

Discursive skin: Entanglements of gender, discourse and technology

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Foreword

These are the first words you are reading of my dissertation. I typed them into an HP desktop computer running Windows Vista Business Edition. I'm listening to Swedish internet radio to improve my understanding of the language of the country I've moved to for the final stage of my PhD, whilst typing in English. My altered location has meant learning new things about which means of technology works best for conducting each of my relationships at this transitional point in my life – relationships through which I negotiate my gender, my sexuality, and the relationship between personal and intellectual. However, this is not just about the slow conversations (and easy misunderstandings) that can occur when conducting a relationship through email, the endless plane flights between countries or the sensory comfort of a loved one's voice mediated through the echoey connection of a Skype call. It's also about the narratives I am traversing *en route*. It is about the bodily and textual materiality of me and my dissertation, my own entanglements of gender, discourse and technology as well as those surrounding me.

The primary aim of this project was to investigate the relationship between gender, discourse and technology. The first part of the title ('discursive skin'¹) points to my engagement with materiality, and specifically how the three-way relationship of gender, discourse and technology shapes the material body. 'Skin' refers not only to the living tissue which is the largest organ of the body, but also to the permeable conceptual limits of the body. 'Skin' is both the interface between the human body and the world but also the adaptable interfaces that cover many technologies such as instant messaging clients or mobile phones. These different usages of 'skin' give it multiple, intersecting layers of meaning particularly relevant to this project and its concerns with how technologies are involved in contemporary negotiations of identity. The second part of the title, 'entanglements of gender, discourse and technology' was chosen because I wished to think about how the three strands (gender, discourse and technology) constitute one another simultaneously and equally.

¹ Thankyou to Jenny Sundén for suggesting this as the title during my final seminar.

Contemporary Western society is marked by a reliance on info- and bio-technologies, a claim already widely noted and discussed by commentaries from a range of fields. In the Introduction to *Mediatization: Concept, changes, consequences*, for example, Knut Lundby emphasises the integration of media technologies into everyday life, stating that ‘(t)he new media and communication technologies are everywhere’.² Meanwhile, Eugene Thacker writes in *The Global Genome: Biotechnology, Politics and Culture*³ about the convergence of info- and bio-technologies that is central to genetic research, and in the Introduction to *Bits of Life: Feminism at the Intersections of Media, Bioscience, and Technology*, Anneke Smelik and Nina Lykke employ the figuration ‘bits of life’ to encompass the varied technological reconfigurations of the body taking place across popular culture, the humanities and the sciences.⁴ These info- and bio- technologies, which have been the topic of much academic discussion,⁵ facilitate and shape everyday ways of working, communicating, playing, learning, forming relationships, shopping and earning for millions of people. These technologies are both the topic of conversation and the medium by which most of the conversations take place. These technologies appear to offer ways of re-presenting gendered bodies, but also function as the means by which data about bodies is captured, processed, shared, transferred, analysed.

My research for this dissertation started in 2003, when according to UK statistics, 50% of all households in Great Britain had internet access. By 2008, this figure had increased to

² (New York: Peter Lang, 2009), pp.1-18 (p.2).

³ (Cambridge, Mass. and London: The MIT Press, 2006).

⁴ (Seattle and London: University of Washington Press, 2008), pp.ix-xix (p.ix).

⁵ A sample of the range of research on this includes: Vandana Shiva and Ingunn Moser, eds., *Biopolitics: A Feminist and Ecological Reader on Biotechnology*, (London: Zed Books, 1995); Manuel Castells, *The Information Age: Economy, Society and Culture. Volume I: The Rise of the Network Society* (Oxford: Blackwell, 1996); David Bell and Barbara M. Kennedy, eds., *The Cybercultures Reader*, (London and New York: Routledge, 2000); Domna Pastourmatzi, ed., *Biotechnological and Medical Themes in Science Fiction* (Thessaloniki, Greece: University Studio Press, 2002); Jeff Hearn, ‘The implications of information and communication technologies for sexualities and sexualised violences: Contradictions of sexual citizenships’, *Political Geography*, 25 (2006), 944-963; Robbie Cooper, *Alter Ego: Avatars and Their Creators* (London: Chris Boot, 2007).

65% of all households.⁶ On average over 1 million households per year in Great Britain have connected to the Internet since 2004. This steady increase is indicative of the pervasiveness of information technologies in contemporary Western society, and is also reflected in fiction, film and media coverage of information technologies. Parallel to, and converging with this, there has been an increasing influence and visibility of biotechnologies.⁷ For example, 2003 also marked the formal completion of sequencing of the human genome and the successful launch of Humira, the first fully humanised monoclonal antibody therapy (more than 25 years after the technique to make monoclonal antibodies was pioneered by César Milstein and colleagues). These and other biotechnological advances have led to innovative treatments for many diseases, whilst playing an important role in the contemporary renegotiation of what counts as ‘natural’.⁸

Info- and bio- technologies have long been the subject matter of films and books. The increasing visibility and importance of these technologies in recent years has only contributed further to popular interest in them. Hopes and anxieties about innovative technologies have emerged in hugely varied forms, from tabloid headlines about ‘mutant’ genetically modified crops,⁹ to the remodelling and renovation of huge swathes of major cities in order to house the offices and homes of ‘dotcom’ millionaires,¹⁰ to the emergence of online worlds onto the world economy when the virtual nation Norrath

⁶ UK Office for National Statistics, ‘Internet Access 2008: Households and Individuals’, <<http://www.statistics.gov.uk/pdfdir/iah0808.pdf>> [Accessed 30 July 2009].

⁷ Vandana Shiva and Ingunn Moser, eds., *Biopolitics: A Feminist and Ecological Reader on Biotechnology*; Francis Fukuyama, *Our Posthuman Future: Consequences of the Biotechnology Revolution*. (New York: Farrar, Straus and Giroux, 2002); Eugene Thacker, ‘Data made flesh: Biotechnology and the discourse of the posthuman’, *Cultural Critique*, 53 (2003), 72-97; Paul Rabinow and Talia Dan-Cohen, *A Machine to make a future: Biotech chronicles* (Woodstock and Princeton: Princeton University Press, 2005).

⁸ Donna J. Haraway, *Modest_Witness@Second_Millennium. FemaleMan[®]_Meets_OncoMouse[™]. Feminism and Technoscience* (New York and London: Routledge, 1997); Sarah Franklin, Celia Lury and Jackie Stacey, *Global Nature, Global Culture* (London, Thousand Oaks, New Delhi: Sage, 2000).

⁹ Sean Poulter, ‘GM blunder contaminates Britain with mutant crops’, *Daily Mail*, 16 August 2002 <http://www.dailymail.co.uk/pages/live/articles/news/news.html?in_article_id=133672&in_page_id=1770> [Accessed 9 April 2007].

¹⁰ William J. Mitchell, *Me++: The Cyborg Self and the Networked City* (Cambridge, Mass. and London: The MIT Press, 2003).

(from the popular game *Everquest*) was named the 77th richest country in the world,¹¹ to popular novels such as Margaret Atwood's *Oryx and Crake*¹² which paint a dystopian vision of a world destroyed by biotech.

This dissertation is the product of both a cultural and professional immersion in an info- and bio- technologies-saturated society. For the majority of this project's duration, I was employed by a biotech company and my previous partner by a software company. Bio- and info-tech companies provided not just our monthly salaries and annual bonuses, but also tangible, daily access to innovative technologies. Working in public relations, my focus was very much on communicating information about novel biotechnologies to the public, the financial markets and doctors. I participated in and witnessed firsthand the powerful hybrid discourses of biotech and the very 'real' effects they have on bodies both human and nonhuman.

Simultaneously, my research into this dissertation was taking shape, drawing on texts which were then often dubbed the work of 'cyberfeminists'. Inspired by feminist responses to technoscience¹³ as varied as Donna Haraway's famous 'A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century',¹⁴ Sadie Plant's *Zeroes and Ones: Digital Women and the New Technoculture*¹⁵ and Anne Balsamo's *Technologies of the Gendered Body: Reading Cyborg Women*,¹⁶ this dissertation set out to explore a set of distinct case studies which foreground a

¹¹ Ben Hammersley, 'A Virtual Fortune', *Guardian*, 8 July 2005

<<http://www.guardian.co.uk/technology/2004/jul/08/games.shopping>> [Accessed 1 March 2010].

¹² (London: Bloomsbury Publishing, 2003).

¹³ 'Technoscience' is understood here as the socially, historically, politically enmeshed implosion of science and technology as outlined by Donna Haraway. Haraway develops Latour's original use of the term to conceive of technoscience as a 'generative matrix', one which in her reading is particularly concerned with the hybrid beings emerging from technoscientific practices at the border of the human and the nonhuman. See: Haraway, *Modest_Witness*, p.50.

¹⁴ in *Simians, Cyborgs and Women: The Reinvention of Nature* (London: Free Association Books, 1991), pp.149-181.

¹⁵ (London: Fourth Estate, 1997).

¹⁶ (Durham and London: Duke University Press, 1996).

relationship central to feminist responses to technoscience: that between gender, discourse and technology.

My choice of the relationship between gender, discourse and technology as a focal point is personal, public and political. The socio-historical context for the writing of this dissertation is/was a world dependent upon technology, a poststructuralist period in theory dominated by the linguistic turn, and an explosive meeting point where interactions between gender and technology have been the focus of both academic and popular writings. Gender, discourse and technology are my own defining strands, but they are also the defining strands of millions of other people. For this reason, and in light of the increasing pervasiveness of these technologies, it remains important to continue to develop detailed analyses of the relationship between discourse and technology, and other power dynamics such as gender.

Section 1: Aim and research questions

This dissertation examines the relationship of gender, discourse and technology in three case studies: cyberpunk fiction, (in)fertility weblogs¹⁷ and biotech nomenclature.¹⁸ I engage with wider theoretical debates to suggest how the relationship between gender, discourse and technology is central to feminist cultural studies of technoscience.¹⁹ In particular, this dissertation seeks to root the theoretical connections between gender, discourse and technology in material bodies, as they are played out in the three case studies. Furthermore, it is concerned with examining how the borders of viable, gendered bodies are constructed in each distinct case study, in an attempt to reveal the limitations of these constructions. I argue that revealing these limitations by situating these particular materialisations opens up the possibility of talking about other genders and other bodies. This dissertation seeks to reveal the situatedness of contemporary understandings of gender, discourse and technology in order to see more clearly the power dynamics in play, and to make visible those excluded bodies whose experiences are not voiced in current constellations. The two questions on which this study focuses, and which will be delineated further over the course of this opening section, are:

¹⁷ During the course of my research, some of the bloggers with whom I corresponded had successful pregnancies and now write about raising their children. Others decided to adopt children. For this reason, I refer to the blogs I have followed as (in)fertility blogs.

¹⁸ For clarity, I distinguish between the industry itself (which I refer to as ‘biotech’) and the products of it (which I refer to as ‘biotechnologies’). This does not in any way assume that biotech/biotechnologies are neatly bounded categories in themselves, for, as Eugene Thacker notes: ‘The very concept of a biotechnology is thus fraught with internal tensions. On the one hand, the products and techniques of biotech are more “tech” than “bio”; biology is harnessed from its natural state and utilized in a range of industrial and medical applications. On the other hand, there is no “tech”, only “bio”; the unique character of the technology is that it is fully biological, composed of the workings of genes, proteins, cells, and tissues (...) The advantage claimed for biotechnology is that it is more natural, a direct working with “life itself”’ (*The Global Genome*, p.xix).

¹⁹ Sarah Franklin, *Embodied Progress: A Cultural Account of Assisted Conception* (London and New York: Routledge, 1997); Mette Bryld and Nina Lykke, eds., *Cosmodolphins: Feminist Cultural Studies of Technology, Animals and the Sacred* (London: Zed Books, 2000); Malin Sveningsson Elm and Jenny Sundén., eds., *Cyberfeminism in Northern Lights: Digital Media and Gender in a Nordic Context* (Newcastle-upon-Tyne: Cambridge Scholars, 2007).

1. What is the relationship between gender, discourse and technology as it materialises in each case study?
2. How are the limits of regulatory norms governing bodies constructed in these distinct spaces, and to what extent (if at all) are these norms breached?

Working with a variety of sources this dissertation engages with the fields of feminist technoscience and cultural studies, crossing disciplinary borders²⁰ to encompass the scientific and the symbolic,²¹ the material and the discursive,²² the factual and the fictional.²³ The three case studies selected are not only representative of the variety of contemporary negotiations between gender, discourse and technology, but they also cross genre and disciplinary borders in their styles, content and formats. Finally, as an interdisciplinary, literary scholar, my readings of cyberpunk fiction, (in)fertility blogs and biotech nomenclature all have some connection to literature and literary language. This emerges in a variety of ways, whether as a distinctive sub genre of popular fiction (cyberpunk), a remediated incarnation of a well-established literary genre such as autobiography (blogs) or the use of a novel as a conversation partner to official documents (biotech nomenclature).

Outline and aims of the dissertation

This dissertation consists of four articles and a kappa. The first three articles analyse the relationship between gender, discourse and technology as it materialises in the three case studies of cyberpunk fiction, (in)fertility blogs and biotech nomenclature, respectively. The fourth article develops a theoretical tool for examining the construction of the border between sense and nonsense, viable and unviable bodily norms in technoscience through a synthesis of the abject and white noise.

²⁰ See Chapter 2 of Nina Lykke, *Feminist Studies. A Guide to Intersectional Theory, Methodology and Writing* (New York: Routledge, 2010).

²¹ Dorothy Nelkin and M. Susan Lindee, *The DNA Mystique: the gene as cultural icon* (New York: W.H. Freeman, 1995).

²² Judith Butler, *Bodies That Matter: On the discursive limits of "sex"* (New York and London: Routledge, 1993) and Karen Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning* (Durham and London: Duke University Press, 2007).

²³ Donna J. Haraway, *Primate Visions: Gender, Race, and Nature in the World of Modern Science* (London and New York: Routledge, 1989).

The premise from which this study starts is that gender, discourse and technology play a central role in shaping contemporary identities.²⁴ This study takes seriously the effects of the intra-action²⁵ between gender, discourse and technology in shaping bodies and lived realities, whether determining which images permeate popular culture, whose stories are heard or which medical options are considered relevant for whom.

The study uses three case studies to develop an understanding of the relationship between gender, discourse and technology. It then extends this enquiry to examine how bodily norms are constructed (and possibly challenged) in each of these cases. By placing the different case studies alongside one another this study aims to make clearer the differences in construction of these norms and thus reveal ‘cracks’ which might facilitate expression or revaluation of that which is beyond the norms.

This introductory chapter is intended to provide broader contextual information for the four articles, and is divided into four sections. In this section I present the case studies and refine the research questions in more detail. The next section is concerned with the analytical frameworks. Section Three discusses method and methodology. The final section provides a summary of the articles and a discussion of their findings.

