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SPECULATIVE DESIGN AS RESEARCH METHOD

From answers to questions and “staying with the trouble”

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Discourses of speculative design

In UK designers Anthony Dunne and Fiona Raby’s *Design Noir: The Secret Life of Electronic Objects* (2001), they argued that design too often unquestioningly reinforces the status quo of industrial and technological progress, and that its primary purpose was “still to provide new products – smaller, faster, different, better” (p. 58). In contrast, they advocated using the medium of design to “challenge industrial agendas” (p. 58), and offer “a critique of the prevailing situation through designs that embody alternative social, cultural, technical or economic values” (p. 58). Originally operating in the fields of industrial and product design, in the fifteen years since publication, this call to arms has been taken up by a wide range of designers, researchers, theorists, and authors. Critical and speculative design also holds an established place in design education, with seminal programs like Design Interactions at the Royal College of Art in London, UK, and many more continuing to emerge in universities and design schools around the world.

In addition to critiquing design itself, contemporary critical and speculative design aims to present alternate social and cultural realities. Dunne and Raby (2013) explain that their speculative practice:

thrives on imagination and aims to open up new perspectives on what are sometimes called *wicked problems*, to create spaces for discussion and debate about alternative ways of being, and to inspire and encourage people’s imaginations to flow freely.

(p. 2)

More recently, Dunne and Raby have broadened their scope to call for “speculative everything” (2013, p. 161), incorporating not just product design or human needs, but rather “a multitude of worldviews, ideologies, and possibilities” (p. 161). In this speculative design practice, what Dunne and Raby (2013) refer to as “world-building” still happens primarily through physical artefacts, or “parts representing wholes designed to prompt speculation in the viewer about the world these objects belong to” (p. 92). In other words, rather than

creating the world itself, their intention is to hint at, or conjure, societies and cultures different from their own through the materials and forms of objects. Furthermore, Dunne and Raby seek to “challenge how people think about everyday life” (p. 45), and seem to assume that their critical and speculative designs will encourage viewers to carry out “a sort of imaginary archaeology” (p. 93) that renders the familiar strange but is still grounded within “scientific possibility” (p. 71). Important critiques of this world-building approach are beyond the scope of this chapter, but include Prado and Oliveria (2014) and Oliveira and Prado (2014). Most notably for our interests, critical and speculative design is not presented in terms of *how* to make or assess objects, but rather in terms of what these objects *could* or *should* do.

Design fiction is another label given to works of design that imagine, speculate on, and represent alternate visions of design and the worlds it inhabits. In 2009, American designer Julian Bleecker and science fiction author Bruce Sterling separately wrote essays on the concept of design fiction. For Bleecker (2009), design fiction was a way of describing design prototypes that aim to tell stories about the near future. To Sterling (2009), design fiction was essentially science fiction in which the science and objects adhere to design principles and practices, allowing them to offer a grounded critique, or, as Sterling had previously expressed, to move “much closer to the glowing heat of technosocial conflict” (2005, p. 30). Much like Dunne and Raby’s critical and speculative design, design fiction grapples with the cultural, social, and ethical impact of technology, but makes fewer claims to sparking debate or encouraging change. However, design fiction likewise remains more a genre of – or an interpretive framework for – design-in-the-world, than a practice or method for actually *doing* design.

To illustrate this further, both Bleecker (2009) and Sterling (2013) have thoroughly discussed science fiction film and literature under the umbrella of design fiction. Of particular relevance is the discussion of diegetic prototypes, or objects that are capable of representing larger worlds and worldviews. In film, these depictions of nascent technologies or scientific theories are intended to entertain and often create broader public interest. Bleecker (2009) draws attention to this practice as a potent example of the mutual influence of fact and fiction, as diegetic, fictional prototypes in cinema can spur interest in an emerging technology by showing its positive impact, and quelling fears or concerns through the story in which it is embedded. This ease with technology can, in turn, raise its profile in the public imagination, generating demand for its development. David Kirby (2010, 2011) has written extensively on this subject, highlighting examples of films where technology and science consultants were intimately involved in production to “create realistic filmic portrayals of technological possibilities” (p. 43). For example, both Kirby (2010, 2011) and Bleecker (2009) discuss the 2002 film *Minority Report* at length to highlight its role in driving the recent development of gestural interfaces.

