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Speculative design: crafting the speculation

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Abstract

The article positions the author's work as speculative design but—like the term design fictions—is open to several interpretations. How is the fictional character of such work conceptualised and produced? What kinds of speculation are involved? The article considers the value of one particular approach and argues that speculative design serves two distinct purposes: first, to enable us to think about the future; second, to critique current practice. Methods are described through case studies, either of the author's own projects or projects completed by graduates of the design interactions course at the Royal College of Art. A key concept is the 'perceptual bridge'—the means by which designs engage their audience. The article argues that a vital factor in the success of a Speculative Design proposal is the careful management of the speculation, specifically what informs the use of technology, aesthetics, behaviour, interaction and function of the designed artefact.

Keywords: speculative design, design fictions, critical design, futures, evolution of technology

1 Introduction

In this article I present methods and strategies used in the practice of speculative design, describing how a combination of informed extrapolations of an emerging technology and the application of techniques borrowed from film, literature, ecology, comedy and psychology can be used to develop and present plausible futures. I will describe the methods through the presentation of case studies, either of my own projects (Auger–Loizeau) or projects completed by tutors and graduates/students on the design interactions course at the Royal College of Art where I have been teaching and researching since 2005.

2 Historical and semantic issues

I begin with an attempt to address the complex issues surrounding the definition of speculative design, as it has much in common with other design related activities such as critical design,[1] discursive design,[2] design probes[3] and design fictions.[4]

There is much overlap between these practices, the differences are subtle and based primarily on geographical or contextual usage: all remove the constraints from the commercial sector that define normative design processes; use models and prototypes at the heart of the enquiry; and use fiction to present alternative products, systems or worlds.

My choice was informed mostly by semantics and the subsequent loading of experience: the *physical* object presented as a 'design fiction' may be identical to a 'speculative design' object

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or a 'design probe,' and so on; however, the use of the modifier gives the *cultural* object a substantially different value. For example, the word 'fiction' before design immediately informs the viewer that the object is not real; 'probes' infer that the object is part of an investigation; and both 'discursive' and 'critical' reveal the intentions of the object as an instigator of debate or philosophical analysis. These terms act to dislocate the object from everyday life, exposing their fictional or academic status. For those within the design or research community these semantic details are less problematic as familiarity with the discourse makes the terminology less important, but for those unfamiliar with these practices, semantics fundamentally affect how the work is experienced and assessed. As one of the core motivations of this practice is to shift the discussion on technology beyond the fields of experts to a broad popular audience, the choice of 'speculative' is preferable as it suggests a direct correlation between 'here and now' and existence of the design concept.

3 Speculative futures and alternative presents

Having settled on speculative design, it is now necessary to explore some of the difficulties with this term, as it is not ideal. With its etymological baggage, the word has a strong leaning towards conjecture; many of the classic 'visions of the future' such as jet packs and flying cars are wild speculations, playing to spectacle and technocentric dreams rather than being based on logical trajectories or contained by the rules of real life.[5] Through acknowledging these rules, collaborating with scientists and by not straying too far into the future, it is possible to craft the speculation into something more poignant, based on logical iterations of an emerging technology and tailored to the complex and subtle requirements of an identified audience.

The second problematic with the word *speculative* is related to the close relationship between speculation and the future. Here it is important to state that speculative design is not only to encourage contemplation on the technological future but can also provide a system for analysing, critiquing and re-thinking contemporary technology. To ease confusion I separate the practice into two categories:

First, existing paradigms can inform future developments of technology: speculative futures imagine, through the extrapolation of contemporary systems and product lineages, near future products and services. These are intended to act as a form of cultural litmus paper, testing potential products and services on both a mainstream audience and within industry, before they exist.

Second, alternative presents are design proposals that utilise contemporary technology but apply different ideologies or configurations to those currently directing product development. This method is similar to the historiographical practice of counterfactual histories[6] and the literary genre of alternate histories,[7] but rather than focusing on asking 'what if' of historical events and imagining the effect on here and now, it shifts the emphasis onto artefacts. Here, we break free of a lineage at a certain historical point to question why things are the way they are.

4 Speculative design: a methodology

One of the key factors responsible for the success of a speculative design project is the careful management of the speculation; if it strays too far into the future to present implausible concepts or alien technological habitats, the audience will not relate to the proposal resulting in a lack of engagement or connection. In effect, a design speculation requires a bridge to exist between the audience's perception of their world and the fictional element of the concept. Inspiration and influence for this 'perceptual bridge' can come from diverse fields such as observational comedy, psychology, ecology, horror films and illusion for the insights they offer into the complex working of the human mind and how it can be carefully manipulated to elicit reaction. Below I describe some of these bridging techniques.[8]

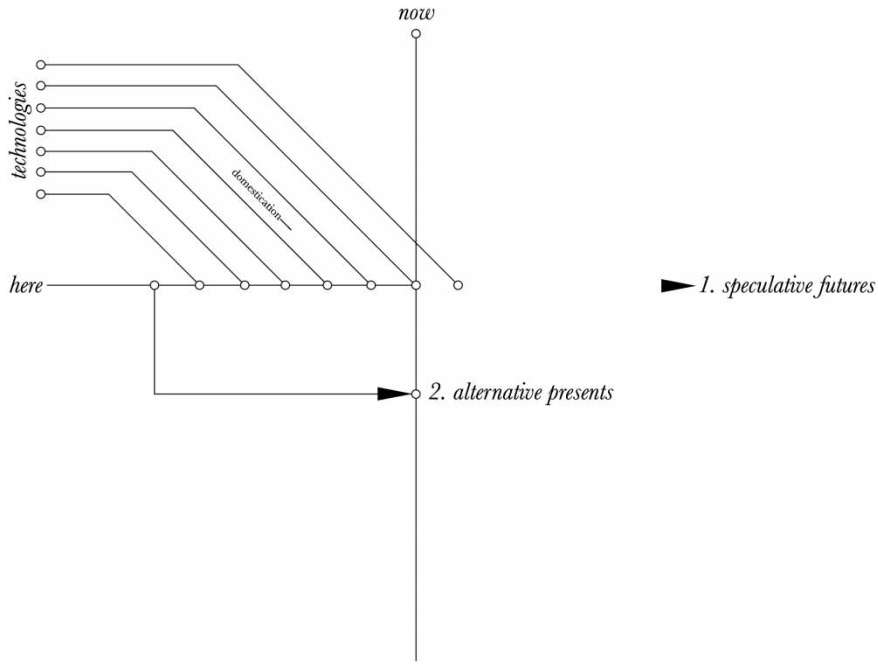

Figure 1. Alternative presents and speculative futures. At the origin is here and now—everyday life and real products available on the high street. The lineage of these products can be traced back to when the technology became available to iterate them beyond their existing states. In Figure 1, the technology element on the left hand side represents research and development work, the higher the line the more emergent the technology and the longer and less predictable its route to everyday life. As we move to the right of the diagram and into the future we see that speculative designs exist as projections of the lineage, developed using techniques that focus on contemporary public understanding and desires, extrapolated through imagined developments of an emerging technology. Alternative presents step out of the lineage at some poignant time in the past to re-imagine our technological present. These designs can challenge and question existing cultural, political and manufacturing systems.

4.1 Design for context: the ecological approach

The designer must consider the environment and context in which speculative future products or services would exist; this could be a specific space such as the home or office or a cultural or political situation based on current developments or trends.[9] This could be described as an ecological approach to speculative design[10] and assists in grounding the concept in a familiar or logical reality.