²⁴ Richard Doyle, ‘Vital Language’, in *Are Genes Us? The Social Consequences of the New Genetics*, ed. by Carl F. Cranor (New Brunswick: Rutgers University Press, 1994), p.52-68; Nina Lykke and Rosi Braidotti, eds., *Between Monsters, Goddesses and Cyborgs: Feminist Confrontations with Science, Medicine and Cyberspace* (London: Zed Books, 1996); Jenny Sundén, *Material Virtualities: Approaching Online Textual Embodiment* (Linköping University Studies in Arts and Science: 2002); Janne Bromseth, *Genre Trouble and the Body that Mattered: Negotiations of gender, sexuality and identity in a Scandinavian mailing list community for lesbian and bisexual women* (Norwegian University of Science and Technology: 2006); Lotte Nyboe, ‘Identity, aesthetics and digital narration’, in *Mediatization: Concept, Changes, Consequences*, ed. by Knut Lundby (New York: Peter Lang, 2009), pp.161-176.

²⁵ Here I am borrowing from Karen Barad who coined this term, defining it as follows: ‘The neologism “intra-action” signifies the mutual constitution of entangled agencies. That is, in contrast to the usual “interaction,” which assumes that there are separate individual agencies that precede their interaction, the notion of intra-action recognizes that distinct agencies do not precede but rather emerge through, their intra-action’ (taken from: *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*, p.33). I find ‘intra-action’ a useful neologism when handling gender, discourse and technology as this view focuses on the dialogue between them and resists any linear causal relationship.

Choice and presentation of case studies

In order to make analysing the relationship between gender, discourse and technology (and the construction of the related bodily norms) more manageable, I carried out three different case studies. The three case studies are: cyberpunk fiction, (in)fertility weblogs and biotech nomenclature. Selecting three different case studies not only demonstrates the workings of the relationship in different ways, but also provides a way of working through its complexity. The way in which the relationship between gender, discourse and technology materialises is very different in different contexts. The relationship itself is complex and shifting, but using distinct case studies makes analysis manageable by narrowing the field of enquiry. These three case studies provide different, but complementary examples of the relationship.

On first glance, these case studies are very different, looking at very different technologies, taking very different forms. However, all three demonstrate how the relationship of gender, discourse and technology materialises in each of their specific contexts. Collectively, they show the broad relevance of this relationship in contemporary society, and the way in which its flexibility is key to its prolific nature. All of the case studies also engage with the permeable boundary between science fact and science fiction that underlies contemporary understandings of technology.²⁶

The similarities between the case studies connect them and allow overall conclusions to be drawn in response to the two main research questions, while the differences provide a multi-faceted perspective on the relationship between gender, discourse and technology. It is also these differences that make visible the different ways in which regulatory norms governing bodies are constructed, and therefore, how their authoritative ‘naturalness’ might be called into question. In the following paragraphs, I introduce each study and explain the reasons for its inclusion in the study.

²⁶ See for example, Donna Haraway writing in *Modest_Witness*: ‘On either side is a lie – on the one hand, the official discourses of technoscience and its apologists; on the other hand, the fictions of conspiracy fabricated by all those labeled ‘outsider’ to scientific rationality and its marvelous projects, magical messages, and very conventional stories. In the end, the joke is on us. Inside and outside are lies. The edge is all there is.’ (p.154).

Cyberpunk

At heart I am a geek, fascinated by new technologies both real and imagined. It is no surprise then that in both my undergraduate and Masters training as a literature scholar I was always drawn to science fiction. However, the genre which foregrounds most strikingly innovative new technologies is cyberpunk, and my attention was inevitably drawn to this when considering case studies for this project. The material used in the case study is a novel called *Snow Crash*, by Neal Stephenson,²⁷ and a short story by Candas Jane Dorsey, titled '(Learning About) Machine Sex'.²⁸ Close reading of these two texts was supplemented by broader reading within the genres of science fiction and cyberpunk.

Cyberpunk is a sub-genre of science fiction concerned with futuristic technologies and characterised by a distinctively hyperbolic style of writing which is very pro-technology. Science fiction has traditionally been an arena in which hopes and anxieties about new technologies, species and places have been addressed, whether in H.G. Wells' 1903 story 'The Land Ironclads'²⁹ which imagined tanks long before they became a reality, or Walter M. Miller Jr's 1953 story of the human colonisation of Mars.³⁰ Cyberpunk marks a particular point in the history of science fiction when the notion of what is now known as the Internet was entering popular consciousness.

The genre of cyberpunk is generally considered to have emerged in the early 1980s, with the best-known example, *Neuromancer* by William Gibson, published in 1984.³¹ The first 'generation' of cyberpunk authors (for example, Gibson, Rudy Rucker,³² Bruce Sterling³³) produced texts which often speculated on and imagined life online, although long before the Internet was widely available or personal computers a popular feature in the home. More recent cyberpunk has reflected contemporary anxieties about

²⁷ *Snow Crash* (New York: Bantam, 1992)

²⁸ As it appears in *Machine Sex and Other Stories* (London: The Women's Press, 1990), pp.76-97.

²⁹ In *The Oxford Book of Science Fiction Stories*, ed. by Tom Shippey (Oxford: Oxford University Press, 1993), pp.1-21.

³⁰ 'Crucifixus Etiam', in *The Oxford Book of Science Fiction Stories*, ed. by Tom Shippey (Oxford: Oxford University Press, 1993), p.228-246.

³¹ (London: Voyager, 1995).

³² See the Ware trilogy, for example.

³³ See *Zeitgeist*, for example.

biotechnologies or globalisation (recent novels by Neal Stephenson,³⁴ Greg Bear³⁵ and Greg Egan,³⁶ for example, all deal with these topics). This subgenre occupies the position then of being able to reflect upon contemporary technologies whilst imagining future ones.

As the list of authors above suggests, cyberpunk authors have been predominantly men. Earlier cyberpunk work in particular has been critiqued for reproducing a number of reductive gender stereotypes in the representation of its characters. Wendy Wahl and June Deery, for example, have commented on the man/mind versus woman/body binary in Gibson's work and the 'macho' discourse he employs.³⁷ This is not to say, however, that the field is devoid of authors whose work offers more challenging or complex ideas about gender and species boundaries.³⁸ In fact, one of the most striking features of cyberpunk fiction in general is its exploration of shifting boundaries and the anxieties they produce. This encompasses all three boundary crossings identified by Donna Haraway in 'A Cyborg Manifesto': species boundaries,³⁹ organism-machine boundaries⁴⁰ and physical-non physical boundaries.⁴¹

The boundary confusions seen in cyberpunk fiction encompass not only bodies and species, but also extend into the discourses of the genre. Writing in *The Jewel-Hinged Jaw: Notes on the Language of Science Fiction*, Samuel Delany comments on the

³⁴ *Snow Crash, or The Diamond Age: Or, a Young Lady's Illustrated Primer* (New York: Bantam Dell, 1995).

³⁵ *Blood Music* (London: Gollancz, 2001).

³⁶ *Luminous* (London: Millenium, 1999).

³⁷ See Wendy Wahl, 'Bodies and Technologies: *Dora*, *Neuromancer*, and Strategies of Resistance', *Postmodern Culture*, 3 (1993) <http://muse.uq.edu.au/journals/postmodern_culture/v003/3.2wahl.html> [Accessed 28 April 2008]; June Deery, 'The Biopolitics of Cyberspace: Piercy Hacks Gibson', in *Future Females, The Next Generation: New Voices and Velocities in Feminist Science Fiction Criticism*, ed. by Marleen S. Barr (Lanham, Boulder, New York and Oxford: Rowman & Littlefield, 2000), pp.87-108.

³⁸ For example, Marge Piercy's well-known novel, *He, She and It* (New York: Fawcett Books, 1991), or Pat Cadigan's *Synners* (London: Grafton, 1991).

³⁹ For example, Octavia Butler's Xenogenesis trilogy, the first of which is *Dawn* (New York: Warner Books, 1987).

⁴⁰ For example, Justina Robson's *Mappa Mundi* (London Macmillan, 2001).

⁴¹ For example, Greg Bear's *Blood Music*.

innovative language of science fiction authors,⁴² whose work blends scientific discourse with flavours of action-adventure narratives, coining neologisms to emphasise the alienness of the worlds and the technologies portrayed ('cyberspace' is perhaps the best-known of these, originally coined by Gibson). Cyberpunk fiction too is notable for this 'blending', resulting in a distinctive style that combines technophilic rhetoric with the anti-establishment slang of punk. This hybrid discourse is also often heavily sexualised, bringing into play questions of desire in the context of human-machine interactions.

This technosexualisation is brought into clear relief in one of the texts I used for this particular case study: '(Learning About) Machine Sex' by Candace Jane Dorsey. This short story is remarkable for its time, published just a few years after *Neuromancer* but avoiding many of the criticisms levelled at Gibson and others of his generation. This text offers a feminist parody of the work of the 'mirrorshades'⁴³ group, focusing on a central character who is a radical punk woman programmer called Angel. Unlike female characters in other cyberpunk texts published in the mid to late 1980s, Angel is not a technologically enhanced desirable woman, instead she is described as 'a sweaty-smelling, disheveled, anorectic-looking waif'.⁴⁴ Angel's appearance and attitude appealed to me because she is so different to other female characters in cyberpunk. Angel's refusal to play by society's rules is also echoed in Dorsey's own parodic prose style and narrative structure, which is fragmented and circular. '(Learning About) Machine Sex' breaks with the action-adventure model common to much cyberpunk and deliberately avoids technophilic prose. Its apparent difference from other texts published at the same time, together with its clearly advertised interest in issues of gender, discourse and technology made it the ideal candidate for inclusion in this study.

⁴² (New York: Dragon Press, 1977).

⁴³ This is the name often given to Gibson, Sterling, Rucker and other male cyberpunk writers publishing in the 1980s. Larry McCaffery writing in *Storming the Reality Studio: A Casebook of Cyberpunk and Postmodern Fiction*, says, 'Decked out in mirrorshades and leather jackets, the cyberpunks projected an image of confrontational "reality hacker" artists who were armed, dangerous, and jacked into (but not under the thumb of) the Now and the New.' See: 'Introduction: The Desert of the Real', in *Storming the Reality Studio: A Casebook of Cyberpunk and Postmodern Fiction* ed. by Larry McCaffery (Durham and London: Duke University Press, 1991), pp.1-16 (p.13).

⁴⁴ Dorsey, p.81.

If, following Rosi Braidotti, '(f)igurations are not figurative ways of thinking, but rather more materialistic mappings of situated, or embedded and embodied, positions,'⁴⁵ then Angel is not simply a metaphor for the anarchic potential of cyberpunk, but rather her own difficult relationship with her body reflects and amplifies her own challenged position as a woman programmer in a male dominated industry, as a rebel in a corporate situation, as a woman beaten by the man who is both her lover and boss. There are multiple strands to Angel's identity and multiple, intersecting ways in which she is dominated. Her own discomfort with these restrictive frameworks emerges onto her own skin and body. Angel puts the dirt back into being cool, she points out the unreal, glossy surface of cyberpunk figures by showing the reverse side of the coin – exploitation, sexism, corporatisation. The point made here is that living outside the system (as advertised by cyberpunk cowboys) is not as sexy or cool as it appears to be.

The other text analysed for this case study is a novel called *Snow Crash* by Neal Stephenson. Published in 1992, this novel appears as a development of the original cyberpunk fiction in terms of both the themes it addresses (for example, *Snow Crash* deals with issues such as biotechnologies, globalisation and religious fundamentalism), the world it portrays (a recognisable, near-future 'America') and a more world-weary style that significantly moderates the hyper-technophilia of earlier cyberpunk. All of these differences when compared with earlier cyberpunk fiction position this text as closer to contemporary society and give it an urgency which is perhaps missing from the hyper-futuristic settings of texts such as *Neuromancer*. This text also differs in that it has two main characters, a computer hacker called Hiro Protagonist and a skateboard courier called Y.T.. The dual perspective provided by having two main characters (one man and one woman) creates a more complicated trajectory to the story and goes some way towards avoiding the dominant male gaze which resulted in lurid descriptions of female characters in earlier cyberpunk.

⁴⁵ *Metamorphoses: Towards a Materialist Theory of Becoming* (Cambridge and Malden, MA: Polity Press, 2002), p.2.

As a number of critics have noted, both cyberpunk and its 'parent' genre, science fiction, show an interest in innovative style and language.⁴⁶ The distinctive discourses of punk and technophilia combine to produce the fast-paced, popular style of cyberpunk (also seen in many of its commentaries), which relies heavily on neologisms to create a futuristic feel in the narrative. Cyberpunk mixes up the technophilia of cyberculture with the anti-establishment attitude of punk, resulting in a number of recognisable characteristics in its texts, including 'hybrid' identities, dystopian futures, and a focus on technology. This focus often upsets any easy distinction between human and machine, while its alternative (cyborgian) identities perhaps offer new paradigms for thinking about gender.⁴⁷ The two texts by Dorsey and Stephenson appear to depart from the cyberpunk fiction produced by Gibson, Rucker, Sterling and others in important ways for considering the relationship between gender, discourse and technology.

In exploring the relationship between gender, discourse and technology I have found it helpful not to respect disciplinary borders in considering what constitutes 'reliable' results. That is to say, I do not consider that the relationship between gender, discourse and technology as it appears in fiction is any less useful than as it appears in 'factual' narratives when exploring this relationship. Rather, the more different perspectives that can be taken on this relationship, the richer the understanding. With its advertised interest in technology, and a well-documented predisposition for eye-catching language use amongst authors in this subgenre, cyberpunk presents itself as an excellent candidate for

⁴⁶ See for example, Scott Bukatman, *Terminal Identity: The Virtual Subject in Postmodern Science Fiction* (Durham and London: Duke University Press, 1993); Nickianne Moody, 'Aphasia and Mother Tongue: Themes of Language Creation and Silence in Women's Science Fiction' in *Speaking Science Fiction: Dialogues and Interpretations*, ed. by Andy Sawyer and David Seed (Liverpool: Liverpool University Press, 2000), pp.179-187; Veronica Hollinger, "'A Language of the Future": Discursive Constructions of the Subject in *A Clockwork Orange* and *Random Acts of Senseless Violence*' in *Speaking Science Fiction: Dialogues and Interpretations*, ed. by Andy Sawyer and David Seed (Liverpool: Liverpool University Press, 2000), pp.82-95; Brian Attebery, "'But Aren't Those Just...You Know, Metaphors?'" Postmodern Figuration in the Science Fiction of James Morrow and Gwyneth Jones', in *Edging into the Future: Science Fiction and Contemporary Cultural Transformation* ed. by Veronica Hollinger and Joan Gordon (Philadelphia: University of Pennsylvania Press, 2002), pp.90-107.

⁴⁷ For example, Donna Haraway suggests that '(t)he cyborgs populating feminist science fiction make very problematic the statuses of man or woman, human, artefact, member of a race, individual entity or body', in 'A Cyborg Manifesto', p.178.

examining this relationship. The texts under discussion here offer a certain distance from the original cyberpunk texts, and suggest a greater complexity or subtlety in their treatment of the relationship between gender, discourse and technology.