Speculative narratives & the question of reception

Possibly due to the sheer proliferation of self-described critical and speculative design projects online (see for example Core77, 2011; Antonelli, 2011), and accompanying public discussions of design fiction (see for example Nova, 2013; Sterling, 2004), these creative practices began to garner the attention of social science and humanities scholars working in the areas of emerging science and technology. For example, DiSalvo (2009) convincingly argues that speculative

design and design fiction's modes of storytelling are found in the formal qualities of design, the expertise of a designer, and consumer culture. Through an expert understanding of how products are conceptualized, developed, and marketed, the speculative design "projection is plausible and persuasive because the representations are so easily consumed in the present (they are visually striking) and imaginable to be consumed in the future (they appear like we envisage such 'real' products would appear)" (DiSalvo, 2009, p. 55). Of course, this raises questions about what is actually being challenged, and who the audience for speculative design could, or ought to be.

Indeed, the question of how audiences might most productively engage with speculative and critical design is far from resolved, even amongst its own practitioners. Dunne and Raby (2001) originally placed sense-making in the hands of the audience, as they expected "the user would become a protagonist and co-producer of narrative experience rather than a passive consumer of a product's meaning" (p. 46). However, subsequent practitioners and critics have noted this is not a self-evident process. For example, despite what specific materials and forms may communicate, Malpass (2013) points out that contextualizing information beyond the object itself is usually necessary:

Because of their provisional and unfamiliar characteristics, many objects of speculative design require a detailed supporting narrative to establish their use. This is established through scenario building, where objects and technologies are situated in contexts of use, and through technocratic visualization.

(p. 348)

Dunne and Raby (2013) also maintain that their speculative designs are primarily objects, and to them, "[v]ideo and photography are secondary media. The physical prop is the starting point for a chain reaction developed through other media rather than a reality anchor for the video" (p. 100). However, Malpass (2013) suggests that it is actually the combination of media that tells a story as "the critique is established through a synthesis of objects and contextualizing material" (p. 348). This supplementary material is also required because this kind of fictional design is still developing, and encountered by audiences who may not know the role(s) they are expected to play.

Malpass (2015, 2016) calls this shift towards storytelling – and the expectation that viewers become storytellers instead of listeners or consumers – speculative design's 'rhetorical function,' or its capacity to communicate a narrative. Malpass (2015, p. 65) argues that understandings of function are a significant barrier to understanding speculative works, as in design, function is traditionally concerned with optimization, or the extent to which use is made technically efficient and practical. Nonetheless, drawing a link to literary storytelling, Auger (2013) affirms that viewers should recognize a speculative object as belonging in their everyday life, and unfold a story accordingly:

The presence of the designed artefact in popular culture allows for the viewer to project its presence into his or her own life. Then they effectively become the protagonist in the story, playing out individual and informative roles. Their reactions become the true products of this form of design research.

(p. 20)

Speculative design as research method

Given its interest in using storytelling to engage audiences, can speculative design be effectively used as a sociocultural research method? Ferri et al. (2014) suggest that without a clear and shared understanding of what speculative and critical design is, it will not be possible to evaluate projects against each other, or assess their success. More optimistically, Knutz, Markussen and Christensen (2014) propose a typology of design fiction that can be applied for comparison and contrast of different projects. This involves five characteristics: the basic role of fiction, which asks what is the ‘what-if’ question at hand; the manifestation of the critique, which asks how the project is critical; the design aims, which questions the possible consequences of the project; the materialization and form, which questions the form the project takes; and the aesthetic of design fiction, which categorizes the project’s political perspective (p. 8–10). This humanities-based approach suggests that research methodology and validity might be found in the critical (i.e., ethical and aesthetic) capacity of individual stories.

Embracing a more social-scientific approach, Bardzell, J., Bardzell, S. and Stolterman (2014) ask:

How can the technologies, practices, norms, and/or ideologies we wish to explore be expressed in the language of design? During brainstorming, sketching, and prototyping phases, how do we know if we’re on the right track? How do we assess or evaluate critical designs? What sorts of effects do we expect, want, or need a critical design to have?
(pp. 1951–1952)

They further argue that critical design in particular needs strategies in place for reading its works in order to convey the designer’s intended meaning – if only to encourage critical reflection on design’s role in our present and future lives (p. 1959).

Related is the call for a clear framework for actually doing speculative design: one that effectively addresses a specific issue or phenomena, rather than a general questioning of mainstream design. To do so, Bardzell et al. (2012) chose a salient issue in feminist Human-Computer Interaction research – the gendering of spaces – and created design prototypes to give to participants in order to elicit responses regarding the perceived provocativeness of the design. Recalling Dunne and Raby’s (2001) assertion that good critical design sits between strangeness and normality (p. 63), Bardzell et al. (2012) interviewed participants and reached the conclusion that “achieving this ‘slight strangeness’ is anything but straightforward, as it plays out across conceptual, functional, material, and aesthetic dimensions of design in complex ways” (p. 294). By conducting focused conversations with people engaged in their critical designs, Bardzell et al. (2012) were also able to highlight the impact on viewers or audiences – something absent from Dunne and Raby’s critical practice, as they more often focus on what their intentions are, rather than what their designs actually achieve.