Below are two descriptions of the Martians from *The War of the Worlds*. The first is an excerpt from H.G. Wells's original novel of 1898, the second from Steven Spielberg's film version of 2005. If we take the Martian to be a speculative object, it is possible to compare the two approaches to its design:

I think everyone expected to see a man emerge . . . But looking, I presently saw something stirring within the shadow: greyish billowy movements, one above another, and then two luminous discs—like eyes . . . A big greyish rounded hulk, the size, perhaps, of a bear, was rising slowly and painfully out of the cylinder . . . The incessant quivering of the mouth, the gorgon groups of tentacles, the tumultuous breathing of the lungs in a strange atmosphere, the evident heaviness and painfulness of movement due to the greater gravitational energy on earth . . .Suddenly the monster vanished. It had toppled over the brim of the cylinder and fallen into the pit, with a thud like the fall of a great mass of leather. (Wells 2004, 19)

'I tried a bunch of different heads, but Steven Spielberg wanted to pay tribute to the

> *shape of the spaceship in the original movie,' Sims said. 'No matter what I did with that head, we always went back to this shape. For the eyes, Spielberg kept saying they should be overly dilated, refracting with light almost like you'd see in a cat. Spielberg wanted one leg in the back and two in the front. At Stan Winston's we did an animation of the alien crawling on the ceiling, showing how his legs would function as arms as well and pick stuff up while using the other leg to balance.'* (Hart 2008)

The question I pose here is not which interpretation is the most compelling, engaging, terrifying or memorable but which is the most likely. The celluloid version has a certain familiarity, resembling many other filmic depictions of disconcerting aliens in recent years. It displays its physical superiority to humans with a cat-like deftness employing its several arms to move three-dimensionally around a room. It is without question captivating and terrifying and therefore perfect as a form of entertainment, which arguably was the primary factor influencing its design. Wells's Martian, on the other hand, is clearly suffering, ungainly, awkward and struggling to cope with Earth's gravity. Wells trained as a biologist,[11] so would have a good understanding of the concept of adaptation. Although this is pure supposition, logic suggests that Martians would be maladapted to life on Earth and his depiction applies this theory to inform the design of the creature.

A similar approach has been employed by designers, Dunne and Raby in their project 'Technological Dream Series: No. 1, Robots' (2007) (see Figures 2 and 3). The stereotypical design of many robots could be compared to Spielberg's alien; Dunne and Raby dismantled this familiar image by designing their robots to be harmonious with the contemporary domestic landscape. The concept of adaptation here informs the design process, delivering objects that display an existential logic (or not, in Wells's case) in their intended environment. Any experience that challenges a preconception will at first appear odd, but here the detail and finish of the artefacts, combined with the short explanations describing their functions and modes of interaction, entices the audience into exploring the concept further. The project successfully offers a new perspective on domestic robots by designing for the complex sensibilities of people: robots become needy and subservient to overcome our fear of them; furniture is adapted to accommodate new technologies—it appears familiar but has advanced function; technological interactions take place in odd but intimate ways. Even though their function is little described, we could imagine living with these robots due to their compatibility with the domestic habitat.

4.2 The uncanny: desirable discomfort

In order to elicit audience engagement and contemplation on a subject it is sometimes helpful for a speculation to provoke. If a design proposal is too familiar it is easily assimilated into the normative progression of products and would pass unnoticed. However, proposals dealing with sensitive subjects such as sex or death can quite easily stray too far into provocative territory, resulting in revulsion or outright shock. The design solution is complex and contradictory: provocative whilst at the same time familiar. Sigmund Freud (1990) described this paradoxical reaction humans have that invoke a sense of familiarity whilst at the same time being foreign as 'uncanny' or the term used by social psychologists, cognitive dissonance.[12] This is a complex and difficult reaction to manage but when achieved responses to the design concept tend to be both meaningful and strong. As Freud describes, the most powerful experiences of the uncanny come through death, such as dead bodies, spirits and ghosts (ibid. 364); severed body parts and malfunctioning bodies such as epileptic fits and madness (ibid. 366). Freud goes on to suggest that by using the uncanny, 'the story-teller has a *peculiarly* directive power over us; by means of the moods he can put us into, he is able to guide the current of our emotions' (ibid. 375. emphasis in original). Here he refers specifically to literary works such as the novels of gothic horror exemplified by Edgar Allan Poe's, *The Fall of the House of Usher* (1839) and Mary Shelley's, *Frankenstein* (1818)

Figure 2. Dunne and Raby, Technological Dream Series: No. 1, Robots—Robot 3 (2007). More and more of our data, even our most personal and secret information, will be stored on digital databases. How do we ensure that only we can access it? This robot is a sentinel, it uses retinal scanning technology to decide who accesses our data. In films, iris scanning is always based on a quick glance. This robot demands that you stare into its eyes for a long time, it needs to be sure it is you. On another level, it asks what new forms of furniture might evolve in response to future technological developments.

> *His limbs were in proportion, and I had selected his features as beautiful. Beautiful! Great God! His yellow skin scarcely covered the work of muscles and arteries beneath; his hair was of a lustrous black, and flowing; his teeth of pearly whiteness; but these luxuriances only formed a more horrid contrast with his watery eyes, that seemed almost of the same colour as the dun-white sockets in which they were set, his shrivelled complexion and straight black lips.* (Shelley 18181992, 58)

Shelley creates the uncanny through first describing familiar signs of wellbeing and normality, then contrasting these with signs of disease and death. More recently, this deft juggling of signs has been practised by film directors such as Stanley Kubrick (*The Shining*, 1980) and William Friedkin (*The Exorcist*, 1973) to elicit powerful cinematic effect.

Careful management of the uncanny is imperative when a project attempts to deal with subjects such as death or the invasion of the human body (for example, technological implants). In the genre of horror it is preferable to exploit the uncanny to elicit maximum psychological effect; however, for a speculative design project a more careful approach is required.

The 'Afterlife' project (Auger–Loizeau, 2001–2009) directly touched on many of the sensitive issues surrounding the subject of human death. The core concept was the utilisation of a microbial fuel cell[13] in the post-death processing of a human being, charging a dry-cell battery during the decomposition process of the body (see Figures 4 and 5). The installation of the project at the New York Museum of Modern Art (MoMA) exhibition, Design and the Elastic Mind (2007), presented the piece as the core of a metaphysical dialogue examining the cultural shift from belief systems upheld by organised

Figure 3. Dunne and Raby, Technological Dream Series: No. 1, Robots—Robot 4 (2007). This one is very needy. Although extremely smart it is trapped in an underdeveloped body and depends on its owner to move it about. Neediness is designed into very smart products to maintain a feeling of control. Originally, manufacturers would have made robots speak human languages, but over time they will evolve their own language. You can still hear human traces in its voice.

Figure 4. Auger–Loizeau (2008), Afterlife coffin with microbial fuel cell.

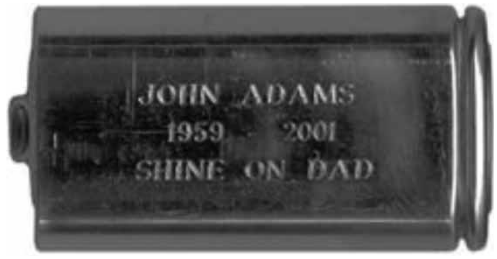

Figure 5. Auger–Loizeau (2001), engraved Afterlife battery.

religion to the more factual basis of science and technology. Here, technology acts to provide conclusive proof of life after death, *life* being contained as energy in the battery.