Weblogs

'Blog' is the abbreviated form of 'weblog', an online journal that can be viewed by anyone using the Internet.⁴⁸ Authors of these journals are referred to as 'bloggers' and the activity is 'blogging'. Anyone with an Internet connection can set up her or his own blog by registering at a site such as www.blogger.com. 'Wiki' was the term originally used for a collaborative blog, although many blogs now offer a more interactive approach through use of comments and connections to other blogs or websites. Connecting together a number of blogs through links creates a 'blogring' and is also known as 'blogrolling'.

I did the initial research and writing for this chapter in late 2003 – nearly ten years after the first blog is considered to have been started. Even then, the format had still not been widely used or discussed. In 2004, however, blogs made the front cover of *New York Times Magazine*, indicating their entry into popular culture, a move which has inevitably spawned a huge range of critical and popular responses.⁴⁹ As technology becomes increasingly integrated into everyday life, spaces such as blogs provide places where different discourses and ideas come together in a user-friendly package.

⁴⁸ The earliest blog is unofficially considered to have been started in 1994, with the name 'weblog' being coined in 1997. Wikipedia provides a good history of blogs, as do various other personal websites, for example *Rebecca's Pocket* <http://www.rebeccablood.net/essays/weblog_history.html> [Accessed 21 May 2008]. *The Oxford Dictionary of English* defines a 'weblog' as follows: 'a personal website on which an individual records opinions, links to other sites, etc. on a regular basis'. From: *The Oxford Dictionary of English* (revised edition) ed. by Catherine Soanes and Angus Stevenson (Oxford: Oxford University Press, 2005) in *Oxford Reference Online* <<http://www.oxfordreference.com/views/ENTRY.html?subview=Main&entry=t140.e87597>> [Accessed 29 May 2008].

⁴⁹ Laurie McNeill, 'Teaching an old genre new tricks: the diary on the Internet', *Biography*, 26 (2003), 24-47; Susan C. Herring, Lois Ann Scheidt, Elijah Wright and Sabrina Bonus, 'Weblogs as a bridging genre', *Information, Technology & People*, 18 (2005), 142-171; Jill Walker Rettberg, 'Blogs, Literacies and the Collapse of Private and Public', *Leonardo Electronic Almanac*, 16 (2008), 1-10; Anne Scott Sørensen, 'Social media and personal blogging: Textures, routes and patterns', *MedieKultur*, 47 (2009), 66-78.

Blogs are now written on almost every conceivable topic, and have been the subject of much research. Their heritage as part of the journal or diary keeping tradition marks them as descendants of the genres of autobiography or memoir, whilst their user-friendly interactive space has made them of interest to educators and pedagogy researchers, while corporations often use their personal voice and accessible format as a means of ‘soft’ marketing⁵⁰ to potential or existing customers. Now highly visible and well-used by a cross-section of society, they sit at the intersection of popular culture and a number of other fields. The role of blogs as the latest generation of autobiographical writing connect them to my literary interest in the autobiography genre, with particular reference to the ways in which this format negotiates the traditionally gendered divide between private and public. The accessibility and visibility of blogs also links productively with work done in cultural studies about the production of meaning in popular culture and everyday life.

There remain a large number of purely personal, or autobiographical, blogs on the internet. These are often characterised by the lack of context provided by the blogger to explain any aspect of what s/he writes, demonstrating the blogger’s assumption that readers will have ‘local’ knowledge. As such, these blogs display little sense of a wider audience, and are very much in keeping with any other journal or diary. However, even autobiographical blogs have evolved, due in part to a growing awareness of the consequences of making public personal opinions or information. Cases of employees, for example, who have been dismissed after posting negative comments about their employer on their blog have been covered in the press.⁵¹ The increasingly active role played by readers who are now able to post comments in response to entries has also contributed to the evolving blog style. For example, these changes in use have resulted in some bloggers being more cautious in using their real names. This entanglement of ‘public’ space and

⁵⁰ ‘Soft’ marketing is an indirect way of attracting customers that avoids traditional advertising methods such as billboard or television advertisement. Instead, the product or service is marketed through careful product placement. A good example would be Coca-Cola cups being used by judges on popular television programmes. The cups are visible to the viewers and audience, but the brand is never explicitly mentioned. This more subtle form of advertising has become increasingly popular in advertisement-saturated societies where resistance to explicitly advertised products and services is high.

⁵¹ Kate Hilpern, ‘Blog busters’, *Guardian*, 10 April 2006

<<http://jobsadvice.guardian.co.uk/officehours/story/0,,1750352,00.html>> [Accessed 20 Oct 2006].

‘private’ narratives clearly exemplifies the potential of blogs to make visible previously unseen stories and bodies.

The format of blogs has played a significant role in creating an environment in which issues such as the blurred boundary between a perceived separation of private and public lives, or the development of a publicly negotiated personal identity come to the fore. The blogger is able to remain anonymous if s/he wishes, which both acts as a form of protection and removes responsibility. Furthermore, the medium’s dependence on text appears to dislocate/distance the physical body and remove the need for visual cues. This creates a space in which bloggers feel less restricted as to what they say, demonstrated by both the intimate content and informal style of many personal blogs, which at times can be seen to challenge boundaries in surprising and liberating ways, including through the presentation and experience of gender.

I explored a particular subgroup of personal blogs: (in)fertility blogs, which represent a distinctive subgenre in which women write about their experiences of trying to conceive, undergoing fertility treatments, adoption and pregnancy. I draw on questionnaires completed by a small group of these bloggers, together with extracts from their blogs and extended conversations conducted via email following return of the questionnaire.

(In)fertility blogs are an extremely interesting example of the relationship between gender, discourse and technology. Here the technology of the blog offers a way for isolated women going through similar experiences to share their stories, and offer one another support. This contact would not be possible without the blog. As noted above, the blog can be seen as the descendant of a number of heritages. Particularly relevant here is its connection to autobiographical or memoir writing. The theme of these blogs, or the bloggers primary reason for writing – infertility – is part of a heritage which has rendered women’s bodies the passive vehicles for medical intervention, and which has resulted in a situation where women’s stories of pregnancy and childbirth appear only in certain, highly regulated spaces. Cynthia Huff, for example, writing in ‘Sexual Silencing: Anesthetizing Women’s Voices in Childbirth 1910-1960’, cites as an example, the versions of births which appear in hospital manuals where ‘birth narratives support the

medical view of birth'.⁵² These blogs make public narratives which have traditionally been visible only in private or in medical spaces, with inevitable consequences for the gendering of these stories.

Writing a blog about these experiences, however, is not as simple as making visible previously less-seen narratives. Telling these very particular stories in a very distinctive space often includes incorporating significant detail about the medical treatments and technologies involved, thus producing a fascinating hybrid discourse which weaves together personal story and medical procedure.

Biotech

Between January 2004 and November 2008 I worked in the Communications department of a UK biotech company which develops novel anti-cancer therapies. My role there involved a range of activities including presentation of clinical data at scientific congresses, investor relations and corporate branding, and provided me with valuable insights into the internal workings of the biotech industry which resulted in this third case study. Given the wealth of practical experience and knowledge of the industry that I gained, biotech presented itself as a good topic for inclusion very early on in my research. Furthermore, with its connections to debates on technology and women's health,⁵³ feminist Science and Technology Studies (STS),⁵⁴ critical approaches to illness narratives⁵⁵ and images of hybridity in popular culture or fictional writings, biotech is an

⁵² As it appears in *Bodily Discursions: Genders, Representations, Technologies*, ed. by Deborah S. Wilson and Christina Maneera Laennec (Albany: State University of New York Press, 1997), pp.135-148 (p.138).

⁵³ For example, Paula A. Treichler, Lisa Cartwright and Constance Penley, eds., *The Visible Woman: Imaging Technologies, Gender and Science* (New York and London: New York University Press, 1998); Janine Marchessault and Kim Sawchuck, eds., *Wild Science: Reading Feminism, Medicine and the Media* (London and New York: Routledge, 2000).

⁵⁴ See, for example, Donna J. Haraway, 'Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective' in *Simians, Cyborgs and Women: The Reinvention of Nature* (London: Free Association Books, 1991), pp.183-201; Donna J. Haraway, *Modest_Witness*; Sarah Franklin, 'The Cyborg Embryo: Our Path to Transbiology', *Theory Culture Society*, 23 (2006), 167-187.

⁵⁵ Jackie Stacey, *Teratologies: A Cultural Study of Cancer* (London and New York: Routledge, 1997); Lisa Diedrich, *Treatments: Language, Politics, and the Culture of Illness* (Minneapolis: University of Minnesota Press, 2007).

excellent and very rich example of an entanglement of gender, discourse and technology. Perhaps unsurprisingly then, and given the increasing prominence of discourses drawn from the life sciences in both popular media and critical writings,⁵⁶ this proved to be one of the most fruitful case studies, and the largest of the three. For this reason, the material gathered from this case study appears in two of the four articles which follow.

Within the field of biotech, this study was narrowed down to the area of nomenclature and specifically the naming of new biotechnologies. Here my analysis takes inspiration from important commentaries on women's health such as Treichler, Cartwright and Penley's book *The Visible Woman: Imaging Technologies, Gender, and Science*. In this collection, the contributors suggest how new scientific (imaging) technologies simultaneously provide more information about the body and redefine networks of power, whilst also being the site of a power struggle for control of these new technologies. New biotechnologies change not only our idea of what constitutes 'medicine', but also where the boundary between disease and health is situated, questions with immediate relevance to women's health issues. This study looks at the ways in which networks of power are redefined and reproduced through the naming process.

During its development a new drug will have many different names. It will usually be assigned a code number during preclinical development when it is still being tested in the lab. When the drug enters clinical trials in humans, and becomes 'visible' to a new, wider audience including doctors and patients, it will be assigned a new name/number. If successful, the drug will be allocated a further two names during its development process – an International Nonproprietary Name (also known as the 'generic' name) and a brand name. This list of names may grow if the product is developed in partnership with another company or is acquired. The names held by a drug during its development reflect the stage of development, the mode of action, the structure of the molecule, the company, or the family

⁵⁶ See for example, Donna Haraway's writings on OncoMouse in *Modest_Witness*, Eugene Thacker on the convergence of biology and information technology in *The Global Genome*, Sarah Franklin's work on Dolly the Sheep in *Dolly Mixtures: The Remaking of Genealogy* (Durham and London: Duke University Press, 2007), or coverage in *Wired* magazine on investment in stem cell research such as David Jensen's article, 'California Snags Another Half Billion for Stem Cell Labs', 29 February 2008 <http://www.wired.com/medtech/stemcells/news/2008/02/stemcell_labs> [Accessed 24 July 2008].

of medicines to which that particular product belongs. Biotechnologies pose new challenges to the existing nomenclature schema due to their innovative mechanism of action or hybrid constitution.

Both commercially and in terms of healthcare the impact of naming cannot be underestimated. Every time a name is used publicly it is further validated and enters a complex system of peer review and cross-referencing by other scientists. The citing of publications about the drug causes its name to become better known within the scientific community and locates it in relation to other drugs. This is particularly important when the drug is still in trials and is therefore not a fully realised, and marketed, medicine. The power of this process should not be underestimated, as Bruno Latour highlights in *Science in Action: How to follow scientists and engineers through society*:

The presence or the absence of references, quotations and footnotes is so much a sign that a document is serious or not that you can transform a fact into fiction or a fiction into fact just by adding or subtracting references.⁵⁷

The material used here is a novel by Margaret Atwood about biotech called *Oryx and Crake* and regulatory documents from the World Health Organisation (WHO) concerning the assignment of International Nonproprietary Names (INN) to biotechnologies.⁵⁸ Using ‘fictional’ and ‘factual’ materials on biotech as conversation partners helps to reveal the implications of the distinctive discourses of this field, whilst reintroducing gendered bodies into scientific narratives. It is also a nod to the arbitrary nature of the boundary drawn between science ‘fiction’ and science ‘fact’, which is deconstructed by the highly convincing – albeit futuristic - narrative of Atwood. These materials are supplemented by material from four interviews I conducted in Spring 2007 with women associated with the UK biotech industry, and who have an active interest in the position of women within this field.

⁵⁷ (Cambridge, Mass.: Harvard University Press, 1987), p33.

⁵⁸ World Health Organisation, *International Nonproprietary Names (INN) for Biological and Biotechnological Substances: A Review*, November 2007

<http://www.who.int/medicines/services/inn/CompleteBioRevdoc%2008-11-07_2_.pdf> [Accessed 30 July 2009].

Biotech draws on many different practices and discourses. Many of these are specialist discourses: for example those associated specifically with clinical trials, and also regulatory, ethical, and financial discourses, together with the highly technical narratives related to the technologies used in the lab to discover new products. It is, therefore, no surprise that this industry regularly spawns new vocabulary to name new biotechnologies, new drugs, new mechanisms of action for drugs, and new aspects of the development process. Through a close-up on INN, this study traces the impact of this particular regulatory process on bodies. Innovative biotechnologies which make contributions to understandings of the ways in which the human body works pose new challenges to received wisdom on the workings of the human body. As bodies are always, already gendered, it is important to consider how these new understandings fuelled by biotechnologies intersect with gendered bodies. If what we can know or experience about our bodies is limited by – the albeit shifting boundary of – discourse, then the discursive renegotiation of existing definitions or categorisations (of diseases, treatments or bodies) caused by biotechnologies will inevitably shift understandings of the gendered body.

Refining the research questions

The two questions on which this study is based are deliberately broad so as to encompass the different contexts of the case studies, and function as red threads through the dissertation. In this section, I will refine these and delineate the limits of this project. I would like to begin this process by supplementing my original questions as follows:

1. What is the relationship between gender, discourse and technology as it materialises in contemporary case studies of info- and bio-tech convergences?
2. As these convergences prompt renegotiations of bodily norms, how are the limits of regulatory norms governing bodies constructed in my case studies, and to what extent (if at all) are these limits breached?

Why gender, discourse and technology? What is the relationship between the three?

As I noted in the Foreword, the choice of gender, discourse and technology is a personal choice, and also a reflection of contemporary interests both in popular and academic research cultures. There is a rich seam of texts available which are concerned with the co-

construction of gender and technology,⁵⁹ as well as a wide range of texts on gender and discourse.⁶⁰ There are also texts which deal with the causal effects of technology on gender and language use.⁶¹ This study aims to build on this existing body of work and contribute to a more interactive way of thinking about the relationship between gender, discourse and technology. In particular, the aim of this project was to avoid thinking of gender, discourse and technology as being in a causal relationship where, for example, changes to technology → changes to understandings/performance of gender. Instead, the aim here is to think through in detail the relationship between gender, discourse and technology in a less causal and more co-constitutive way, a more ‘messy’ entanglement between the three strands. To do this, I want to start by outlining the understandings of gender, discourse and technology which were the departure points for this study, and which will be elaborated throughout the kappa.