Other ways of using speculative design to engage audiences includes design friction and critical making. Forlano and Matthew (2014) employ speculative design in their workshop-based research to encourage stakeholders to engage with frictions and controversies surrounding urban technologies. The authors highlight that speculative design is often criticized for elitism as it “often does not move beyond the realm of the museum exhibit” (p. 11), but argue that public workshops are effective means of raising questions about participants’ future-oriented concerns and issues. Critical making is another design research practice that aims to

reflect on social and cultural values and beliefs related to technology. Ratto (2011) explains that critical making “differs from these practices in its focus on the constructive process as the site for analysis and its explicit connections to specific scholarly literature” (2011, p. 253). This is achieved through a “review of relevant literature and compilation of useful concepts and theories . . . mined for specific ideas that can be metaphorically ‘mapped’ to material prototypes, and explored through fabrication” (p. 253). In other words, rather than displaying designed objects to an audience, in critical making it is the act of creation, fabrication, and contextualization or discussion that is the central focus. Ratto claims that this engagement creates personal investment in addressing matters of concern, problematizing connections between society and technology, and creates deeper conceptual understandings of technical innovation. Ultimately, Ratto distinguishes critical making through the notion of care, the fostering of “a ‘caring for’ that is not typically part of either technical or social scholarly education” (p. 259).

We believe that all these approaches offer productive ways of advancing speculative design as creative practice and research method, and that a combination of humanities and social-science devices may provide the greatest range of opportunities for future researchers. The remainder of this chapter will provide a case study from the first author’s research and end with shared reflections.

Case study: *grow your own lamb*

Counting Sheep: NZ Merino in an Internet of Things was a Royal Society of New Zealand-funded research project that explored how contemporary production and consumption of New Zealand merino wool and meat might be (re)shaped by emerging technologies like the Internet of Things. The first part of the project comprised a multi-site ethnography of NZ merino breeding, and case studies of industry production and marketing strategies. The second part of the project ‘translated’ this research into a set of four speculative design propositions for public engagement, published online at: <http://countingsheep.info/> along with an audience survey. *Grow Your Own Lamb* was a near-future scenario created to explore the possibility of both emerging technoscience and increased consumer control over animal husbandry and meat production (<http://countingsheep.info/grow-your-own-lamb.html>).

The first option in this fictional service allows consumers to grow their own *in vivo* (paddock-raised) lamb meat (<http://countingsheep.info/grow-your-own-lamb-in-vivo.html>). From the selection of breeding rams and ewes, to their care, feeding, and eventual slaughter, consumers can use an app (and its associated identification and location technologies) to track the pregnant ewe, and later, the lamb.

If at any time the consumer is not satisfied with the treatment of the animals, they can contact the farmer, who is required to respond within six hours; they are also invited to visit the farm at any time. The scenario relies on audiences recognizing written and visual metaphors for cultural authenticity and artisanal food, as well as the well-worn trope of consumer empowerment through technology use – although in this case the farmer (producer) is arguably disempowered at the same time because of unprecedented surveillance.

The second service option offers *in vitro*, or lab-raised meat, as an exploration of cultured meat markets and the possible replacement of farmers by lab technicians, alongside the rise of a new kind of consumer-scientist (<http://countingsheep.info/grow-your-own-lamb-in-vitro.html>). Again relying on a range of surveillance technologies, consumers are encouraged to constantly monitor the growth of their meat in a refined rural-lab setting.



FIGURE 7.1 “Merino ewes and lambs raised on lush, green pasture.” *Grow Your Own Lamb – In Vivo.*
Copyright Anne Galloway.



FIGURE 7.2 “Fresh lamb cutlets produced your way!” *Grow Your Own Lamb – In Vivo.*
Copyright Anne Galloway and Matasila Freshwater.



FIGURE 7.3 “Cultured food animals listen to Radio New Zealand.” *Grow Your Own Lamb – In Vivo.*
Copyright Anne Galloway and Matasila Freshwater.



FIGURE 7.4 “Meat and fibre: felted racks of lamb.” *Grow Your Own Lamb – In Vitro*.

Copyright Anne Galloway and Matasila Freshwater.

Both the visual and written rhetoric were designed to maintain the comforting feel of the *in vivo* system of production, while providing tongue-in-cheek features like being able to place growing meat in a window with a view and Radio New Zealand for company. Playing with a muscle and wool fibre metaphor, we decided to make the meat out of felted wool; this choice of craft material allowed us to soften or feminize the stereotypically male space of laboratories, as well as attempt to normalize a product that is often referred to by media as monstrous.