Unfortunately the viewers of the exhibition chose mostly to ignore the intellectual aspect of the project to focus on the more unsavoury aspects, namely tampering with the process of death, the passing of a loved one and the material activity of the human body during the operation of the fuel cell. This resulted in simple revulsion as the benefits of the concept were overlooked: The audience experienced the proposal as *too* uncanny.

In 2009 we were invited to present 'Afterlife' at Experimenta 09, the Design Biennale in Lisbon, Portugal. This provided the opportunity to reflect on the problems of the MoMA installation, specifically how the presentation could be adjusted to move beyond material factors and revulsion to touch the deeper sensibilities of the audience. In addressing this problem we shifted the emphasis from the fuel cell and coffin to the existence and function of the battery; this effectively put the focus on the *familiar* aspect of the uncanny experience. To communicate the diversity and possibility of battery applications we invited fifteen colleagues to propose what they would do with either their own Afterlife battery or that of a loved one. They were also asked to write a short paragraph describing their choice:

Why an aeroplane? Why a Spitfire MK1? (See Figure 6.)

Figure 6. Tom O'Brien, Afterlife product—remote control Mk.1 Spitfire.

I don't feel the need to be remembered as an object. I'd like my energy to create an act. Since a child flying has fascinated me, not sure why, just does. I have always wanted to fly but have never completely felt at ease enough to think I could manage it without killing myself. I still intend to fly myself in one way or another but just in case I don't this will ensure it.

Very rarely man creates an object that connects with the human soul; anyone who has witnessed a Spitfire and especially the MK1 in flight will have felt that connection. It looks, sounds, functions and is just 'right,' it is perfect. The curve of the wings, it's proportions, it's functionality, it was also fitted with the Rolls Royce Merlin which without exception, before, after or at anytime in the future is the greatest four stroke engine ever produced. (Tom O'Brien, 2009)

We'd use our battery for a euthanasia machine. (See Figure 7.)

As we are a couple, once one goes, we're not sure how long the other one would be able to hang on. So, if it's all too much, we could use the energy from the first one to go, to help the second one on their way. I'm not sure if it would be a form of conceptual murder or not, but definitely an 'assisted' suicide.

Ideally we'd like to propose an object based on an existing machine, it would foreground the battery, which would be inscribed and silver-plated. We would probably replace the usual questions the machine asks you to check your state-of-mind with something more personal.

We imagine you would set it up on a small table by your bed or a chair, insert the battery, put the mask on, then after a few minutes, insert the tube into the device which causes a green light to come on letting you know it is working and ready. Then, you can lie back on your bed, or armchair, close your eyes, and 30 seconds later the carbon dioxide will begin to flow. (Anthony Dunne and Fiona Raby, 2009)

A regular event in my family life is the argument over the control of the TV remote and the

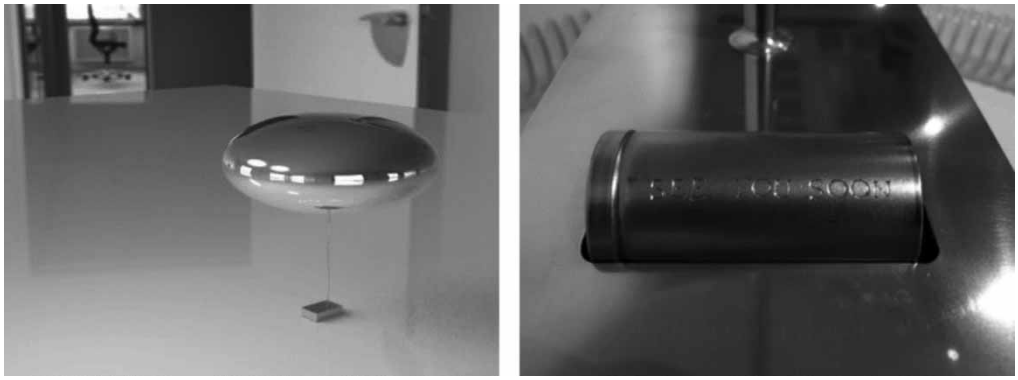

Figure 7. Anthony Dunne and Fiona Raby, Afterlife product—euthanasia machine.

programmes that we will collectively watch. There is a complex process of negotiation that involves give and take, selfishness and selflessness. I would like to be memorialized in an evocation of this process, not least because I want to be remembered in relation to mundane technology (one of my academic specialisms), as a typically contradictory human being, and as a loving partner and father who was intent in bettering his family (my preferred genre was nature documentaries) while being chronically silly.

I would like my Afterlife battery to power a small speaker mechanism (much like the sort you find in a singing birthday card) integrated into a remote control. [See Figure 8.] Whenever the TV is switched on by the remote, a recording of my voice is played to say either: 'It's my turn, so I'm going to decide what we watch' or 'I really don't mind, it's your turn to choose.' Given how fragile and contentious everyday familial memory is, these two phrases should appear at random. Alternatively, and slightly more subtly, I'd like my Afterlife battery to power a circuit that makes the TV remote select very occasionally, automatically and unpredictably a channel showing a nature documentary. The channel cannot be changed for the duration of the programme, and the television can only be switched off at the mains. (Mike Michaels, 2009)

Figure 8. Mike Michaels, Afterlife product—television remote control.

My basic idea stems from the deceased (myself) being an attention seeking and needy individual in life, so it follows that death should not pry his grip from the ones around him. He must be remembered by providing a useful battery for his loved ones, but one

Figure 9. Matt Karau, Afterlife product—batteries.

> *battery isn't enough. To be remembered only twice more—when the battery is installed and when the battery dies—simply will not suffice. He wants to die many times so that his loved ones will recall, each time, how much they miss him.*
>
> *The deceased requests that a series of cells are manufactured [see Figure 9], each with a random volume of electrolyte, so that the user of the cell never knows how long it will last. One may last a month, another a year. The deceased then, in death, continues to get the attention they so desired in life.*
>
> *The exact devices in which the cells are to be used are not specified by the deceased. Though, he does request they be used in devices that are used by his loved ones to perform banal but vital tasks in their lives. (e.g. hearing aid, pacemaker, bike lights, garage-door opener, etc.)* (Matt Karau, 2009)

The installation in Lisbon focused on the fifteen proposed Afterlife battery applications and the short narratives supporting the objects. This introduced an emotional and personal content that the project had previously lacked, encouraging the audience to reflect on how they themselves might use the battery. This management of the uncanny allowed the project to genuinely engage the audience whilst at the same time limiting the negative emotions normally associated with such themes.[14]

4.3 Verisimilitude: design fiction or design faction?

As mentioned above, the term speculation can take the viewer too far away from the here and now, making the proposed design concept seem unreal or far-fetched. The problem lies in the range of possibility for a fiction—from simply impossible to bordering on reality. The speculative tag makes sense in the context of this article and the design research community where methods, motivations, values and audiences are a key factor. Here the fictional status of the designed concepts is an aspect of discussion. But in the domains where these *fictions* ply their wares and meet their audiences, it is preferable for the concept to pass as *real*, described better perhaps as design *factions*: a form of verisimilitude

where truths are blurred and disbelief is suspended. Thinking again about *The War of the Worlds*, I remembered Orson Welles's famous radio play of 1938 that created widespread panic in certain US towns due to its realistic delivery. Looking more closely into why this particular broadcast was so successful in bringing fiction to life, it became apparent that it was not down to one single factor but several disparate timely elements: the prevailing political and cultural atmosphere (coming war in Europe; Munich Crisis of September 12–30); the product used for the dissemination and its contemporary relevance (the radio); the language and style of the broadcast (based on previous disaster broadcasts such as the crash of the airship Hindenburg); and the shift in setting from England to very specific real places in the United States (where the play was broadcast).