This dissertation uses a definition of ‘technology’ that spans, in the case studies alone, virtual worlds, high-spec skateboards, weblogs, and targeted antibody therapies.

⁵⁹ For example, Cynthia Cockburn and Susan Ormrod, *Gender and Technology in the Making* (London: Sage, 1993); Stefan Hirschauer and Annemarie Mol, ‘Shifting Sexes, Moving Stories: Feminist/Constructivist Dialogues’, *Science, Technology and Human Values*, 20 (1995), 368-385; Anne Balsamo, *Technologies of the Gendered Body: Reading Cyborg Women*; Maria Lohan, ‘Constructive Tensions in Feminist Technology Studies’, *Social Studies of Science*, 30 (2000), 895-916; Judy Wajcman, *TechnoFeminism* (Cambridge and Malden: Polity Press, 2004).

⁶⁰ For example, Dale Spender, *Man Made Language* (London and New York: Routledge and Kegan Paul, 1985); Judith Butler, *Gender Trouble: Feminism and the Subversion of Identity* (New York and London: Routledge, 1990); Deborah Cameron, *Feminism and Linguistic Theory* (London: MacMillan, 1992).

⁶¹ For example, Susan Herring, Susan, Deborah A. Johnson and Tamra DiBenedetto, “‘This Discussion is Going Too Far!’: Male Resistance to Female Participation on the Internet’ in *Gender Articulated: Language and the Socially Constructed Self*, ed. by Kira Hall and Mary Bucholtz (New York and London: Routledge, 1995), pp.67-98; Shannon McRae, ‘Coming Apart at the Seams; Sex, Text and the Virtual Body’, in *Wired Women: Gender and New Realities in Cyberspace*, ed. by Lynn Cherny and Elizabeth Reba Weise (Seattle, Washington: Seal Press, 1996), pp.242-263; Elizabeth Reid, ‘Text-based Virtual Realities’, in *High Noon on the Electronic Frontier: Conceptual Issues in Cyberspace*, ed. by Peter Ludlow (London and Cambridge, Mass.: The MIT Press, 1996), pp.327-345; S.C. Herring, I. Kouper, L. A. Scheidt, and E. Wright, ‘Women and children last: The discursive construction of weblogs’ in *Into the Blogosphere: Rhetoric, Community, and Culture of Weblogs*, ed. by L. Gurak, S. Antonijevec, L. Johnson, C. Ratliff, and J. Reyman (2004) <http://blog.lib.umn.edu/blogosphere/women_and_children.html> [Accessed 10 February 2010].

Throughout, technologies are always contingent, contextually specific, designed with particular uses in mind, emergent from and understood within particular discourses. They are, therefore, never ‘neutral’.⁶² Technologies are also ways in which aspects of embodied identity are mediated and performed. In this case, I am particularly concerned with how gender and discourse are mediated and performed through and in conversation with technologies. This performance then influences design and use of the next generation of technologies, creating a feedback loop. In this understanding, technologies do not have effects *per se*, rather the use and design of them does. Considering ‘technology’ in this way positions it very much as a human behaviour or practice which emerges in dialogue with gendered behaviours. This definition also takes into account Teresa de Lauretis’ ‘technologies of gender’⁶³ to look at the practices of gender and embodiment which take place in these case studies, from the mould-breaking female protagonist of ‘(Learning About) Machine Sex’, to the renegotiating of femininity that takes place in the (in)fertility blogs, to the bodies of patients reclassified by the workings of the World Health Organisation.

Gender is here considered primarily as a socio-cultural construct, drawing on the model described by Judith Butler as ‘improvisation within a scene of constraint’.⁶⁴ Doing gender ‘appropriately’ in order to be recognisable within a predefined set of gendered behaviours is an activity or practice constantly repeated. These repetitions or renegotiations of gender are mediated by and through technology and discourse, as well as shaping the evolution of technology and discourse. The relationship between gender and the sexed body however, is not a straightforward one, as Butler has shown:

...gender is not to culture as sex is to nature; gender is also the discursive/cultural means by which “sexed nature” or “a natural sex” is produced and established as

⁶² Keith Grint and Steve Woolgar, ‘On Some Failures of Nerve in Constructionist and Feminist Accounts of Technology’, in *The Gender-Technology Relation: Contemporary Theory and Research* ed. by Keith Grint and Rosalind Gill (London: Taylor and Francis, 1995), pp.48-75; Finn Olesen and Randi Markussen, ‘Reconfigured Medication: Writing Medicine in a Sociotechnical Practice’, *Configurations*, 11 (2003), 351-381.

⁶³ *Technologies of Gender: Essays on Theory, Film, and Fiction* (Basingstoke and London: MacMillan, 1987).

⁶⁴ *Undoing Gender* (New York and Abington: Routledge, 2004), p.1.

“prediscursive,” prior to culture, a politically neutral surface *on which* culture acts.⁶⁵

The discursive performance of gender requires that the sexed body appear as its natural or prediscursive referent, in order to shore up its authority. However, sex too may be articulated/shaped through and by discourse and technology, and also shape them in return challenging the apparently stable, reliable position of ‘matter’. This generative capacity of bodies is, as Shannon Sullivan notes, less emphasised in Butler’s reading, which focuses on the ‘first half’ of the process, in which discourse constitutes bodies:

The second half is that the bodies that are discursively constituted are also actively constitutive of the political and other discourses that constitute them (...) Sexed bodies are not merely the products of political, social, and other demands that they be male or female. They also are actively productive in their environments by means of the ways that they live the impact of the demands made on them.⁶⁶

To say that bodies are discursively constituted runs the risk of suggesting that once the body has been ‘produced’, it is then static. Rather, the body has to keep performing itself in order to remain recognisable. These performances do not take place in a vacuum, rather they take place in dialogue with gender, discourse and technology. Sex, gender and material bodies are co-constitutive of one another, and it is this coming-into-being that is under discussion here. Matter may be articulated/shaped through and by discourse, but discourse too is shaped by the multiple ways in which bodies materialise and challenge the apparently stable, reliable position of ‘matter’. This agency and productiveness of the body is clear in Haraway’s description of the ‘apparatus of bodily production’:

...bodies as objects of knowledge are material-semiotic generative nodes. Their *boundaries* materialize in social interaction. Boundaries are drawn by mapping practices; ‘objects’ do not pre-exist as such. Objects are boundary projects. But

⁶⁵ Butler, *Gender Trouble*, p.7.

⁶⁶ Shannon Sullivan, *Living Across and Through Skins: Transactional Bodies, Pragmatism, and Feminism* (Bloomington: Indiana University Press, 2001), p.57-8.

boundaries shift from within; boundaries are very tricky. What boundaries provisionally contain remains generative, productive of meanings and bodies.⁶⁷

The emphasis on the connection between the material and the discursive is central to this study, which takes into account the material-discursive construction of gender, technology and discourse itself.

Discourse is understood and used in this context as ‘a particular way of talking about and understanding the world (or an aspect of the world)’.⁶⁸ This definition is taken from Marianne W. Jørgenson and Louise Phillips’ text, *Discourse Analysis as Theory and Method*, in which the authors frame discourse as that which both describes and shapes the world. This definition does not spell out, but points towards the power of discourse to shape or regulate, to produce knowledge, to mould the gendered body. In this sense, my understanding of discourse is a Foucauldian one in that it is a socio-historical product. However, in line with the material aspect of this study, my understanding of discourse is also significantly shaped by Friedrich Kittler’s development of Foucault’s work which takes into account the material production of discourse by inscription technologies:⁶⁹

In the second industrial revolution, with its automation of the streams of information, the analysis of discourses has yet to exhaust the forms of knowledge

⁶⁷ Haraway, ‘Situated Knowledges’, p.200-201.

⁶⁸ *Discourse Analysis as Theory and Method* (London, Thousand Oaks & New Delhi: Sage, 2002), p.1.

⁶⁹ ‘Inscription’ technologies is my choice of term from the many offered by Friedrich Kittler. In the English translation alone of Kittler’s *Gramophone, Film, Typewriter* (trans. and intro. by Geoffrey Winthrop-Young and Michael Wutz (Stanford: Stanford University Press, 1999)), five different terms are used to denote material technologies which produce discourse, including ‘media and communication technologies’ (p.xxvii), ‘inscription technologies’ (p.xxv), ‘new recording technologies’ (p.xxvii), ‘mechanical storage technologies’, (p.188), and ‘storage technologies’ (p.3). ‘Inscription’ here ‘refers to a level of material deployment that is prior to questions of meaning’ (Friedrich Kittler, *Discourse Networks 1800/1900* trans. by Michael Metteer, with Chris Cullens. Foreword by David E. Wellbery (Stanford: Stanford University Press, 1990), p.xii)), and connects productively with the use of scripts in Madeleine Akrich’s work on preconfigured users (see, ‘The de-scription of technical objects’ in *Shaping technology/building society, studies in sociotechnical change* ed. by W. E. Bijker and J. Law (Cambridge, MA: MIT Press, 1992), pp.205-24).

and power. Archeologies of the present must also take into account data storage, transmission, and calculation in technological media.⁷⁰

Discourse thus not only makes up the ‘discursive skin’ of the gendered body, but has a materiality of its own in the form of the bits and bytes of genetic code or inscription technologies such as the typewriter. Inscription technologies both reflect prevailing social norms and also materially shape the discourses they produce. Technology is a discursively mediated human practice carried out by, and upon, gendered bodies of all kinds. The relationship between gender, discourse and technology thus functions as a symbiotic feedback loop in which each of the three strands is both outcome and input for one another, a loop with ‘real’ effects on material bodies.

What are ‘regulatory norms’ in this context?

A norm is not the same as a rule, and it is not the same as a law. A norm operates within social practices as the implicit standard of *normalization*. Although a norm may be analytically separable from the practices in which it is embedded, it may also prove to be recalcitrant to any effort to decontextualize its operation. Norms may or may not be explicit, and when they operate as the normalizing principle in social practice, they usually remain implicit, difficult to read, discernible most clearly and dramatically in the effects that they produce.⁷¹

My second research question is in two parts: i) in the context of the entangled relationship between gender, discourse and technology, how are the limits of regulatory norms governing bodies constructed in these distinct spaces of the case studies, and ii) to what extent (if at all) are they breached?

‘Regulatory norms’ here refers to the material-discursive practices that determine which bodies become viable by correlating certain behaviours with contingent notions of ‘man’ or ‘woman’. Through performance of these behaviours the gendered body is rendered visible and viable in society. Here I am following Judith Butler’s work in *Bodies that*

⁷⁰ Kittler, *Discourse Networks 1800/1900*, p.369.

⁷¹ Butler, *Undoing Gender*, p.41.

Matter: On the discursive limits of “sex” on how discourse shapes the limits of bodily experience. Butler specifically discusses juridical, medical and social discourses in relation to gendered bodies.⁷² However, as my analysis is concerned with the entangled, co-constitutive relationship between gender, discourse and technology, ‘regulatory norms’ as it is used here also encompasses normative ideas about what constitutes ‘discourse’ and ‘technology’.

Butler’s primary focus is on the role of the heterosexual matrix in the constitution of gendered, sexed bodies. A matrix which functions through discourse. In my study, I look specifically at how these discursive frameworks both shape and are shaped by technologies – that is to say, how discourse shapes the technologies which are developed, but also how the material configurations of technology play a role in determining what is considered discourse and what is considered nonsense. What constitutes discourse is subject to the play of regulatory norms, most notably through different technological media which process, disseminate and relay information, but also through pedagogical approaches. The act of interpreting is shaped by not only what our bodies are trained to process but also by the media of transmission that interpret and process for us – both of these constitute material, embodied regulatory norms.

The regulatory norms I am particularly interested in here, then, are those which emerge from the intra-action between gender, discourse and technology. Talking about these norms as ‘constructed’ is necessary to emphasise their unnaturalness, their arbitrariness, and to make room for the possibility of change. Changes to gender roles over time suggest how what may constitute ‘acceptable’ gendered behaviour or practice is not static, but rather shifts in dialogue with other factors. Similarly, what counts as ‘technology’ or ‘discourse’ too changes over time in dialogue with other factors.

The regulatory norms that govern gendered bodies, discourse and technologies can be breached, however. In order to maintain the power and authority these regulatory norms are dependent upon repetition. However, no two repetitions are identical and these small

⁷² Butler, *Bodies That Matter*, p.121.

inconsistencies not only allow the movement of norms over time, but also make possible the breaching or questioning of the norms.

What is the connection between the two main research questions?

1. What is the relationship between gender, discourse and technology as it materialises in contemporary case studies of info- and bio-tech convergences?
2. As these convergences prompt renegotiations of gender and bodily norms, how are the limits of regulatory norms governing bodies constructed in my case studies, and to what extent (if at all) are these limits breached?

Consideration of regulatory norms in this context spans all three strands (gender, discourse and technology), taking note of the contingency of contemporary understandings of the three. However, this consideration of regulatory norms is primarily concerned with the way in which the relationship between gender, discourse and technology materialises bodily norms.

As discussed earlier, the understanding of bodies from which this study starts is that the body is both constituted by, and generative of, gender, discourse and technology. As a material-discursive entity, the body is never static, rather understandings of the body are culturally and historically specific. In using three distinct case studies, I want to show the different ways in which the relationship between gender, discourse and technology functions in each, thus prompting recognition of the differing construction of bodily norms which takes place in each.

Different case studies offer a way of working through the complex relationship between the three strands, but also suggest differences in the way this relationship materialises in different locations. These differences show ‘cracks’ in the regulatory norms which border the ‘proper’ object in the case of gender, discourse and technology. The case studies also demonstrate the entanglement of the three strands, and thus the entanglement of these regulatory norms, thus denaturalising them, and making space for those bodies, narratives, identities erased by the norms.

In the final section of this kappa, I discuss the similarities and differences which can be traced across the case studies. In so doing, I will demonstrate how the different regulatory norms at work in the case studies produce different norms for governing bodies. ‘Governing bodies’ here refers to both the Foucauldian notion of bodies produced and disciplined by discursive practices,⁷³ but supplements it with the Kittlerian focus on the material production of discourse⁷⁴ and the generative potential of bodies seen in Haraway’s ‘apparatus of bodily production’.⁷⁵

⁷³ See for example, Michel Foucault, *Discipline and Punish: The birth of the prison* (London: Penguin, 1991); Michel Foucault, *The birth of the clinic* (London : Routledge, 2003).

⁷⁴ Kittler, *Gramophone, Film, Typewriter*.

⁷⁵ Haraway, ‘Situated knowledges’, p.200-201.

