making sense of the system design, provides insights into how bringing speculative design together with STS can transform possibilities and processes of public-forming, participation, and politics in the broad sense, and how such designs might form a basis for new modes of co-constructive embodied knowledge-production.

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Speculative design by practice - A robot case study

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STS's methods tend to be descriptive, focused primarily on producing accounts of technology and science in action. As a consequence, they have not been applied in any concerted fashion to examining possibilities for the future (for exceptions, see Haraway, Urry, etc.). Moreover, STS's concerns for analytical interpretation and theorising can appear, at times, removed from the worlds they describe and thus inaccessible to many. Indeed, there is a tendency for the methods and theories to obscure the very phenomena being examined.

In its ideal form, Speculative Design provides a means to solve some of these problems. By applying normative methods commonly associated with industrial design, the themes being studied take on forms that echo the everyday products people use and play on the familiarity people have with them. As such, there is the potential to both reach and engage a wide public audience. Moreover, speculative design can effectively 'domesticate' emerging technologies by extrapolating scientific research into potential future realities and by giving these realities form.

In this presentation, we describe our use of speculative design for these purposes. Our presentation centres on the design of five speculative entertainment robots that are meant to raise questions about contemporary ideas of domestic robotics. Deliberately invoking a stylized aesthetic, the five robots are meant to seduce the viewer into thinking about what it would be like to live with machines that incorporate a degree of autonomy. To provoke speculation, we take advantage of commonly held views of furniture and domestic appliance design, but disrupt them with somewhat troubling notions of entertainment. Thus, the robots intentionally toy with the ideas we have of consumer products whilst at the same time suggesting something more sinister.

Ambivalent Animal

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The Ambivalent Animal project explores the interactions of animals, culture and technology through the creation of two speculative design projects: *Zoocentrix: Purrplex* and *Petite Charm*. These projects focus on domestic pets, highlight the animal's uncertain status and explore the overlapping ontologies of animal, human and machine. They create concrete artifacts that engage with theoretical issues of anthropocentrism, animality and alterity.

Zoocentrix: Purrplex is a series of artifacts and experiences that are tailored to the phenomenological interests of an individuated cat. The project privileges cat concerns, sometimes at the expense of human interests. *Zoocentrix* includes the following pieces:

Customized CatTV: television programming tailored to an individual cat's preferences.

OutsideIn: a space that tracks cat movement and projects twitching images a cat can chase.

SunSeeker: a moving 'bot that seeks out sunlight in your home; a cat naps on top of the 'bot assured he'll be moved to the warmest place in the house.

Meat Mobile: a mobile adorned with dried fish that slowly rotates as a cat approaches.

Tail Twitcher: stuffed-animal mice tails that twitch, triggering a cat's hunting instinct.

Petite Charm is inspired by the innovations and manipulations of biotechnology. The central image of the project is a genetically modified puppy who lives on your arm. The animal feeds by drawing blood from you and removes bodily waste by accessing your body's digestive tract. This parasitic pet is promoted as the latest emotional-support dog. A pet attached to your body can accompany you throughout the day; she goes where you go. But this continual companionship creates complications: an animal drawing blood from your body may create light-headedness; the mingling of body fluids and waste may lead to infection; and removing the pet from your arm requires a life-support system for the animal—a system that requires a steady supply of blood. *Petite Charm* explores the complications of a bioengineered symbiotic relationship between animal and human.

These projects employ an ambivalent aesthetic that evokes two or more incompatible sensibilities. *Zoocentrix* is simultaneously affirmative and critical. The project is a serious attempt to imagine mediated experiences that a cat might enjoy. At the same time, the project parodies the utopian drive to solve all problems by technological means. A cat's desires are affirmed even as the excesses of techno-culture are questioned. *Petite Charm* encapsulates the long history of complicated interactions between humans and animals. Genetically modifying an animal so that he is small and docile enough to live on a human's arms is an exaggeration of the anthropocentric demands imposed on animals. Yet in *Petite Charm's* scenario, demands are made on animal *and* human bodies, and the extreme intimacy between pet and host is something to be desired and feared. Both projects explore the terrain of speculative design by highlighting conflicting desires and issues of subjectivity and

corporeality. They also include moments of humor as they embrace contradiction and irresolution.