The techniques employed by Welles bear many similarities to those used in the creation of a convincing speculative design project: the crafting of complex narrative or artifice using the real life ecology where the fictitious concept is to be applied and taking advantage of contemporary media, familiar settings and complex human desires or fears.

It is these real-life delivery methods that differentiate speculative designs from many of their cousins in science fiction. We predominantly experience science fiction through film, television, literature or comics, and as such consciously and willingly enter into the fiction as soon as the curtain rises or the book is opened. Reality is temporarily suspended until the end credits roll and normal life clicks back into place. Speculative designs, however, are played out in real life. 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.

This blending of truth and reality was used in our first speculative design project, Audio Tooth Implant (Auger–Loizeau, 2001). Our original project brief was to examine the implications of implantable technology for human enhancement purposes through proposing possible applications and access points for technology to enter the body. The resultant product was an implantable telephone.

The concept of implantable technology for enhancement purposes immediately conjures images from science fiction,[15] it was important from the outset that we steered the proposal away from these more profound representations towards the public audience's understanding of three factors. First, the perceived lifestyle benefit of having an implant: by examining the technological habitat to acknowledge the cultural phenomenon of the mobile telephone, which at the time (2001) was revolutionising human communication, we aimed to deliver a concept that would play to contemporary aspirations.

Second, the psychological issues related to an alien object entering the body (managing the uncanny); we consciously chose the tooth as an entry point for the implant as this is the least invasive surgery available, creating a tangible balance between cost and benefit.[16]

And third, for technological believability, the Audio Tooth Implant relies on a general public awareness of hard and well-publicised facts such as the miniaturisation of digital technology and urban myths such as dental fillings acting as radio antenna and picking up audio signals. These combine to give the concept a familiarity. It was also necessary to provide a convincing description, in layman's terms, of the technology involved. With the tooth implant we were assisted in this by approaching research scientists at a large telecommunications company, who offered the following:

> *The moisture in the cheeks effectively make the inside of the mouth a faraday cage: a radio free space. Therefore the chip would have to receive low-frequency radio in the order of 150kHz. This signal would energize the dormant chip implanted in the tooth through near field magnetic effects. A transducer transforms this sound information into micro vibrations which through the process of bone transduction are transmitted along the*

jawbone and directly into the cochlea where they are experienced by the wearer as normal sound.

This description helped in convincing those with a good understanding of electronic technology. To communicate the concept we created a clear epoxy resin model tooth with embedded computer chip (see Figure 10). This model was photographed in a studio and used to accompany the related text description of the concept.

With this material we presented the project at the Science Museum in London in an exhibition called Future Products. From here it quickly entered the public domain through both the popular press and specialist media. Our initial goal was to disseminate the project as broadly as possible, from the contemporary technology magazine, *Wired* to *The Sun* newspaper with its average daily readership of 7,733,000 people.[17]

By consciously avoiding the formal academic language normally associated with technological research and critique to adopt a familiar product design language we aimed to appeal to a more general audience. Using the press allowed the concept to disseminate globally, working particularly well with new media such as Internet news sites and blogs. A possible problem with this approach is that it allows for little control once a project is in the public domain and concepts can quickly mutate as facts become embellished. With projects like the Audio Tooth Implant this is not problematic, as the core proposal is simple enough for the key message to not get lost in translation. We assumed that due to the extremely large numbers of individuals reached,[18] a percentage would be induced into contemplating a subject they had not consciously considered before. One of the key advantages of speculative design is that there is no intention to bring the product to market, this means that critical responses such as the one below are of equal value to positive articles:

Dear Mr's Auger and Loizeau,

As a physician I believe the technology you describe in your press release, has the potential for producing immense social harm. This social harm would include psychological trauma, and angry behaviour in both the workplace and the home.

. . .

. . .

Figure 10. Auger–Loizeau (2001), Audio Tooth Implant.

XXXXXXX X. XXXXXX, MD
Associate Professor of Medicine,
(Cardiology)
Stanford Medical School.[19]
Subject: Re: implant retained crown test
Date: Sunday 16 February 2003 23:46
From: XXXXXXX
To: James Auger <jamesa@mle.media.mit.edu >
Mr Auger,
Thank you for your prompt reply. Since I am a dentist and my husband's crown is implant retained not on tooth structure, We would be happy to be included in the test phase. I could make sure the crown was placed in a temporary mode and it could easily be removed for further modification.
Please let me know if you are interested in this test.
Sincerely,
XXXX XXXXX

4.4 Observational comedy: rooting the speculation in the familiar

Presenting design proposals based on little understood (by the popular audience) emerging technologies is a complex challenge. Too much up front technical information can alienate or simply bore the viewer, but too little can leave the concept intangible or whimsical. The problem lies in the amount or complexity of knowledge that needs to be communicated before a project can be understood. In their analysis on the evolutionary reasons for humour and laughter, Hurley, Dennett, and Adams (2011, 164) describe the comedian's solution to a similar issue suggesting that 'shared stories are excellent data-compression devices. . .The more of a story you can tell with a few words, the more efficient your joke or witticism will be'. Watching a recent performance by Sean Lock on the television comedy programme 'Live at the Apollo', I began contemplating the similarities between observational comedy and the tactics of speculative design. During the set he described the filthy state of the back seat of his car, boxes of organic raisins and the raising of small children. Here there are several relevant points. First, observations are of mundane but

THE SUN, Saturday, June 29, 2002

RADIO CHEW

Listen to shows and phone via your tooth

RADIO fans could soon be able to pick up programmes and take mobile phone calls via a gadget in their TOOTH.

Helped

Figure 11. *The Sun* newspaper (29 June 2002, 25); average daily readership 7,733,000 people. In the UK the Tooth Implant was also featured in *The Mirror*, *The Express* and *The Daily Star*.

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SCIENCE : DISCOVERIES

Excuse Me, Is Your Tooth Ringing?

Lakshmi Sandhana 06.21.02

A wireless receiver can be implanted into your tooth with the aid basic dental surgery. The implant can allow a person to receive digital signals from radios and mobile phones, from the privacy of their own head.

Soon the phrase "I've got something in my tooth" -- instead of conjuring up fears of root canal surgery and the like -- could refer to the latest in wearable wireless technology.

A new design for a tooth implant that receives digital signals from radios and mobile phones will be on display at the Science Museum in London beginning Friday.

Designed by Jimmy Loizeau and James Auger, research associates from MIT Media Lab Europe, this collaboration between the Science Museum and the Royal College of Art aims to increase public understanding of science, technology and the arts by showcasing young talent. Part of the "future products" exhibit, it is supported by the National Endowment for Science, Technology & the Arts.

Figure 12. *Wired* initially featured the concept in an article by Lakshmi Sandhana dated 21 June 2002. They followed up several years later (March 2006) with an article entitled: 'Lying through their teeth' by Rachel Metz.

Figure 13. *Sky News* (2002) featured the Audio Tooth Implant at the launch of the talking points exhibition at the Science Museum in London.