Section 2: Analytical frameworks - Feminist cultural studies of technoscience

The primary field of reference for this study is feminist cultural studies of technoscience, which, as the name suggests, brings textual⁷⁶ (and visual⁷⁷) analysis together with critical feminist perspectives and studies of science and technology. This relatively recently developed approach⁷⁸ is characterised by contextualising, denaturalising and reflexive moves, and has been productively employed in developing critical perspectives on a range of topics including women's health,⁷⁹ reproductive technologies,⁸⁰ and genealogy.⁸¹ In this section I outline why and how this field is the most fitting location for this study. As the name suggests (and has been most clearly illustrated in the Venn diagram used by Nina Lykke in *Bits of Life*⁸²) the field of feminist cultural studies of technoscience emerges at the intersection of three existing fields: feminist studies, cultural studies and science and technology studies (STS). Taking these fields in turn I want to highlight what each brings that is useful here.

⁷⁶ Janine Marchessault and Kim Sawchuck, eds., *Wild Science*.

⁷⁷ Cecilia Åsberg and Jennifer Lum, 'Pharma AD-ventures: A Feminist Analysis of the Pharmacological Imaginary of Alzheimer's Disease', *Body & Society*, 15 (2009), 1–23.

⁷⁸ See Maureen McNeill's article, 'Roots and Routes: The Making of Feminist Cultural Studies of Technoscience', for a suggested chronology. As it appears in *Bits of Life: Feminism at the Intersections of Media, Bioscience, and Technology*, ed. by Anneke Smelik and Nina Lykke (Seattle and London: University of Washington Press, 2008), pp.16-31.

⁷⁹ Treichler et al, *The Visible Woman*, Kerstin Sandell, 'Stories without Significance in the Discourse of Breast Reconstruction', *Science, Technology and Human Values*, 33 (2008), 326-344.

⁸⁰ Rayna Rapp, 'Real Time Fetus: The Role of the Sonogram in the Age of Monitored Reproduction', in *Cyborgs and Citadels: Anthropological Interventions on the Borderlands of Technoscience*, ed. by Gary Lee Downey and Joseph Dumit (Seattle: University of Washington Press, 1998), pp.31-48; Sarah Franklin, 'The Cyborg Embryo: Our Path to Transbiology'.

⁸¹ Sarah Franklin, *Dolly Mixtures*, Jackie Stacey, 'Screening the Gene: Hollywood Cinema and the Genetic Imaginary', in *Bits of Life: Feminism at the Intersections of Media, Bioscience, and Technology*, ed. by Anneke Smelik and Nina Lykke (Seattle and London: University of Washington Press, 2008), pp.94-109.

⁸² In 'Feminist Cultural Studies of Technoscience: Portrait of an Implosion', in *Bits of Life: Feminism at the Intersections of Media, Bioscience, and Technology*, ed. by Anneke Smelik and Nina Lykke (Seattle and London: University of Washington Press, 2008), pp.3-15 (p.7).

Feminist theory provides a set of tools attuned to examining difference, with particular reference to gender and the body. Writing in *Global Nature, Global Culture* Sarah Franklin, Celia Lury and Jackie Stacey provide a clear outline of the particular uses of feminist theory in their introduction. Amongst the focus on difference and the understanding of gender, they also draw attention to the relationship between discourse and power: '(f)eminism offers a long tradition of recognising the power to define, to make distinctions, and to create categories as key to a host of other power effects'.⁸³ Feminist writers and thinkers have long engaged with topics which are of central interest in this project, namely gender, the body and the power of discourse. Discourse is not only the subject of criticism, but the means by which that criticism is made and a medium which has been creatively transformed to change power dynamics in a more 'practical' sense. This can be used to de-naturalise dominant discourses, as well as making a space for alternative narratives to be heard.

Thus, feminism offers an approach which is both critical and creative, as exemplified in Haraway's 'A Cyborg Manifesto':

From one perspective, a cyborg world is about the final imposition of a grid of control on the planet (...) From another perspective, a cyborg world might be about lived social and bodily realities in which people are not afraid of their joint kinship with animals and machines (...) The political struggle is to see from both perspectives at once because each reveals both dominations and possibilities unimaginable from the other vantage point.⁸⁴

This well-known extract from 'A Cyborg Manifesto' demonstrates perfectly the combination of critical ('the final imposition of a grid of control') and creative ('joint kinship with animals and machines') work done within feminist theory. This dual perspective prevents a single dominant discourse or 'right' answer emerging, rather producing a polyphonic perspective which makes space for multiple opinions. The combination of critical and creative seen in feminist theory extends to feminist cultural studies.

⁸³ Franklin, Lury and Stacey, *Global Nature, Global Culture*, p.6.

⁸⁴ Haraway, 'A Cyborg Manifesto', p.154.

Cultural studies is a broad and much debated term for work done from a wide range of disciplinary perspectives on ‘the entire range of a society’s arts, beliefs, institutions, and communicative practices’.⁸⁵ As this definition suggests cultural studies does not recognise the traditional low-high boundary previously associated with considerations of culture, and instead focuses on a wide range of activities, many of which are associated with everyday life. The above definition also points towards the focus within cultural studies on the production of meaning, a process which engages closely with the power of discourse and the ‘power to define’. The wilful avoidance of the low-high boundary so distinctive of cultural studies resonates with feminist critiques of the literary canon, which successfully reveal the arbitrary inclusions and exclusions determining the cultural value of different pieces of literature. This interconnection between feminist critiques of the canon and cultural studies revaluing of ‘everyday’ practices is reflected in my choice of material. Despite being trained as a literature scholar, none of my case studies include texts which have previously been considered part of the canon, and yet through the intervention of cultural studies (often in conjunction with feminism) they have been rendered open and accessible for analysis in previously unconsidered ways. Both cultural studies and feminism emphasise a methodological pluralism which is well suited to the study, as each of my case studies uses different methods of analysis.

As Maureen McNeill notes in her useful genealogy,⁸⁶ feminist cultural studies turned rather late towards examining science and technology. However, the resulting work has meant two important changes which are particularly relevant here: firstly, *who* is allowed to research science, and secondly, *what* is examined when researching science. By including science and technology in the remit of cultural studies (thereby bringing high scientific culture onto the same level as popular culture) it became possible for non-scientists to research science. Furthermore, the focus shifted from the scientists and their theories to the *discourses* of science and technology, or as McNeill aptly puts it: ‘the heretical implication of this new kind of technoscience studies was that scientists and

⁸⁵ Cary Nelson, Paula A. Treichler and Lawrence Grossberg, ‘Cultural Studies: An Introduction’, in *Cultural Studies*, ed. by Lawrence Grossberg, Cary Nelson and Paula Treichler (New York and London: Routledge, 1992), pp.1-16 (p.4).

⁸⁶ See McNeill, ‘Roots and Routes’, p.25-6 in particular.

technologists did not control and could not regulate the meanings of technoscience'.⁸⁷ Thus, in the complicated meeting of feminism, cultural studies and science and technology studies, we also see the early traces of the discussions surrounding gender, discourse and technology emerging.

The combination of feminism and cultural studies has produced a particular approach towards technoscience, in which there is a strong focus on the production of meaning in relation to gender and the body, seen for example in readings of videos about fertility treatments, advertisements for medical technologies and patient information.⁸⁸ These readings treat with equal weight the discourses and the practices of technoscience, seeing them as inseparably entangled in producing meanings which shape everyday practices, including gendered, bodily behaviours. There is, furthermore, a more sceptical eye turned towards easy distinctions, in particular between 'fact' and 'fiction'.⁸⁹ In this way, they act as ideal templates for my readings in which all 'texts' are treated as providing equally valuable or reliable narratives of technoscience. The revaluing of the creative and the attention to the popular which feminism and cultural studies provide thus feed directly into this study.

Feminist cultural studies of technoscience also tend to reject technological determinism, and advocate a less humanist bent, for example in the case of Karen Barad ascribing a kind of agency to the world around human beings.⁹⁰ Instead, technologies and others are seen as co-constitutive, constantly modifying and reproducing identity and subjectivity. This position (somewhere beyond technological and social determinism) also has a heritage within feminist studies of technoscience in which the role of technology in the construction of gender, and the effects of gender on constructions of technologies have

⁸⁷ *ibid.*, p.26.

⁸⁸ See Sarah Franklin, 'Postmodern Procreation: A Cultural Account of Assisted Reproduction', in *Conceiving the New World Order: The Global Politics of Reproduction*, ed. by Faye D. Ginsburg and Rayna Rapp (Berkeley and Los Angeles: University of California Press, 1995), pp.323-345; Haraway, *Modest_Witness* and Stacey, *Teratologies*, respectively.

⁸⁹ Haraway, *Primate Visions*.

⁹⁰ Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*.

been widely documented.⁹¹ This mode of thinking provides an open-minded approach to thinking about technologies, which avoids the causal approach I mentioned earlier, while retaining a strong emphasis on the contingency of each manifestation of technology. Or, in the words of Donna Haraway: '(c)ontexts are dynamic material webs of human and nonhuman actors'.⁹²

Haraway's words are more than catchy epithets for this project. Rather, her critical eye on the production of meaning in science and technology has provided essential guidance. The following section looks in more detail at the relationship between gender, discourse and technology which is at the heart of this dissertation. My main companion in this exploration is Donna Haraway, whose work offers tools which can be productively calibrated to my purpose.

Inspiration from Donna Haraway....

The importance of situatedness

Writing in the opening chapter of her 1989 volume, *Primate Visions: Gender, Race, and Nature in the World of Modern Science*, Donna Haraway's caveats about the limits of her study exemplify a number of the most important aspects of her work:

This will not be a disinterested, objective study, nor a comprehensive one – partly because such studies are impossible for anyone, partly because I have stakes I want to make visible (and probably others as well). I want this book to be interesting for many audiences, and pleasurable and disturbing for all of us.⁹³

This statement immediately distances this text from the usual academic rhetoric in that it uses the first person and it explicitly states its lack of objectivity. Through both content and style, Haraway makes herself present in the research. This manoeuvre not only makes

⁹¹ Cynthia Cockburn and Susan Ormrod, *Gender and Technology in the Making*; Anne-Jorunn Berg and Merete Lie, 'Feminism and Constructivism: Do Artifacts have Gender?', *Science, Technology and Human Values*, 20 (1995), 332-51; Maria Lohan, 'Constructive Tensions in Feminist Technology Studies'.

⁹² Haraway, *Modest Witness*, p.116.

⁹³ Haraway, *Primate Visions*, p.3.

clear the impossibility of objectivity in any research, but also acknowledges the researcher's own agenda. The final line of the above extract accepts that this manoeuvre departs from a recognised tradition of doing and writing about research, a departure which may upset readers by challenging their own practices and beliefs. This approach to doing and writing about research is what has come to be known as 'situated knowledges'.

'Situated knowledges' is a practice of knowledge production which emphasises the context in which knowledge is produced, including taking into consideration the position of the researcher or the scope of the field, in order to avoid transcendental knowledge claims. In 'Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective', Donna Haraway writes: '(f)eminist objectivity is about limited location and situated knowledge, not about transcendence and splitting of subject and object'.⁹⁴

The kind of 'strong objectivity' produced by situated knowledges acknowledges the particular power dynamics at play in a field of knowledge production. Knowledge is produced in contexts shaped by particular gender dynamics, for example, and reveals itself to different extents as shaped by these dynamics. 'Situated knowledges' is about making these contextual dynamics more visible in order to make clear the contingency of the knowledge produced from within these contexts. It is about challenging the doctrine of objectivity which in its production of 'universal' knowledge assumes that all knowers are the same, a kind of essentialist humanism. It is also about being clear about one's own assumptions and beliefs in both theory and practice. In the context of this study this means paying attention to the particular contexts of the case studies, but also the limits of contemporary understandings of gender, discourse and technology. Last, but not least, it means locating myself in this text.

'Writing the I'

There are various ways of practising situated knowledge production, but the one to which this study owes the most is the practice of 'writing the I'. 'Writing the I' is one form of knowledge production which makes the situatedness of the knowledge visible through use

⁹⁴ Haraway, 'Situated Knowledges', p.190.

of the first person and personal experience. ‘Writing the I’ is a term usually associated with feminist writing practices, and aims to breach the boundary between public and private, to validate experiences not usually considered relevant and to move away from the carefully neutral, third person narratives often associated with the official discourses of science.⁹⁵

As the secondary aim of this dissertation is concerned with how the boundaries of viable gendered bodies are constructed through discourse and technology, the twin practices of ‘situated knowledges’ and ‘writing the I’ serve this aim perfectly by focusing on the conditions of production both generally and in the space of this dissertation. ‘Writing the I’ is a simultaneously critical and creative approach which both reveals the role of carefully ‘neutral’ scientific discourse in the construction of objectivity, and produces an alternative discourse. Consequently, this practice requires a critical approach to discourse, which is particularly apt in the case of this dissertation, where discourse is one of the themes under investigation.

‘Writing the I’ does not promise access to a ‘better’ quality of knowledge, but perhaps a more honest one, in the sense that it should make clear the limits of the knowledge produced and the context within which it was produced. In this scenario, ‘writing the I’ should make the story messier,⁹⁶ it should introduce inconsistency and uncertainty, it should acknowledge ‘noise’ in the research process, and the author should consider her/his relationship to ‘writing the I’. Acknowledging the messiness of the research process means acknowledging that one’s own identity can never be kept completely separate from the research. It is here that epistemology and methodology meet. Instead of using ‘writing the I’ as another voice which produces a neat, tidy narrative, this method could be used as a way of roughening up the edges of the narrative, of making noise. This

⁹⁵ For a more detailed discussion of ‘writing the I’, see Chapter 10 of *Feminist Studies. A Guide to Intersectional Theory, Methodology and Writing* by Nina Lykke.

⁹⁶ See in particular Nina Lykke’s discussion of *Troubling the Angels* in *Feminist Studies. A Guide to Intersectional Theory, Methodology and Writing*.

interest in noise echoes through some of Haraway's own analytical tools, for example in her use of the semiotic square.⁹⁷

'Situated knowledges' requires making clear the conditions of knowledge production and 'writing the I' offers a way to do this. In the context of this dissertation it is directly inspired by Donna Haraway's understanding and use of the term. Haraway's reading is useful in that she uses it to produce feminist critiques of science and technology, thus providing a useful guide for handling my own empirical material. Her reading of situated knowledges also picks up on two other strands which are relevant here - materiality and noise:

...knowledge is *always* an engaged material practice and *never* a disembodied set of ideas. Knowledge is embedded in projects; knowledge is always *for*, in many senses, some things and not others, and knowers are always formed by their projects, just as they shape what they can know.⁹⁸

In this quotation, Haraway turns knowledge production in different ways to show the range of groups and persons involved in and affected by the politics of knowledge production. In particular, by emphasising how knowledge production shapes the producer her reading seems to refer one back to the important reflexivity involved in 'writing the I'.