Track 09 – SPECUALTION, DESIGN, PUBLIC AND PARTICIPATORY
TECHNOSCIENCE

Critical Making

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The description of this track notes the increasing engagements between design and STS, and emphasizes a nascent desire to articulate and develop novel modes of intervention into technoscience. The development – and the critique – of such modes is the main focus of our recent work in which design methods and open source software and hardware (e.g. arduino, processing, etc) are used to supplement and extend critical reflection on the role of information and information technologies in modern life. We call this work ‘critical making’ in order to highlight the reconnection of two modes of engagement with the world that are typically held separate: critical thinking, traditionally understood as conceptually and linguistically based, and physical ‘making’, goal-based material work. We see this as a necessary integration for a variety of reasons; first, as a way of overcoming the ‘brittle’ and overly-structural sense of technologies that often exist in critical social science literature; second, as a way of creating shared experiences with technologies that provide joint resources for transforming the socio-technical imagination; and third, as a site for overcoming problematic disciplinary divides within technoscience.

One divide that remains under-addressed in many design-oriented methodologies is the variety of epistemic valences afforded the explosion of artifacts that are typically produced in speculative design methods. Texts, drawings, photographs, storyboards, material and digital prototypes, and so forth – each is considered more or less important, more or less valid, depending not only on the use to which the artifact might be put, but also on the disciplinary context in which the artifact is to be found. In this paper we will explore some of the links between design artifacts and disciplinary affiliations, noting in particular the ways epistemic and ontological commitments impact on what kinds of artifacts are seen as relevant – and, even more importantly, when they are seen as such.

Ultimately, critical making is an attempt to bring hands-on material making – not just design – to bear on the continuing divide between critical scholarship on technologies and the work of technological production itself. To do so requires attention to the results of such work as constellations of artifacts with varying and different affordances and associated ‘objectual relations.’ Rather than differentiate these results using standard binaries, e.g. as analytic texts made to be read and symbolically interpreted, or as emotive material prototypes made to be used and experienced, our focus is on the whole constellation of materialities that are engendered through and within acts of production. Through such attention we hope to both value and relate the different modes of engagement and intervention into technoscience that are articulated through forms of making.

***Artifacts from the future of domestic living: Engaging innovation by means of
speculative design – a preliminary investigation***

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The background for this paper is a forthcoming research project “Artifacts from the future of domestic living” initiated by the Danish Design School in conjunction with TEKO and Innovation Lab as part of a recently established innovation network, Innonet Interior and Wear, financed by the Danish Ministry of Science, Technology and Innovation. The network is comprised by a diverse array of research and educational institutions and consultancies. The general aim of the network is to support growth and innovation within the Danish furniture, clothing industries and create stronger ties between research and industry.

The main focus of this paper is to investigate and discuss the ways in which a speculative design practice can be deployed as an exploration of possible futures, but also how this proposition is likely to be shaped by various actors and agendas – designers, research partners, new materials and technologies, innovation policies among others – involved in the project at present and in the future. The paper will attempt to answer the following questions:

What is of concern when attempting to engage Danish furniture and lifestyle product manufactures in projecting the role of their future products in the shaping of domestic living – and, vice versa, the shaping of the future products by changing conditions of domestic life?

And how are such prospects of the future likely to be influenced and co-produced, by the heterogeneous network of actors and potential publics?

Central to this preliminary examination is an outline of a framework of how to address the future through conventions of the imaginary or in the present. It seems that STS in general and what has been called a sociology of expectations (Michael & Brown) in particular has a lot to offer in this respect by complementing a looking *into the future* found in critical design practices with a *looking at the future* as located in the expectations of past futures presented in the real-time now. How can such considerations be translated into the rather mundane practices of furniture and lifestyle product production, and what are the subsequent potentials and limitations to be gained from these radically different approaches?

The research project utilizes domestic living as a collective thematic context through which to explore the possible futures of a number of different products and produces. Aspects of domestic life have often been the subject of critical design endeavours, such as PLACEBO (Dunne and Raby) and more recently Carnivorous Domestic Entertainment Robots (Auger & Loizeau). What differentiates the notion of domestic life discussed in the this paper from these examples is a conception of the speculative which is more readily preoccupied with understanding how users can adopt and evoke a critical stance towards the use of designed objects in their everyday life; what tactics they deploy to tweak and appropriate future products as means of articulating an implicit or explicit critique of inherent values in designed artefacts and services.