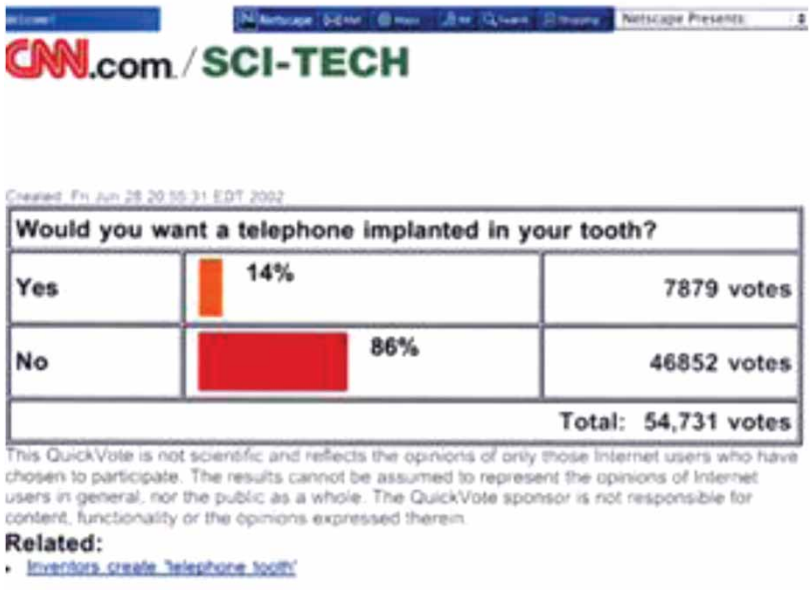

Figure 14. CNN.com (2002) "My mouth is ringing: Inventors create 'telephone tooth'." No longer available online. CNN ran a poll asking the audience is they would want a telephone implanted in their tooth. Over fifty-four thousand votes were cast in a forty-eight-hour period.

familiar aspects of daily life. This type of comedy is popular because the audience can personally relate to the situations described.

Second, observations are often specific to a particular time, place and person. Lock's analysis wouldn't have worked ten years ago, as these particular boxes of raisins didn't exist then. Also, to fully understand the observations and therefore the humour, the audience needed to be a parent of children between the ages of two and eight from a certain social class and culture.

Third, the importance of attention to detail; Lock meticulously describes how his children open the box of raisins and then shake the box in a very particular way, scattering them all over the car and down the small cracks between the seats. As he describes this, a picture forms in my mind of my own children doing the exact same thing. This is a very familiar scene but one to which I hadn't previously given conscious thought to.

Fourth, once the familiar short story has been told, the foundations are laid for wilder more extreme anecdotes; these demonstrate the humour in the situation. In Lock's set he concludes by describing seagulls following his car as he drove past landfill sites and foxes retching as they walked past the open car door.

By utilising the mundane, the familiar and small, unnoticed details the designer can provide spectacular, even preposterous, proposals with a tangible link to our contemporary sensibilities and understanding. It roots them in known contexts limiting the need for complex explanations. The spectacular narratives that stem from the comedian's initial observations effectively represent the designer's technological future, made palatable through familiar elements.

In his project 'Sensual Interfaces,' Chris Woebken applies hypothetical advances in nanotechnology to explore new ways of interacting with a computer. In his video scenario (see Figure 16), we see a familiar office scene: an Anglepoise lamp; a desk; a nondescript computer screen; a suited man; and a mug. The unusual element is the form of interaction, the keyboard

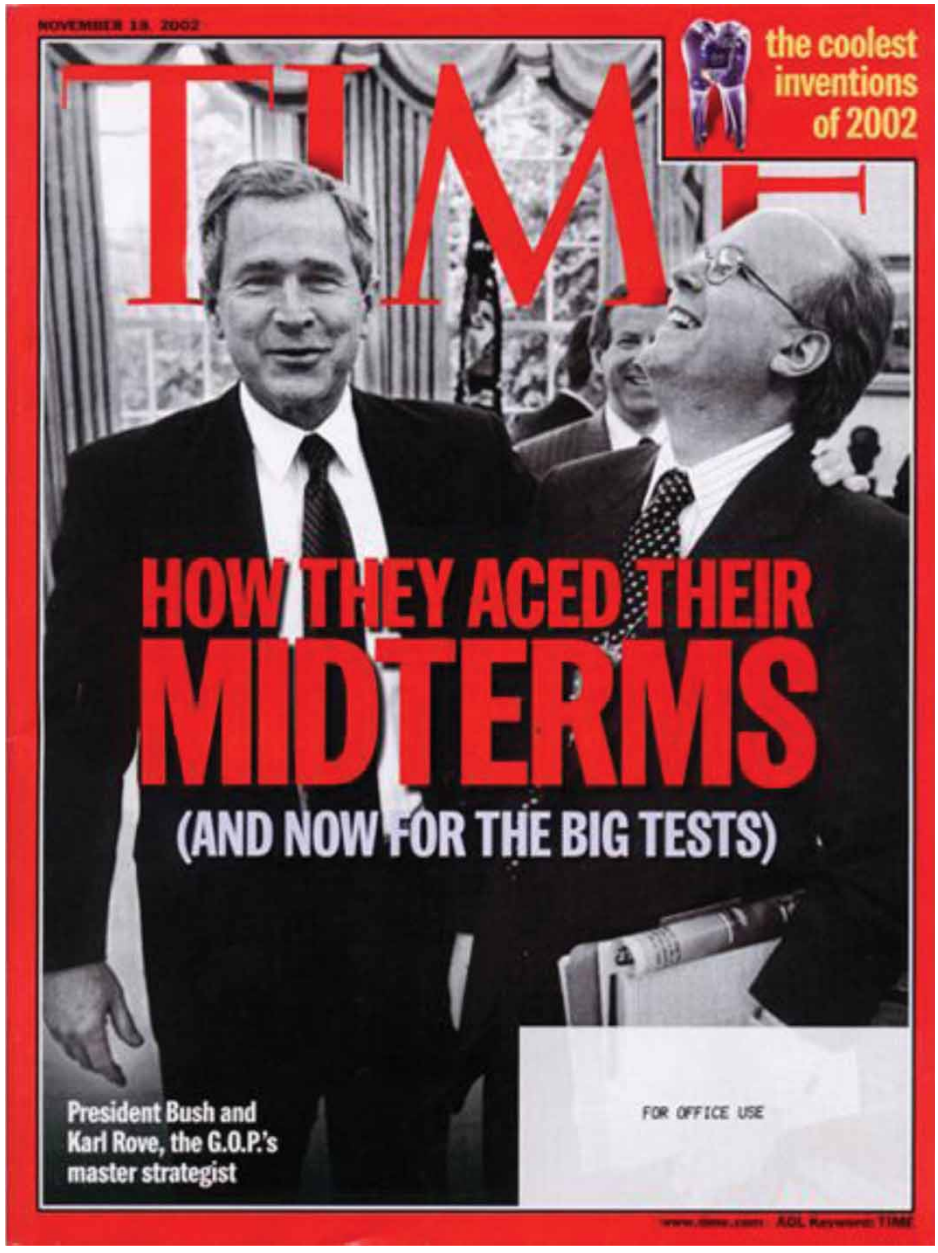

Figure 15. *Time* magazine, November 2002. The Audio Tooth Implant was listed on *Time* magazine's list of the coolest inventions of 2002, and was used as their cover image for this feature. The only dialogue we had with the magazine was their request to use the tooth image; there were no questions about the state or nature of the project.

is no longer present, but in its place is a large pile of seeds. The businessman sits at the table, and through a series of choreographed and considered movements sifts, moves and sorts the seeds. This sounds bizarre and nonsensical when described in words, but partially through the familiar

elements and partially the choreography, it works in portraying a tangible and engaging new mode of interaction. Its power lies in the familiarity of the scene, making the film both compelling and thought-provoking.