⁹⁷ In 'The Promises of Monsters: A Regenerative Politics for Inappropriate/d Others', Haraway adapts A. J. Greimas' semiotic square as means of tracing the complex network of actors engaged in technoscientific meaning-making. She writes 'I like my analytical technologies, which are unruly partners in discursive construction, delegates who have gotten into doing things on their own, to make a lot of noise, so that I don't forget all the circuits of competences, inherited conversations, and coalitions of human and unhuman actors that go into any semiotic excursions.' As it appears in *The Haraway Reader* (New York and London: Routledge, 2004), pp.63-124 (p.77). A similar tool would be Nina Lykke's use of the Venn diagram for 'mapping the implosion' that led to feminist cultural studies of technoscience, see 'Feminist Cultural Studies of Technoscience: Portrait of an Implosion', in *Bits of Life*..

⁹⁸ Donna J. Haraway, 'Morphing in the Order: Flexible Strategies, Feminist Science Studies, and Primate Revisions', in *The Haraway Reader* (New York and London: Routledge, 2004), pp.199-222 (p.199-200).

I use the first person as my starting point, as a way of breaking out of the ‘traditional’, third person narrative style, and acknowledging the impact of my own experiences and opinions on the research. In order to use this mode with any comfort at all, I have to occupy a relatively privileged position. This critical approach to ‘writing the I’ not only situates it, but intends to make clearer some of the inherent difficulties, rather than using this mode unthinkingly. It’s not about always using this mode. It’s about having choices, choices as to what mode to use. Some of my articles are written in a more ‘traditional’ style than others, while some are more innovative.⁹⁹ My own different voices and the different audiences for which they were written are clear. Breaking the mould of academic writing by ‘writing the I’ does not condemn one to always using it, rather it opens up the possibility of using more than just one style.

Boundary-crossing discourses

This use of multiple styles and the personal voice is one which Haraway not only advocates, but actively practices in her own work, thus again providing a useful template. Haraway’s writing is dense, weaving together discourses from many fields. Her writing is striking for its use of language, which she uses very much as a tool.¹⁰⁰ Her prose style is elegant, witty and full of metaphor. She departs radically from the traditional style of scientific writing in terms of both this more poetic, descriptive language, but also in her use of the first person and her resistance to formal structures which see her incorporate lists, images, diagrams and cartoons into the body of her text. Consequently, her texts become difficult to place within one distinct discipline, absorbing as they do metaphors, phrases and ideas from many different disciplines, for example:

⁹⁹ For example, ‘What’s in a name? The importance of nomenclature in biotechnology’ is the oldest article in this dissertation and which uses most explicitly the detached, third person style. In contrast, ‘Abject/noise: a new tool for feminist analysis of technoscience’ shows the emergence of my own voice more clearly, and in ‘Online negotiations of infertility’ I wanted to work with the comments of the bloggers who shaped my understanding of their blogs.

¹⁰⁰ This is a recurring theme in *How Like a Leaf: An Interview with Thyra Nichols Goodeve* (New York and London: Routledge, 2000), as well as a recurrent critique of Haraway’s work. See for example, Istvan Csicsery-Ronay Jr., ‘The Cyborg and The Kitchen Sink; or, the Salvation Story of No Salvation Story’ (review essay of Donna J. Haraway, *Modest_Witness@Second_Millennium. FemaleMan®_Meets_OncoMouse™. Feminism and Technoscience* (New York and London: Routledge, 1997), *Science Fiction Studies*, 25 (1998), 510-525.

Nature is not hidden and so does not need to be unveiled. Nature is not a text to be read in the codes of mathematics and biomedicine. It is not the 'other' who offers origin, replenishment, and service. Neither mother, nurse, nor slave, nature is not matrix, resource, or tool for the reproduction of man.¹⁰¹

This disrespect for the borders of Science has the effect of polluting the 'purity' of science, revealing the borders between disciplines as semi-permeable and arbitrary. Haraway shows the power of discourse in maintaining and producing these structures, but never forgets the effects on material bodies. Her hyperbolic rhetoric, too, plays a role in situating science; through exaggeration and wordplay Haraway's work makes clear the arbitrary nature of the authoritative discourses of science and technology.

Science offers particular understandings of the body, which do not gel with alternative conceptualisations produced 'outside' this distinct discourse. The biotech case study, for example, engages directly with one of the ways in which understandings of the body are produced and managed – that of nomenclature. I consider what discourses and cultures of authority are in play, and, using Haraway's critical approach, whether certain gender and bodily norms have been unquestioningly reproduced in them. By integrating 'fictional' narratives of nomenclature with official, 'factual' narratives such as those produced by the WHO, the limits and assumptions of each are revealed.

Haraway's own writing style is a very visible exposition of the use of other discourses and metaphors by science to explain and uphold their findings. By writing across many different discursive disciplines, Haraway also opens up her writing to many audiences, and this is directly related to her concern to make clear the limits of her work by 'situating' herself and her research. Both the use of multiple discourses and the emphasis on situating knowledge production position technoscience as a human practice, tempered by human assumptions and flaws. In particular, Haraway's work repeatedly stresses the ways in which technoscience is mediated by and through language, with material effects on lived bodies of humans and nonhumans. Her emphasis on reflexivity (or, rather, what

¹⁰¹ Haraway, 'The Promises of Monsters: A Regenerative Politics for Inappropriate/d Others', p.65.

she calls ‘diffraction’¹⁰²) also introduces the opportunity to reflect on and revise existing narratives of technoscience, allowing them to shift over time and place and to intersect with other power dynamics.

Reading technoscience

‘Situating’ one’s knowledge is an important element in the feminist toolbox and can be applied across disciplines and contexts. It is particularly useful in the analysis of science and technology, which have been considered ‘neutral’ or ‘objective’. In the context of this study, ‘situating’ the case studies includes taking into consideration the social or historical conditions under which technologies come into being, the shifting performance of gender or gendered bodies in different locations or the effects of inscription technologies on the shape of discourse. For example, the emergence of cyberpunk fiction reflects a particular point in western societies where the ability to connect computers across great distances was becoming possible while the anarchic music, images and lifestyle of punk presented apparent resistance to law and order. The emergence of this subgenre required both of these ‘movements’ to coincide and cross-fertilise, resulting in the irreverent hackers who are so often the heroes of cyberpunk.

Feminist readings of technoscience play multiple roles in knowledge production, by revealing scientific ‘facts’ and discourses as not neutral or ‘natural’. These readings also highlight an absence of women and others in technoscience, an absence which has resulted in a lack of role models for other women, but which has also significantly affected the knowledge produced. This absence has an important impact on the bodies of women and others not actively enrolled in knowledge production, meaning that the discourses and practices of technoscience produce understandings of the lived body which shape the materialisation of the body and draw the boundaries of what constitutes a visible or viable body.

Being enrolled in the process of meaning making not only encompasses more women being involved in technoscience, but also new spaces in which valid meanings are created and disseminated. The case study on (in)fertility blogs represents one way in which new

¹⁰² Haraway, *Modest_Witness*, p.16.

understandings of the lived body are made through weaving together personal narratives with ‘translations’ of medical discourses that make them more accessible and relevant to all.

Haraway’s use of ‘situated knowledges’ provided a clear example of both theory and practice which formed the backbone of my analytical framework. Her work examines the production of meaning in technoscience with a sharply critical eye. In this project, I use the idea of situating knowledge production to examine the relationship of gender, discourse and technology as it emerges in three case studies. As a literature scholar and lover of words, my project not only has a critical perspective on discourse, but also seeks to produce a combination of critical and creative writing. Thus, this project represents in many ways the process of ‘growing into’ my own voice. I re-calibrate Haraway’s tools to use them on popular examples of science: the fictional stories of cyberpunk, the first person (in)fertility narratives in blogs and the criss-crossing of fact and fiction in biotech nomenclature.

In the context of this study, Haraway’s work provides a sound epistemological starting point in the form of situated knowledges, and complementary methods in the shape of multiple discourses which include a personal voice. Together, these enable a feminist critique of technology. As the primary research question driving this study is the relationship between gender, discourse and technology, I enriched my theoretical understandings with readings from the fields of gender studies/queer theory and media theory. These readings allowed me to develop my understanding of the relationship between gender and discourse, and between discourse and technology, respectively. To explain how this worked in practice, I want to return to the nature of the relationship between gender, discourse and technology.

In an interview with Nina Lykke, Randi Markussen and Finn Olesen, Donna Haraway spoke about the figurations which populate her work:

I have this family of entities, these imploded objects – chip, gene, cyborg, seed, foetus, brain, bomb, ecosystem, race. I think of these as balls of yarn, as gravity

wells, as points of intense implosion or as knots. They lead out into worlds, you can explode them, you can untangle them, you can somehow loosen them up.¹⁰³

The knot which Haraway uses so evocatively in the above extract, can also be productively used when thinking through the relationship between gender, discourse and technology. In Haraway's reading, these figurations are envisaged as intense points at which a myriad of forces come together: the 'implosion of the technical, organic, political, economic, oneiric, and textual that is evident in the material-semiotic practices and entities in late twentieth-century technoscience'.¹⁰⁴ Her use of 'implosion' above conveys some of the force of this meeting, while figurations such as 'balls of yarn' and 'knots' convey a very tangible sense of the entangled nature of these forces.

This knotting aptly captures the entangled material-discursive state of Haraway's figurations, and inspired my reading of the relationship between gender, discourse and technology. The knotting I envisage taking place between gender, discourse and technology is, however, a slightly different one to Haraway's. Rather than an implosion, I prefer to think of it as a 'disturbingly lively'¹⁰⁵ ongoing process, twisting and turning on itself. Technologies constantly change and adapt, and this ongoing evolution takes place in dialogue with the 'incessant activity'¹⁰⁶ of doing gender, a doing that is also, always, already shaped and shaping discourse, or as Judith Butler succinctly puts it: '(t)he limits of the discursive analysis of gender presuppose and pre-empt the possibilities of imaginable and realizable gender configurations within culture'.¹⁰⁷ Discourse itself is, of course, intimately related to the technologies which shape its material production – the material production of the body (of the text). Friedrich Kittler's work on the effects of technologies on the production of discourses takes an historical perspective to suggest

¹⁰³ Donna J. Haraway, 'Cyborgs, Coyotes, and Dogs: A Kinship of Feminist Figurations' and 'There are Always more things going on than you thought! Methodologies as Thinking Technologies' (A Two Part Interview with Donna Haraway conducted by Nina Lykke, Randi Markussen and Finn Olesen) in *The Haraway Reader* (New York and London: Routledge, 2004), pp.321-342 (p.338).

¹⁰⁴ Haraway, *Modest_Witness*, p.12.

¹⁰⁵ Haraway, 'A Cyborg Manifesto', p.152.

¹⁰⁶ Butler, *Undoing Gender*, p.1.

¹⁰⁷ Butler, *Gender Trouble*, p.9.

how changing technologies have affected the boundaries of discourse, and productively complements Haraway's focus on technoscientific meaning-making practices.

Adding Kittler to the mix....

Friedrich Kittler develops Marshall McLuhan's maxim that 'the medium is the message' by suggesting that changes in media and communication technologies change not only the shape of the message, but also human society: 'We can only ever know about people what the media are able to store and transmit'.¹⁰⁸ The aspects of Kittler's work most pertinent to this study include his focus on the material production of discourse, the idea of 'discourse networks', and the concept of 'white noise'.

Material production of discourse

By taking account of the social and historical contexts surrounding inscription technologies, Kittler emphasises the conditions and assumptions under which new technologies emerge. In so doing, his methods could be read as being loosely aligned to Haraway's project of 'situating' knowledge production. In Kittler's world, however, 'situating' means a broad focus on socio-historical conditions rather than an individual commitment to reflecting on one's own or other's standpoints, and 'knowledge production' means the drawing of boundaries between sense and nonsense, noise and information by the medium through which discourses pass.

Writing in the translator's introduction to Kittler's 1986 text, *Gramophone, Film, Typewriter*, Geoffrey Winthrop-Young and Michael Wurtz describe Kittler's approach as follows:

His descriptive and nonevolutionary model favouring sudden ruptures and transformations at the expense of genetic causalities is derived from Foucault, but it takes on a certain edge because epistemological breaks are tied to technological ruptures.¹⁰⁹

¹⁰⁸ Friedrich A. Kittler, 'Gramophone, Film, Typewriter', in *Literature Media Information Systems*, ed. and intro. by John Johnston (Amsterdam: G+B Arts International, 1997), pp.29-49 (p.30).

¹⁰⁹ Kittler, *Gramophone, Film, Typewriter*, p.xxxiv.

The connection between ‘epistemological breaks’ and the materiality of communication is particularly relevant to this study. The changes in technologies that Kittler identifies not only change discourses in the sense of spawning neologisms or causing different uses of existing discursive patterns in different ‘locations’. In addition, he draws attentions to the changes in knowledge production or to dominant ways of understanding the world which are the broader effects of these technologies. For example, in ‘The World of the Symbolic’, he suggests that the primary differences between Freudian and Lacanian psychoanalysis are due to the invention of the computer:

...Freud and Lacan are separated by the computer, Alan Turing’s Universal Discrete Machine of 1936. Under high-tech conditions, therefore, psychoanalysis no longer constructs psychic apparatuses (if they are still psychic) merely out of storage and transmission media, but rather incorporates the entire technical triad of storage, transmission and computation.¹¹⁰

The invention of a machine which can not only store and reproduce information, but also process it is, in Kittler’s framework, more than just a technological innovation, it changes the ways in which the unconscious is understood.

Throughout I have found Kittler’s insistence on the material conditions for production of discourse valuable in recognising the socio-historical events and situations which shape the inscription technologies under consideration. In the case of the (in)fertility blogs, the emergence of the Internet and development of user-friendly formats such as the blog intersects with advanced medical technologies, resulting in the ‘translation’ of medical discourse which I argue is such a central feature of these narratives. Looking at these material considerations is also helpful when opening up ‘technology’, revealing how ideas of what constitutes ‘technology’ are shaped by those who construct and ‘use’ them.

¹¹⁰ Friedrich A. Kittler, ‘The World of the Symbolic – A World of the Machine’ in *Literature Media Information Systems*, ed. and intro. by John Johnston (Amsterdam: G+B Arts International, 1997), pp.130 - 146 (p.135).

Thus, a focus on the material production of discourse reveals the contingent nature of different communication hardware and examines how this impacts what technology is actually capable of recording, reproducing or processing. These material limitations on inscription technologies determine what is considered ‘sense’ and ‘nonsense’ (what Kittler also refers to as ‘white noise’).

Discourse networks

Kittler’s work also takes into account what could be termed a different kind of ‘white noise’ to that produced by the material limitations on inscription technologies. A more metaphorical or symbolic white noise is produced by the existence of ‘discourse networks’. While material production of discourse focuses very much on what could be described as the ‘hardware’, the discourse networks are the ‘software’. This aspect of Kittler’s work then is about the discursive mechanisms that regulate the production of meaning in a symbolic rather than a material sense.