While we had no personal interest in promoting or condemning either option, it was our intention as design researchers to offer a (relatively) plausible and appealing service that might encourage audience reflection on the relationship between technology, producers, and consumers. Besides limitations inherent in the English-speaking Internet, there was no specific target audience for our online exhibition – although we did ask survey respondents to identify their occupation, and we were almost always able to identify location by IP address.

Audience responses & design research reflections

The *Grow Your Own Lamb* proposition featured what Mike Michael (2012) calls “difficult” objects, or ones that:

warp the scientific and the social (as mediated by the designers) – they have implications that are good and bad, individual and collective, internal and external, biological and cultural, emancipatory and authoritarian, modest and arrogant, cruel and funny, academic and commercial, serious and playful, and of course, designerly and scientific.

(p. 542)

Following Haraway (2008), our speculative design work aimed “to build attachment sites and tie sticky knots to bind intra-acting critters, including people, together in the kinds of response and regard that change the subject – and the object” (p. 287). But as we argued above, these responses and changes are not given; rather they are both more and less than what researchers may intend, expect, or hope.

The first issue we encountered was the kind of public that constituted our audience. Not only was it quite small – we received only 54 responses to all four scenarios – but a full 40% of these respondents identified as working in a university, and design was the most commonly selected personal interest. These data do little to counter the above-mentioned concerns that speculative design speaks best, if not also predominantly, to itself. However, our research questions were qualitative not quantitative – and there were interesting contributions made to ‘public’ discourse on how meat is produced and consumed.

The *in vivo* scenario was generally well received from a consumer perspective, and demonstrated a range of concerns:

This scenario seems . . . appealing because I think I’d enjoy keeping track of my in-vivo lamb and then enjoying a nice roast.

– *Unknown Respondent, Australia*

I like the idea that consumers have some say in how their meat is produced, with the ability to visit the farm.

– *Farm Respondent, New Zealand*

Interesting because I can have my own lamb and tracked I know who is, where came from, the freshness of the meat, what the animal ate during his period of life etc.

– *Unknown Respondent, Italy*

I like the idea of being very conscious of where the food we consume comes from; and as a consumer having a better ‘big picture’ view of the ecosystem/infrastructure/heritage/history of food.

– *Government Respondent, New Zealand*

The idea is not an easy take for most people, since we’re used (at least from where I’m from, in Brazil) about NOT having a clue about where our food comes from, who the producers are or how the animal was treated. We’re one of the largest countries exporting meat worldwide, still we don’t have sufficient information about its processes. I’m concerned about the path we’re leading to the future, and for that I believe this scenario can be appealing. Consciousness and transparency are necessary. The question is if that sort of information is capable of changing behaviors, of empowering people to act in a different way.

– *University Respondent, Brazil*

Nevertheless, more ambiguous, and sometimes negative, perspectives arose in relation to what it might be like for the producer, demonstrating the audience’s comprehension of the complexity of these issues:

Paddock raised I found interesting and provocative. This scenario is an extreme end of producer/consumer relationship.

– *Industry Respondent, New Zealand*

General logistics of physically (in vivo) farming each individual . . . and the constant monitoring of what is going on with each individual animal [is problematic]. Plus the consumer being able to have so much input into what the farmer is doing would, in

my opinion, add stress to what is already a stressful job. Also not sure how consumers would cope with getting to the end of 'raising' their lamb and then making the choice on how/when to kill and butcher. Not a lot of people actually want to do 'the dirty work,' myself included, and I have lived rurally most of my life.

– *Farm Respondent, New Zealand*

Some elements . . . raised go a step too far in that the consumer is driving the process but probably doesn't have the experience or knowledge on how best to achieve the result. Best left to those in the know, I don't tell my dentist how to fix my teeth, he is the expert.

– *Industry Respondent, New Zealand*

On the other hand, responses to the *in vitro* scenario were often conflicted, if not completely opposed, and unlike the *in vivo* scenario, respondents commented specifically on our images:

Lab raised I found disturbing and alarming. Not at all interested or would support non natural food production – yes I would starve before eating it . . . Everything about lab raised is a bad idea.

– *Industry Respondent, New Zealand*

Turned off by the blood images and not sure I would want to eat it . . . yet I know this is likely to be the more sustainable option for future food production and is contributing to advances in scientific research.