Another technique based on observation is to take advantage of stereotypical or commonly held assumptions about a specific subject to bypass the complex underlying technological aspect; for example, if an observational comedian chose to focus on the topic of nanotechnology he/she could start the set with the grey goo scenario,[20] move on to cryonics and Michael Jackson,[21] and finish off with golf balls.[22] In his nanotech project, 'The Minutine Space' (see Figure 17), Mikael Metthey follows the familiar promise of nanotechnology to potentially eradicate disease. In Metthey's fictional future, humans no longer suffer illness; in this utopian world of wellness, the extreme experience of being profoundly unwell becomes recreational.

Metthey's project, like Woebken's, requires a basic familiarity with the subject matter for the extrapolation to work. To those with an interest in emerging technology, the familiar promise of a zero-disease society made possible through developments in nanotechnology is blended with the contemporary popularity of extreme sports to create a proposal that, whilst extremely odd, makes sense.

By observing and taking advantage of mundane, subtle, quirky but ultimately familiar behaviours or perceptions, the speculative designer can take the viewer on a journey to a technological future or alternate present that, whilst potentially alien, makes perceptual sense.

Figure 16. Chris Woebken (2007), *Sensual Interfaces* (video). Available at http://www.woebken.net/nano_project.html (accessed 23 August 2010). Using seeds to simulate smart dust, this video visualises new interactions such as breaking, sharing, throwing away and mining data. These new interactions not only generate new behaviours but will also define new relationships with products.

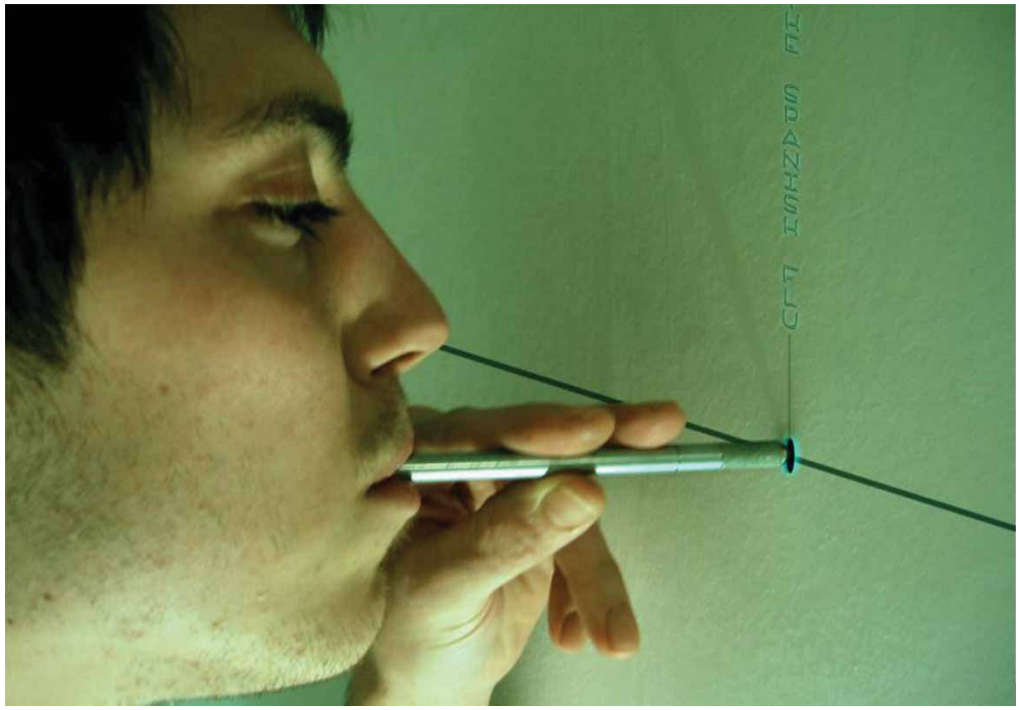

Figure 17. Mikael Metthey (2006), *The Minutine Space*. Available at http://www.mikaelmetthey.net/ (accessed 19 September 2011). People can visit a space where they get infected by engineered organisms designed to provoke the physical and psychological reactions associated with sicknesses. The space is designed to emphasise the social aspect of sicknesses. It is composed of a viral area where the viruses can be chosen, facilities to rest and suffer relatively comfortably and a 'central sick pit' where people who need to be sick can vomit. The visitor, once they have had enough, can leave through the 'minutine' zone where all harming organisms are removed by the nano-antidotes.

4.5 Alternative presents: counterfactual and alternate histories

Returning to the idea of the ecological approach discussed in Section 4.1, by conflicting with rather than embracing engrained systems and established modes of behaviour, 'alternative presents' *always* display an inherent oddness that can be difficult to present.

Alternative presents are intended to question and critique contemporary use of technology in domestic and everyday habitats, so some conflict is helpful in capturing attention. However, for the proposal to have a less visceral impact, it is necessary for the audience to see beyond its conceptual oddness and understand the logic behind it. In literature, imaginaries based on a poignant counterfactual history can offer thought-provoking insights and perspectives on contemporary life:

> *It's America in 1962. Slavery is legal once again. The few Jews who still survive hide under assumed names. In San Francisco the I Ching is as common as the Yellow Pages. All because some 20 years earlier the United States lost a war and is now occupied jointly by Nazi Germany and Japan.* (Dick 1992)

The Man in the High Castle describes the consequences of one of the popular starting points for counterfactual histories, Germany winning World War II. From the writer's perspective, this theme offers a rich source of potential for re-imagining how the world might have evolved under these alternative circumstances. The speculative

designer can borrow directly from the historiographical method: by choosing specific events that shaped the course of today's technological products and re-imagining them, it is possible to create a very poignant alternative present. One example of this approach is Sascha Pohflepp's project, 'The Golden Institute', based on an imagined different outcome to the 1980 United States general election that would have enabled the perpetuation of energy-friendly initiatives undertaken during the term of Jimmy Carter (see Figures 18 and 19). As Pohflepp points out, 'Positioned at the right spot in the past, such counterfactual histories might offer an understanding of the forces at work as well as a fresh perspective on our present challenges.'

The strength of such a project comes from choosing a poignant historical moment on which to initiate the fiction: by choosing a topical and well-understood issue or theme in contemporary everyday life and finding a relevant or connected historical moment that *could* have a perceptible connection, the designer can develop a series of imaginary outcomes that instigate reflection on our current situation. In Pohflepp's case, the potential peak oil crisis and related energy issues that we face today make the 1980 election and its consequential closing down of energy-friendly initiatives a particularly poignant choice.

Taking a more aesthetic approach to an alternate present is James Chambers's project, 'Attenborough Design Group' (ADG). Here he postulates the existence of a research group within the electronics company Texas Instruments, led by the famous natural historian, cultural icon and filmmaker, David Attenborough. The objects developed by the group, whilst based on orthodox and existing products, were given new behavioural rules, exhibiting an underlying survival instinct inspired by complex evolved techniques in the animal kingdom. These new product behaviours act to enhance the chances of both physical survival through the inbuilt defence mechanisms and emotive survival through eliciting a deeper relationship with the owner. This latter element was achieved through an iterative behavioural prototyping, specifically an anthropomorphising of the various movements to elicit either sympathy (the Gesundheit Radio and Floppy Legs, see Figures 20 and 21) or wariness (Anti-Touch Lamp).