A discourse network is the discourses which surround a discourse, from which it emerges and which give it authority, heritage or power. This model stresses that a discourse never exists in isolation, but rather bear the traces of the discourses around/before/after it. As John Johnston outlines in his Introduction to *Literature Media Information Systems*:

...the intelligibility and consequent meaning of literary texts is always and only possible because its discourse is embedded in and operates as part of a specific discourse network comprised of other discourses contemporaneous with it, pedagogy and philosophy in 1800, psychophysics and psychoanalysis in 1900.¹¹¹

The ‘discourse network’ is the means through which understanding is created, a net made up of other discourses. The network authorises and naturalises the emerging discourse. Kittler’s work traces how and why certain discourses have power at certain times, and the results of their coexistence with other discourses.

¹¹¹ Introduction to *Literature Media Information Systems*, p.4.

The biotech case study is an excellent example of the idea of the discourse networks that Kittler outlines. Fed by multiple discourses, including (but not limited to) biological research, corporate finance, images of hybrids from popular culture, regulatory process and safety policy. The discourses of biotech emerged from this very particular combination, and rely heavily on regulatory discourses to manage and respond to the hopes and fears surrounding biotech in popular culture. The discourse network of biotech is also intimately involved with management and production of bodies.

Kittler's work analyses this not only through a direct critique of the discourses, but by practicing this in his own writing. His work displays a careful use of language designed to reveal some of the inherent paradoxes and problems with discourse, as well as making explicit the contribution from different disciplinary discourses such as psychoanalysis, fiction and technical vocabulary. This 'patchwork' effect is a method he shares with Haraway, and, similarly, his texts are also packed with allusion and repay frequent rereading. For both, the language itself is explicitly used as a kind of technology, and materialises as the result of specific sociohistorical contexts. This is aptly demonstrated in the following extract from one of Kittler's articles titled 'Protected Mode':

Until the proof to the contrary on the field of combat – where computers unambiguously revealed themselves as hardware for the destruction of Iraqi hardware (as durable goods are still called in everyday Europe) – advertising brochures and media conferences spread the fairytale of a development of software that would become increasingly more innocuous and user-friendly, more spiritual and intelligent, until one day in the not so distant future it would effectively lead to German idealism – that is, it would become human.¹¹²

The self-conscious piling-up of adjectives about software here functions as a way of locating computer discourse historically and as the product of the media, while also exaggerating and parodying their benefits. Kittler also plays with uses of 'hardware', shifting between 'hardware' as the material part of a computer, a euphemism for military equipment and the renaming of everyday 'durable goods' in order to make them appear as

¹¹² Friedrich Kittler, 'Protected Mode', in *Literature Media Information Systems*, ed. and intro. by John Johnston, pp.156-168 (p.156).

valid military targets. He contrasts this destructive, military application of computers with the humanisation of the machine which has been both the pervading media image and which permeated much 'early' writing on the computer.

Kittler's conceptualisation of the 'discourse network' shows how the production of authoritative discourse relies on existing discourses. Through this Foucauldian model, Kittler denaturalises discourse and reveals its situatedness. In so doing, a distinction is made between that which is rendered sense, and that which is rendered nonsense, or 'white noise'.

White noise

White noise is the sum total of all noise frequencies. As 'white light' is the total of all light frequencies (colours), white noise is of sound. It is thus the prerequisite for discourse, but also the condition which can prevent clear transmission and reception of a message.¹¹³ In his article, 'Injecting Noise into the System: Hermeneutics and the Necessity of Misunderstanding', William Rasch provides a clear exposition of Claude Shannon and Warren Weaver's work which provided the foundation for information theory, outlining how information is the 'total field of choices from which the choice of the correct message is to be made'.¹¹⁴ Rasch's outline makes plain that the more information there is available, the more possible readings of the message may emerge. The eruption of (white) noise into this picture increases the amount of information available and disrupts smooth transmission of the message. Rather than simply reading this noise as an irritation, Rasch goes on to ask,

In light of the ambivalent relationship of noise, information and uncertainty, is noise only an accidental and undesirable component of communication to be rigorously excluded, or is it in fact an indispensable means by which information is generated and the Same never remains the same?¹¹⁵

¹¹³ Claude E. Shannon and Warren Weaver, *The Mathematical Theory of Communication* (Urbana: University of Illinois Press, 1949).

¹¹⁴ Rasch, *SubStance*, 21 (1992), 61-76 (p.65).

¹¹⁵ *ibid.*, p.66.

This ambivalence about the function of white noise can also be seen in Niklas Luhmann's work on 'irritation'¹¹⁶ in communication systems and Michel Serres' work on the parasite.¹¹⁷ Kittler's work too is ambivalent about white noise, as he writes ironically about the standardisation of media which will be 'immunized against disturbances'¹¹⁸ through channelling it via optic fibre cables.

In the most general terms, 'white noise' refers to anything that disrupts the smooth transmission of a message. Kittler's work is concerned with how changes to the technologies used for recording, reproducing and processing information affect what information can be captured, and consequently what information is rendered as 'white noise'. White noise is here considered as both the information considered by society to be irrelevant and therefore not worth recording, but also as marking the material limitations of the inscription technologies:

A compromise between engineers and salespeople regulates how poor the sound from a TV set can be, how fuzzy movie images can be, or how much a beloved voice on the telephone can be filtered. Our sense perceptions are the dependent variable of this compromise.¹¹⁹

In *Gramophone, Film, Typewriter* and *Discourse Networks 1800/1900*, Kittler traces the changes in media which occurred at the turn of the last two centuries, each one marking a change in the way that the subject is expressed and constructed in relation to the material production of discourse. It is within this context that he touches on the idea of 'white noise': excess noise picked up by communications crossing channels, the 'noise of the real – the fuzziness of cinematic pictures, the hissing of tape recordings'.¹²⁰

¹¹⁶ *The Reality of the Mass Media*, trans. by Kathleen Cross (Stanford: Stanford University Press, 2000).

¹¹⁷ Michel Serres, *The Parasite*, trans. by Lawrence R. Schehr and intro. by Cary Wolfe (Minneapolis: University of Minnesota Press, 2007).

¹¹⁸ Kittler, 'Gramophone, Film, Typewriter', p.31.

¹¹⁹ Kittler, *Gramophone, Film, Typewriter*, p.2.

¹²⁰ Kittler, *Gramophone, Film, Typewriter*, p.14.

Kittler's work in essence posits two forms of 'white noise', a material one and a symbolic one. The case study of cyberpunk fiction explores what could be considered the 'white noise' around the official narratives of technoscience; '(Learning About) Machine Sex' and *Snow Crash* are hybrid narratives which bring together anti-establishment attitudes associated with punk and an approach to technologies which is simultaneously cynical and technophilic. These cautious explorations of the pleasures and pains of technology have as a central theme 'alternative' images of women, both featuring female characters whose behaviour and description does not 'fit' with the images of women featured in earlier cyberpunk. These alternative images can be read as the 'white noise' around the reproduction and repetition of gender norms which Judith Butler outlined in *Gender Trouble*.

Treading carefully through Kittler's world...

One of the problematic aspects of Kittler's work when read from a feminist perspective is the absence of reflection on the specificity of bodies, particularly in relation to gender. His analysis of the introduction of the typewriter, for example, considers why women's bodily specificity may have smoothed their transition into operators of this new technology, but stops short of considering their widespread exploitation as secretaries. Likewise, his interest in the military history of many of these technologies fails to take into account the gender of many of the developers of these technologies and the impact of this on their scope and use. His texts focus primarily on the 'founding fathers' of many disciplines such as psychoanalysis¹²¹ reinforcing the invisibility of women. Women play the supporting role to the great thinkers (invariably men in Kittler's chronology) and women's bodies become the material used by technology. His emphasis is on the socio-historical conditions for development of certain discursive and inscription technologies, a history in which gender is noticeably absent as one of the determining characteristics of the use and development of the technologies. It is not that his texts are overtly masculinist, rather that they equate human with man in a way that ignores the problematisation of technological histories already carried out by many feminist thinkers.

¹²¹ Kittler, *Discourse Networks 1800/1900*.

Kittler has also been accused of media determinism,¹²² an understandable accusation in light of his belief that humans have become ‘reflections of our information systems’.¹²³ However, to read Kittler in this way overlooks the important focus throughout his work on the socio-historical conditions surrounding emergence of technologies:

Around 1800 the book became both film and record simultaneously – not, however, as a media technological reality, but only in the imaginary of readers’ souls. General compulsory school attendance and new technologies of alphabetization helped to bring about this new reality.¹²⁴

To read Kittler purely as a technological determinist is perhaps an overly simplistic view of his position, as one of the central tenets of his approach is a drive to explore the conditions under which information is produced and transmitted, and to ask to what extent the conditions shape the information. These conditions are primarily – in Kittler’s terms at least – the inscription technologies which produce, store and process information. However, his analysis also takes into account the socio-historical conditions under which a new technology comes into being and achieves widespread use or visibility.

These difficulties in using Kittler’s work, however, are worth risking as his work provides such a solid focus on the materiality of inscription technologies, a materiality which – when used alongside thinkers whose work is more attuned to gender dynamics (such as Haraway and Butler) – productively complements the significant body of work within feminism on the materiality of the body. Kittler brings the materiality of discourse firmly into view, and insists on its socio-historical specificity. Haraway’s description of how well known entities such as microbes or genes emerge from the convergence of particular ideas resonates with Kittler’s description of discourse networks, while Haraway’s comment that ‘(h)uman nature, encoded in its genome and its other writing practices, is a vast library’¹²⁵ could be linked with Kittler’s insistence on the role of technologies which

¹²² Paul A. Taylor and Jan Harris, *Digital Matters: The theory and culture of the matrix* (New York and Abingdon: Routledge, 2005), p.66.

¹²³ Kittler, *Literature Media Information Systems*, p.x.

¹²⁴ Kittler, ‘Gramophone, Film, Typewriter’, p. 39.

¹²⁵ Haraway, ‘Situated Knowledges’, p.185.

store and process information. Kittler makes the construction of boundaries between sense and nonsense in discourse very clear, and in a study such as mine that assumes an intimate relationship between discourse and gender, this is a very productive counterpart to Butler's work on the discursive construction of the boundaries of viable gendered bodies. Although Kittler's earlier interests were in discourse analysis as it is understood by Jørgenson and Phillips, his work has developed more towards information theory and the role of technologies in storing and processing discourse. However, both he and Butler start from the same Foucauldian understanding of discourse as power. Consequently, tracking concepts across their work produces rich, multi-faceted understandings of ideas such as 'noise'.

When read in this way, Kittler's work on white noise resonates strongly for me with Butler's on the abject. What both are trying to articulate in their different terms is the necessity of the 'noise' surrounding bodily and discursive sense – bodies that 'make sense' and discourse that 'makes sense'. Both are intimately concerned with intelligibility – one with intelligible discourse and one with intelligibly gendered bodies – and how this is constructed. Writing in *Gender Trouble: Feminism and the Subversion of Identity*, Butler stresses the importance of this task when she says:

...precisely because certain kinds of “gender identities” fail to conform to those norms of cultural intelligibility, they appear only as developmental failures or logical impossibilities from within that domain. Their persistence and proliferation, however, provide critical opportunities to expose the limits and regulatory aims of that domain of intelligibility and, hence, to open up within the very terms of that matrix of intelligibility rival and subversive matrices of gender disorder.¹²⁶

Thus, if considering what are designated 'unintelligible' genders is a way of exposing the discursive acts of construction that determine the materiality of the viable gendered body, then a consideration of what is designated 'unintelligible' in the domain of the discursive can also perhaps reveal the contingent construction of sense. If we can only know about

¹²⁶ Butler, *Gender Trouble*, p.17.

our bodies what is possible in discourse, then the limits placed upon that discourse by material, technological constraints play an important role in the gender options available.

Adding Butler to the mix...

Judith Butler's work informs this study through her conceptualisation of the performance of gender and her engagement with materiality. These two ideas have been essential for thinking through the relationship between discourse and gender in particular. Writing in 1990, Butler outlines the idea of gender performativity as follows:

...*gender* is not a noun, but neither is it a set of free-floating attributes, for we have seen that the substantive effect of gender is performatively produced and compelled by the regulatory practices of gender coherence. Hence, within the inherited discourse of the metaphysics of substance, gender proves to be performative – that is, constituting an identity it is purported to be.¹²⁷

Through her use of 'coherence' in the above extract, Butler emphasises the idea of an expectation of gendered behaviour. There is also here the sense of an ongoing process, a continuous activity to achieve a gender ideal which is never quite reached, which further undermines any sense of a stable signifier. Thus, coherent, intelligible gender requires repeated 'acts' of gendering through which an appearance of stability is achieved and maintained.

The choice of the term 'performativity' not only suggests a range of possible gender 'performances', but also works towards denaturalising 'gender'. Writing in *Bodies That Matter: On the Discursive Limits of "Sex"*, Butler highlights how the performance of sex and gender must work to conceal its socio-historical contingency in order to maintain its appearance of 'naturalness' and thus its authority. The principle means by which authority is achieved and maintained is through drawing on existing authoritative discourses:

¹²⁷ Butler, *Gender Trouble*, p.24-5.

To what extent does discourse gain the authority to bring about what it names through citing the conventions of authority? And does a subject appear as the author of its discursive effects to the extent that the citational practice by which he/she is conditioned and mobilized remains unmarked? Indeed, could it be that the production of the subject as originator of his/her effects is precisely a consequence of this dissimulated citationality?¹²⁸

Thus, while discourse is the means by which gender is produced, the activity of performing gender simultaneously reinforces these discursive structures, creating what could be called a self-fulfilling prophecy.

If discourse gains its power through drawing on existing authority, then this access to authority means relinquishing those forms which fall outside the conventions of authority. That is to say, citing the conventions of authority in order to draw on their power requires obedience to the accepted forms of that authority, thereby limiting the range of discourse and the range of gender performance. These limitations on performativity – what Butler terms ‘improvisation within a scene of constraint’¹²⁹ – are of particular relevance in this study. Butler’s exposition of gender highlights both the possibility of a range of performances available, suggesting that individuals have some agency over their behaviour, but also the existence of *restrictions* on this range. Performing one’s gender outside the range thus means risking unintelligibility or inviability, as this fails to respect and /or draw upon the existing discourses of authority which render certain performances intelligible.

In the case of cyberpunk, for example, Dorsey and Stephenson’s texts both attempt to challenge representations of gender seen in other texts of this genre. They do this through a playful approach to the dominant discourses which shape both the style and content of this subgenre. Dorsey’s short story for example, parodies the technosexualisation of the female body by placing a woman as the main character. This woman breaks with the glossy, technologised representations of the female body seen in texts such as *Neuromancer* in her appearance, her abilities and her visible vulnerabilities. Stephenson’s

¹²⁸ Butler, *Bodies That Matter*, p.13.

¹²⁹ Butler, *Undoing Gender*, p.1.

novel, meanwhile, tries to undermine the style of earlier cyberpunk by contrasting the hyperbolic rhetoric with mundane reality, thus revealing the limits of technological enhancement and making clear the fragility of the material body.