– *University Respondent, Australia*

I like to think that I'm pro-progress and pro-science but I don't think I could eat the meat from the in-vitro scenario. . . . I think the photography on the in-vitro scenario page gives the strong impression of a lab-based process trying really hard to still seem 'natural.' Though I think if it was presented as a clean or sterile lab-based process I'd also find it creepy. Either way it's got a real sense of the uncanny valley about it.

– *Unknown Respondent, Australia*

I think it's probably a good idea for this process to take place in a controlled environment, like a state of the art lab, in order to establish credibility and a sense of trust and order with the public . . . Initially, without reading the information included with the images, I thought this was something grown at home. I thought it was a kit you brought into your kitchen and grew there on the spot. Maybe instead of having technicians who grow the meat for the customer, there could be an option where the growing process is taught to the customer (in a workshop or the like). This way, the customer could take it home and maybe gain a sense of attachment through meat rearing.

– *University Respondent, United States of America*

More positive responses were divided between support for the science itself and support for our design work:

Growing meat in vitro would radically reduce the environmental footprint of the substance and no animal suffering is involved. It's a brilliant solution. Many people might think this concept is unappetizing but if they knew how meat really is produced

traditionally and the consequences of modern industrial farming practices (i.e. antibiotic resistance, animal suffering, unsanitary processing, etc.) many would consider in vitro safer, more sanitary and overall more appealing.

– *University Respondent, South Africa*

Found the in vitro quite amusing, actually did laugh out loud as the lamb chop had views of the field outside and got to listen to the radio . . . Great for opening communication between producers and consumers.

– *Farm Respondent, New Zealand*

It's like a technological version of the craft socialism of William Morris. Only chops. Tasty tasty chops.

– *NGO Respondent, Location unknown*

The possibility of audience indifference or disinterest rarely comes up in discussions of speculative design, and even if we cannot account for it, we can still 'see' it at work here in the limited number of responses – and it must be said to temper any claims of robust 'public engagement.' Nonetheless, that should not prevent us from questioning what kind of public was involved. Because the designs sought to elicit reflection on inherently political matters, such as labour relations and surveillance, it may be tempting to claim them as examples of adversarial design (cf. DiSalvo, 2012). However, despite respondents having divergent political positions, we believe that without the opportunity for direct engagement with each other, an active agonistic politics was actually prevented. Likewise, Le Dantec (2016, p. 122) argues that "issues, attachments and the work of infrastructuring are the entangled components that constitute a public" – and although we have evidence for the first two elements, support for taking citizenly action on these issues and attachments was absent.

Rather than assuming a general public-in-waiting that would respond directly to our interests and designerly expertise, or even assemble citizen publics, the *Grow Your Own Lamb* scenario instead supported what the first author has previously referred to as a temporary, or mobile, public gathered around a specific matter of concern, whose goal is to (be)come together (Galloway, 2010). Put a bit differently, our designs can be understood as "capacitors for moving in and out of different social gels, including the capacity to take on an identity that is able to speak and to participate in specific contexts" (Sheller, 2004, p. 50) – in this case, our survey forum. Given the kind of respondents we had, we also find Michael's (2012) description of speculative design's public to be useful:

The public seems to be composed of more or less fully rounded persons, more or less able to confront with cognitive and emotional maturity (for want of a better phrase) [the] novel . . . designerly artifacts. What is particularly interesting is that this 'maturity' is characterized by a capacity to entertain, deal with, and explore the confusion, ambiguity, blurriness of the issues associated with these objects. This is a tacit model of the public where its members suffer neither from intellectual deficit nor citizenly shortcomings – rather, it is a constituency whose role is not to be 'citizenly' (whatever form that might take) within a context of policy making, but thoughtful within a context of complexity.

(p. 541)

In addition, just as our speculative designs did not seek to solve problems, the kind of public engagement that arose did not provide solutions. Rather than seeing this as a failure of either our research or its impact, we suggest that the respondents' thoughtful engagement indicates its own form of success. Recalling previously discussed approaches to evaluating design, rather than defining success by whether or not the intentions of the designer were met – or if we were able to directly support citizen action – our case of public engagement might be best described as fostering what Haraway (2016) calls “staying with the trouble” and sym-poiesis, or “making-with.”

In summary, we believe that speculative design offers much promise as a form of “unde-sign” that requires a shift from viewing it solely as a form of research output or possible solutions to possible problems, to a method of research, or means of asking questions and generating new connections. Indeed, we might even go so far as to suggest that our case study produced so many questions for further research that it would have been more productive to do this work at the beginning of the project instead of the end – or at least in a more iterative fashion. Ultimately, more research is needed, but we are confident that speculative design offers the potential to support new kinds of publics and different forms of action. Moreover, in a complex and damaged world, that may be exactly what is needed.

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