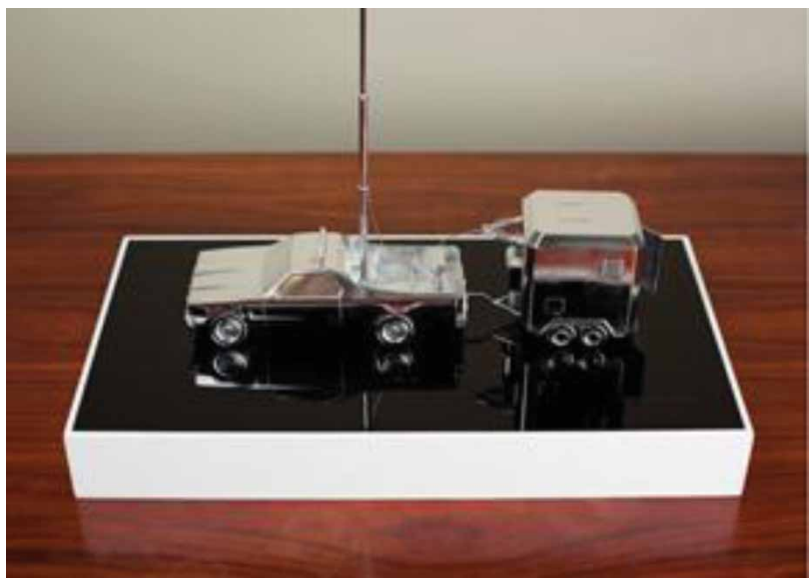

Figure 18. Sascha Pohflepp (2010), *The Golden Institute Model* (1:19) of a Nevada desert Lightning Harvester based on a Chevrolet El Camino. Available at http://pohflepp.com/?q=goldeninstitute (accessed 10 March 2011).

Figure 19. Sascha Pohflepp (2010), *The Golden Institute Model* (1:500) of an induction loop-equipped Chuck's Cafe, Interstate 5 near Bakersfield, CA. Available at http://pohflepp.com/?q=goldeninstitute (accessed 10 March 2011).

Chambers's project shifts the subject of the alternate history from socio/political events to a subject more relevant to the design industry, examining notions of object obsolescence, value and meaning.

This specific technique offers the designer a rich narrative potential for re-imagining and critiquing technological developments and contemporary products. As the two examples above show, the themes of the fiction can be extremely broad, from large-scale political events to the existence of a small imaginative research studio. As with all of the methods described above, the success of the project in engaging an audience lies in the small details: James Chambers's choice of David Attenborough as head of his research studio, for example, not only captures the attention of several generations of UK television watchers due to his unique social standing, but also presents a captivating logic to the behaviour of the prototypes, in turn justifying the benefits of the fictitious studio's approach. Sascha Pohflepp's project takes as its starting point a subject close to the heart of any relatively political individual living in a democratic society: an election and the potential consequences of a poor decision.

4.6 Domesticating technology: literally

In his book, *The Botany of Desire*, Michael Pollan describes the power of the tulip in seventeenth-century Holland; in his words the tulip 'unleashed a brief, collective madness that shook a whole nation and nearly brought its economy to ruin' (Pollan 2002, 69). He describes Dutch growers borrowing techniques from alchemists, sprinkling pigeon droppings, plaster dust and paint powders onto flowerbeds in the hope of growing the perfect specimen. Later, the invention of the microscope unlocked secrets and growers learnt that the 'perfect specimen' was in fact the result of a virus, and as a consequence tulip development took a new direction. Today, advances in genetic engineering are promising to deliver flowers that do not wilt and frost-resistant geraniums.[23]

In his speculative future project, 'Acoustic Botany', David Benqué builds on this ongoing human endeavour, specifically the fascination with the flower, to take us on a

Figure 20. James Chambers (2010), *Attenborough Design Group—Gesundheit Radio*. Available at http://objects.jameschambers.co.uk/ (accessed 10 March 2011). An internal mechanism triggers a sporadic anthropomorphised sneezing behaviour, developed to protect early fragile microprocessors from dust.

Figure 21. James Chambers (2010), *Attenborough Design Group—Floppy Legs*. Available at http://objects.jameschambers.co.uk/ (accessed 10 March 2011). The portable floppy disk drive which stands up if it detects liquid nearby, and the Anti-Touch Lamp, which sways away if you get too close to its halogen bulb.

spectacular voyage to a garden of the future (see Figures 22–24).

To advance the process of domestication beyond contemporary techniques he applies the emerging science of synthetic biology to propose a genetically engineered sound garden. This effectively represents a coming together of two art forms that have captivated human minds for

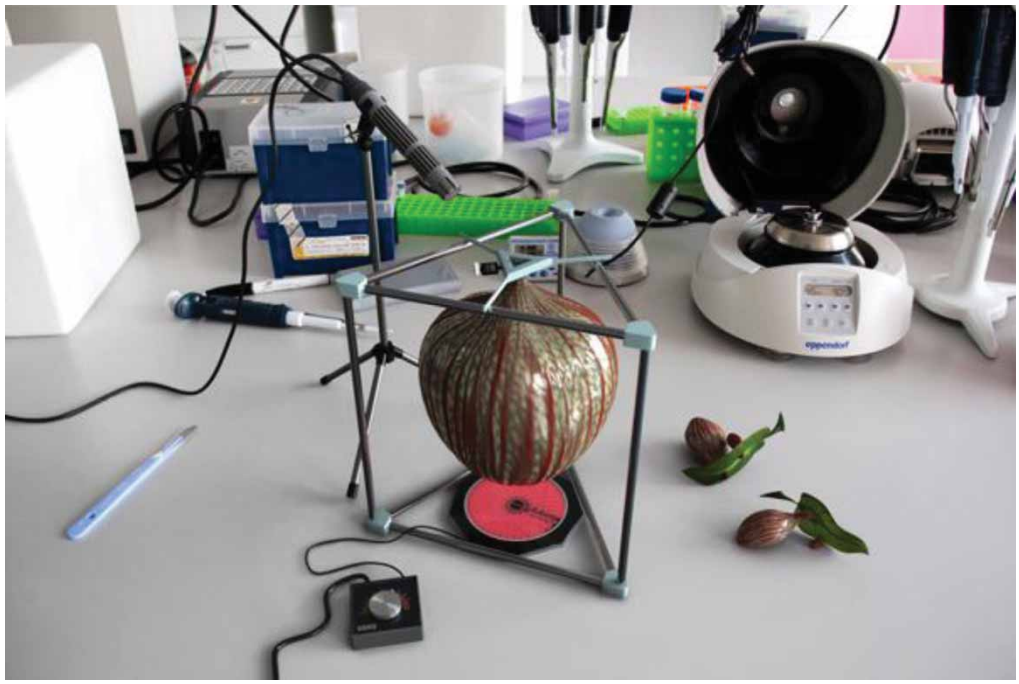

Figure 22. David Benqué (2010), *Acoustic Botany: Genetically Engineered Sound Garden*. Available at http://www.davidbenque.com/projects/acoustic-botany (accessed 10 March 2011).

centuries. The simple logic behind this method means that the complex language and science behind synthetic biology are translated into the results of its hypothetical practice: spectacular gardens, plants and creatures that combine to offer delightful new aesthetic experiences.

The method of using domestication to inform speculative futures limits the potential subjects to those organisms capable of being domesticated and to the sciences capable of manipulating their genetic development; however, the potential to cater to complex human desires and sensibilities is extremely powerful due to our long history of artificial selection to shape nature, as Michael Pollan describes in his introduction to 'Botany of Desire':

> *The big thing the dog knows about—the subject it has mastered in the ten thousand years it has been evolving at our side—is us: our needs and desires, our emotions and values, all of which it has folded into its genes as part of a sophisticated strategy for survival. If you could read the genome of the dog like a book, you would learn a great deal of who we are and what makes us tick.* (Pollan 2002, xv)

I have described above some of the methods and techniques currently being used for practising speculative design. Every speculative design project is unique and the diversity of possible subjects, contexts, technologies, perspectives and audiences make a definitive 'how to' guide impossible. Complicating the situation further is the fact that new techniques are continually being developed and old methods are becoming more sophisticated as the practice matures. The examples described are therefore intended to present a more general attitude or approach towards the subject of speculation, specifically how it must be managed and crafted to connect

Figure 23. David Benqué (2010), *Acoustic Botany: Singing Flower*. Available at http://www.davidbenque.com/projects/acoustic-botany (accessed 10 March 2011). Because the parasite diverts the plant's energy for its own purposes, only small flowers manage to grow.

Figure 24. David Benqué (2010), *Acoustic Botany: String nut and Bugs*. Available at http://www.davidbenque.com/projects/acoustic-botany (accessed 10 March 2011). String-nut and bugs engineered to chew in rhythm.

to a specific audience's perception of the temporal world around them. Once established these perceptions can be stretched or manipulated in precise and informed ways. These exist as plausible, tangible and accessible demonstrations, or more specifically hypothetical translations of disruptive technological innovations into the future products they could become. The key benefit of this approach is the removal of the commercial constraints that normally direct the creative process.[24] This decoupling allows for the goals to be based on questions and discourse rather than market-led agendas; hypothetical possibilities not real products; utopian concepts *and* dystopian counter-products. They can inspire an audience to think not only about what they *do* want for their future selves but also what they *do not* want.

Notes

[1] Critical design uses designed artefacts as an embodied critique or commentary on consumer culture. Both the designed artefact (and subsequent use) and the process of designing such an artefact cause reflection on existing values, mores and practices in a culture.
Critical Design uses speculative design proposals to challenge narrow assumptions, preconceptions and givens about the role products play in everyday life. It is more of an attitude than anything else, a position rather than a method. There are many people doing this who have never heard of the term critical design and who have their own way of describing what they do. Naming it Critical Design is simply a useful way of making this activity more visible and subject to discussion and debate. Its opposite is affirmative design: design that reinforces the status quo. (Dunne and Raby, 2007)

[2] Discursive Design refers to the creation of utilitarian objects whose primary purpose is to communicate ideas—they encourage discourse. These are tools for thinking; they raise awareness and perhaps understanding of substantive and often debatable issues of psychological, sociological, and ideological consequence. (Tharp and Tharp 2009)

[3] 'Philips Design Probes is a dedicated 'far-future' research initiative to track trends and developments that may ultimately evolve into mainstream issues that have a significant impact on business.
The probes generate insights from research in five main areas; politics; economic; culture; environments; and technology futures.
With the aim of understanding 'lifestyle' post-2020, the programme aims to identify probable systemic shifts in the social and economic domains likely to affect our business and create intellectual property in new areas. It challenges conventional ways of thinking to come up with concepts to stimulate debate. Deliverables range from scenarios and narratives to the creation of experience prototypes and IP fortressing.' (Philips n.d)

[4] 'The deliberate use of diegetic prototypes to suspend disbelief about change. That's the best definition we've come up with. The important word there is *diegetic*. It means you're thinking very seriously about potential objects and services and trying to get people to concentrate on those rather than entire worlds or political trends or geopolitical strategies. It's not a kind of fiction. It's a kind of design. It tells worlds rather than stories.' (Bosch 2012)

[5] Whilst these speculations might become feasible in the technological sense, they ignore the more intangible but nevertheless crucial reality of everyday life, such as insurance, licensing, legal liability, traffic control, resource issues, effect on urban planning, etc.

[6] For an excellent essay on the practice of counterfactual histories, see Bunzl (2004).

[7] For a thorough description of Alternate history, see Schmunk (n.d.).

[8] Some of the techniques are specific to either speculative futures or alternative presents, some work for both practices.

[9] A comparison could be drawn here with approaches in literature; for example, in Mary Shelley's Frankenstein (1818/1992) the scientific research of Luigi Galvani was used to inform the methods of Dr Frankenstein in giving life to the monster. This gave the novel a contemporary validity and believability.

[10] This notion borrows heavily from James J. Gibson's influential book *The Ecological Approach to Visual Perception*. Here Gibson stresses the value of moving out of the laboratory with regard to the study of natural vision and into the environment—the surroundings of those organisms that perceive and behave (Gibson 1986, 7).

[11] Wells had a first-class honours degree in biology from the Normal School of Science in London.

[12] Leon Festinger coined the term in his 1957 book, *A Theory of Cognitive Dissonance*. He described the experience as 'the feeling of psychological discomfort produced by the combined presence of two thoughts that do not follow from one another. Festinger proposed that the greater the discomfort, the greater the desire to reduce the dissonance of the two cognitive elements (Harmon-Jones and Mills 1999).

[13] A device that uses an electrochemical reaction to generate electricity from organic matter.

[14] One visitor was lingering for some time at one of the proposals. I walked over to speak to her; she turned to me with tears running down a red face. She told me that in life, her father behaved in exactly the same way as the father described in one of the texts and related perfectly to the proposed function of his specific afterlife battery.

[15] See for example, Bruce Sterling's, Schismatrix Plus and William Gibson's, Neuromancer.

[16] Around the same period Kevin Warwick of Reading University was generating publicity for his Cyborg 1.0 project. Exploring similar issues, Warwick had an RFID tag implanted in his arm enabling him to automatically unlock his office door and turn on lights. The question we ask is would one be willing to experience invasive surgery on a body part for such basic added functionality. See http://www.wired.com/wired/archive/8.02/warwick_pr.html.

[17] Source: http://www.nmauk.co.uk/nma/do/live/factsAndFigures?newspaperID=17.

[18] It is impossible to state exactly how many individuals have been exposed to the concept; however, it has been featured in news reports and magazines in Australia, Canada and Brazil. We have been interviewed on radio shows in the United States, the UK and New Zealand, and have received emails and letters from global locations. Slashdot, the technology-related new website, featured the concept, and at last viewing there were 437 comments (see http://slashdot.org/index2.pl?fhfilter=tooth+implant, accessed 16 November 2011).

[19] The whole correspondence ran to two pages of writing offering a detailed description of exactly how and why the Tooth Implant would cause immense social harm.

[20] See Prince Charles's article in the *Independent on Sunday* newspaper, 10 July 2004, describing the history of the 'grey goo' myth.

[21] Cryonics is the process of deep-freezing the human body after death in the hope that future technological developments will enable the repair of damaged cells and revival of the deceased. The technology usually prescribed for this future use is nanotechnology. Michael Jackson famously subscribed to cryogenics but missed the deadline due to the need for an autopsy.

[22] Contrary to all of the spectacular future speculations for nanotechnology, one of the most common contemporary applications is in the manufacture of golf balls.

[23] http://www.guardian.co.uk/uk/1999/feb/28/antonybarnett.theobserver2.

[24] Constraints still exist, of course; without them the design speculations could drift off into neverlands and dreamscapes; they then entertain but their engagement potential is nullified.

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