Bodily matters

In *Gender Trouble* Butler summarises the way in which sex and gender had previously been separated by associating sex with nature and gender with culture. She extrapolates from this starting point to question the 'naturalness' of sex, asking,

This production of sex *as* the prediscursive ought to be understood as the effect of the apparatus of cultural construction designated by *gender*. How, then, does gender need to be reformulated to encompass the power relations that produce the effect of a prediscursive sex and so conceal that very operation of discursive production?¹³⁰

In *Bodies that Matter* she advocates a more integrated vision of language and the body:

a return to the notion of matter, not as a site or surface, but as *a process of materialization that stabilizes over time to produce the effect of boundary, fixity, and surface we call matter*¹³¹

This is not a writing *on* the body, but instead a slow accumulation of layers of *discursive skin* which come to be the boundaries of the body as we know it. As ever with Butler, her choice of words is vital and in using the term 'effect' we are once more reminded of the idea of 'performance' introduced in *Gender Trouble*, a term Butler is keen to clarify in *Bodies that Matter*. Her choice of the term 'performative' has been useful in rethinking gender and sex as categories which are divorced from any kind of external, 'natural', pre-linguistic state, and, in *Bodies that Matter* she extends the idea of performativity to include sex, and through use of the multiple meanings of 'matter', to politicize this:

¹³⁰ Butler, *Gender Trouble*, p.7.

¹³¹ Butler, *Bodies That Matter*, p.9.

To claim that sex is already always gendered, already constructed, is not yet to explain in which way the “materiality” of sex is forcibly produced. What are the constraints by which bodies are materialized as “sexed”, and how are we to understand the “matter” of sex, and of bodies more generally, as the repeated and violent circumscription of cultural intelligibility? Which bodies come to matter – and why?¹³²

Butler’s own word play in the quotation above juggles four different uses of ‘matter’, thereby raising awareness of the complexity of issues at stake when considering the body and through the flexibility of language opening new entry points for rereading. The quotation above also foregrounds the importance of these questions for lived, bodily experiences, a key question in the three case studies of cyberpunk, (in)fertility blogs and biotech nomenclature.

The women bloggers, for example, who write about their experiences of (in)fertility use the blog technology to make visible their personal bodily experiences, revealing the limits of medical discourse by including the physical and emotional pain they encounter in their narratives. They also explore the connection between reproductive capability and womanhood by using the blog space to write searingly honest accounts of their struggles as infertility challenges their sense of identity and femininity. Their narratives reveal the deep-rooted need to be a mother which lies or lay at the heart of their sense of self, and detail their attempts to develop an alternative identity when motherhood is difficult or impossible.

In *Gender Trouble*, Butler had argued that implicit in the production of gender is the idea of sex as a ‘natural’ category, a stable signifier on which gender draws for its authority. In *Bodies that Matter* Butler focuses on undermining the authority of sex, revealing sex and gender as mutually dependent and co-constitutive. She then develops this in relation to the body, suggesting that the continuous citing of sex and gender determines the range of lived bodily experience, that is to say it shapes the materiality of the body. Furthermore, ‘sex’ is revealed as laden with normative guidelines, in particular including a presumption

¹³² Butler, *Bodies That Matter*, p.x-xi.

of heterosexuality. Drawing on Monique Wittig and Adrienne Rich, Butler details the ways in which sex and gender are cited within a frame which she describes as a ‘compulsory and naturalized heterosexuality’.¹³³ This frame shows how bodies materialise within the frame of an oppositely gendered pair. ‘Coherent’ gender is performed through heterosexuality which requires two opposing genders as the desiring pair. This move correlates and naturalises gender, sex and heterosexual desire. That is to say, ‘coherent’ gender requires heterosexuality, a binary opposition of genders in which desire is focused on the Other, the opposite.

The imperfect repetition of sex and gender is a primary entrance point to opening up these categories to analysis. One of the reasons for the imperfections in this repetition is changes over time and space:

As a sedimented effect of a reiterative or ritual practice, sex acquires its naturalized effect, and, yet, it is also by virtue of this reiteration that gaps and fissures are opened up as the constitutive instabilities in such constructions, as that which escapes or exceeds the norm, as that which cannot be wholly defined or fixed by the repetitive labor of that norm. This instability is the *deconstituting* possibility in the very process of repetition, the power that undoes the very effects by which “sex” is stabilised...¹³⁴

Highlighting the contingency of sex and gender denaturalises these categories and undermines their authority. Thus changes to discourse over time and space are absolutely essential to finding the cracks in a gender performance. The socio-historical contingency of these discursive limits is thus integral to an examination of the limits of the range of gender performance in any particular time and place.

Regulatory norms

One of the most pertinent questions that Butler poses is: ‘(t)hrough what regulatory norms is sex itself materialized?’¹³⁵ By shifting the focus from constructivist perspectives which

¹³³ Butler, *Gender Trouble*, p.22

¹³⁴ Butler, *Bodies That Matter*, p.10.

¹³⁵ Butler, *Bodies That Matter*, p.10.

render the subject the object or product of discourse,¹³⁶ to a focus which makes sex the subject and its emergence a topic for investigation, the possibility for actively engaging the edges of discourse appears. Resisting the model in which sex is equated with a ‘natural’, unmarked body on which gender is then inscribed, Butler engages directly with the materiality of the body:

To claim that discourse is formative is not to claim that it originates, causes or exhaustively composes that which it concedes; rather, it is to claim that there is no reference to a pure body which is not at the same time a further formation of that body.¹³⁷

According to this formulation, access to the body is always mediated by discourse. There is no access to the whole body, in all its multifaceted and layered entirety, rather discourse provides one ‘snapshot’, one vantage point, on the body. This snapshot is a one-time only, temporary view on the body. Its limited validity requires a continuous repetition of the snapshot process in an effort to maintain a coherent identity. However, the moment passes, the vantage point shifts and each snapshot is different because the context in which the image is taken changes. These minute changes are concealed so as not to destroy the subject’s sense of coherence. Thus, a focus on the contingent performance of bodily norms in a particular time/place/context reveals their situatedness, the limits of coherence as determined by gender, discourse and technology.

The biotech case study looks more closely at the regulatory norms which govern bodies by examining the nomenclature process. The strict guidelines for naming new drugs are stretched by biotechnologies whose mechanism of action or composition is often a radical departure from existing medicines – this naming process then plays a central role in the identification of new patient groups, with important consequences for the bodies of those included or excluded in this process. This process is another example of the ways in which a subject is gendered, and resonates strongly with Butler’s well-known comments on the ‘girling’ of a girl on the birth of a baby. As Butler goes on to point out, ‘that “girling” of a girl does not end there; on the contrary, that founding interpellation is

¹³⁶ Butler, *Bodies That Matter*, p.8.

¹³⁷ *ibid.*, p.10.

reiterated by various authorities and through various intervals of time to reenforce or contest this naturalized effect.¹³⁸

Following Butler, then, it can be said that carrying out an exploration of the relationship between gender, discourse and technology thus always requires an engagement with the material body on which norms of sex and gender are inscribed, and which determine the ability to be recognised as ‘human’. This position Butler outlined in *Gender Trouble* and further developed in *Bodies that Matter*.

Although her analysis does not include any detailed examination of the technologies examined in the study, Butler’s formulation of sex and gender is essential in exploring the relationship between discourse and gender. Her formulation links the two indissolubly together, and points to the need to examine the regulatory norms governing bodies as a means of reconceiving this relationship in ways which highlight the possibility for change.

Haraway, Kittler and Butler: a three-way conversation

The regulatory norms which Butler advocates examining in order to understand better how sex and gender materialise are – through Kittler’s work – intimately related to changes in the material production of discourse. Drawing the line between what is rendered intelligible and unintelligible takes place through a range of ‘technologies’, both cultural and material. Kittler’s approach works productively alongside Butler to suggest the role played by material technologies in determining these regulatory norms. The deterministic slant of his work is tempered by Haraway’s approach which sees technologies as emerging from particular practices in distinct spatio-temporal locations. Together, the three theorists provide a means of conceiving the co-constitutive relationship between gender, discourse and technology as a feedback loop or entangled knot which materialises in different ways in different locations.

¹³⁸ Butler, *Bodies That Matter*, p.7-8.

The production of situated knowledges through attention to socio-historical contingency and the position of the researcher form the backbone of my analytical frame. My particular use of this is inspired by, although does not slavishly follow, Haraway's work. Her use of the personal voice and multiple discourses produces conflicting narratives about technoscience challenging the objective, neutral discourse traditionally used in science. Her approach is specifically designed to increase the 'noise' around an accepted fact or discourse, and works productively with the interest in gender and discursive noise seen in Kittler and Butler's work. The careful exploration of the relationship between discourse and technology, and between gender and discourse, in Kittler and Butler's work, respectively, enriches my reading of the relationship between gender, discourse and technology by viewing these three strands as ultimately inseparable. Their interest in noise provided a way in to answering the second research question by focusing on the noise surrounding construction of regulatory norms governing bodies.

The relationship between gender, discourse and technology, and its impact on the material body are issues which underpin the wide range of responses to info- and bio-technologies which includes (but is not limited to) online communities,¹³⁹ fictional narratives about technology in film and literature,¹⁴⁰ medical technologies,¹⁴¹ communication

¹³⁹ Julian Dibbell, *My Tiny Life: Crime and Passion in a Virtual World* (London: Fourth Estate, 1999); Lori Kendall, *Hanging out in the Virtual Pub* (London: University of California Press, 2002); Jenny Sundén, "'I'm Still Not Sure She's a She": Textual Talk and Typed Bodies in Online Interaction', in *Talking Gender and Sexuality* ed. by Paul McIlvenny (Amsterdam and Philadelphia: John Benjamins Publishing, 2002), pp.289-312; Andreas Kitzmann, 'That different place: Documenting the self within online environments', *Biography*, 26 (2003), 48-65; Lotte Nyboe, 'You said I was not a man': Performing Gender and Sexuality on the Internet', *Convergence*, 10 (2004), 62-80; Melissa de Zwart, Francesca Collins and David Lindsay, 'My Self, My Avatar, My Rights? Rights of Avatar Identity and Integrity in Virtual Worlds' <<http://www.inter-disciplinary.net/ati/Visions/V3/De%20Zwart%20and%20Lindsay%20paper.pdf>> [Accessed 7 August 2008].

¹⁴⁰ Cathy Peppers, "'I've Got You Under My Skin": Cyber(sixed) bodies in cyberpunk fictions', in *Bodily Discursions: Genders, Representations, Technologies*, ed. by Deborah S. Wilson and Christine Moneera Laennec (Albany: State University of New York Press, 1997), pp.163-185.

¹⁴¹ Treichler *et al*, *The Visible Woman*; Kelly E. Happe, 'Heredity, gender and the discourse of ovarian cancer', *New Genetics and Society*, 25 (2006), 171-196.

technologies,¹⁴² laboratory science,¹⁴³ clinical and popular science,¹⁴⁴ metaphoric uses of technology,¹⁴⁵ and mapping of the human genome.¹⁴⁶ This dissertation aims to contribute to a deeper understanding of the interaction between gender, discourse and technology, which focuses on the co-constitutive aspect of their relationship. The relationship between the knotted strands of gender, discourse and technology is characterised by two things: firstly, discrete boundaries between each strand are difficult to maintain, and secondly, the three strands display symbiotic dependencies on one another.

¹⁴² Friedrich A. Kittler, 'There is no software' in *Literature Media Information Systems*, ed. and intro. by John Johnston (Amsterdam: G+B Arts International, 1997), pp.147-155; Michel Callon, 'Writing and (Re)writing Devices as Tools for Managing Complexity', in *Complexities: Social Studies of Knowledge Practices*, ed. by John Law and Annemarie Mol (Durham and London: Duke University Press, 2002), pp.191-217.

¹⁴³ Haraway, *Modest_Witness*.

¹⁴⁴ Bettina Leysen, 'Medicalization of menopause: From 'Feminine Forever' to 'Healthy Forever'', in *Between Monsters, Goddesses and Cyborgs: Feminist Confrontations with Science, Medicine and Cyberspace*, ed. by Nina Lykke and Rosi Braidotti (London: Zed Books, 1996), pp.173-191; Jackie Stacey, *Teratologies*; Cecilia Åsberg and Ericka Johnson, 'Viagra Selfhood: Pharmaceutical Advertising and the Visual Formation of Swedish Masculinity', *Health Care Analysis*, 17 (2009), 144-157.

¹⁴⁵ Haraway's cyborg is perhaps the best known figure, but see also Smelik and Lykke's use 'bits of life' as an organising metaphor (from 'An Introduction', in *Bits of Life*).

¹⁴⁶ Amade M'Charek, 'The Mitochondrial Eve of Modern Genetics: Of Peoples and Genomes, or the Routinization of Race', *Science as Culture*, 14 (2005), 161-183; Sarah Franklin, *Dolly Mixtures*.

Section 3: Methodology and methods

This study is based on an understanding of both sex and gender as social constructions, as being inextricably tied up with the norms governing the material body. This study also subscribes to the poststructuralist supposition that language marks the boundaries of our conscious knowledge and that there is no transcendental signified, and thus no stable reference point. Therefore, science cannot promise universal truth or facts, and its appearance of authority is created by authoritative discourse. These understandings lead to a broad suspicion of ‘traditional’ western procedures for producing knowledge, and rather lean towards feminist cultural studies of technoscience which advocate limited objectivity, situated knowledges and desire to dig into the entangled relationship between the material and the discursive, not in a quest for some kind of ‘natural’ or stable reference point, but rather recognising the mutually constitutive existence of the two.

I opened the preceding section by discussing the primary analytical frameworks that this dissertation uses: situated knowledges and ‘writing the I’. Both are attuned to producing knowledge that is explicitly limited in its scope, and where the researcher is present. In this section, I am going to discuss how these theoretical discussions are connected to the ‘practical’ aspect of this dissertation – the methods and methodology.

A commitment to producing situated knowledges affects the methodological aspects of the project by requiring an active curiosity about the context in which material is gathered, but also the relationship between researcher and research participants, and the ‘situations’ from which each speaks. ‘Writing the I’ can mean writing oneself into the text as both researcher and individual, including where this project falls in a broader career trajectory and also the thoughts or feelings produced by the research process. It’s about a kind of honesty as a researcher, acknowledging that one is not neutral and reflecting this in content and form. This individual, personal aspect is particularly relevant in the context of this project as I had some form of personal engagement with all of the case studies. In each case, I will start by describing the collection and analysis of material before reflecting on that process.

Methods

Different research topics are best served by different methods and approaches.

Variety is an essential ingredient and strength of feminist research...¹⁴⁷

The very different nature of each of the case studies meant that each was best served by a different method (or, more precisely, by a combination of qualitative methods). Underpinning this study is the use of textual analysis, reflecting my own history as a literary scholar but also the connection that each case study has (either directly or indirectly) to literary studies. For clarity, each case study is described separately.

Textual analysis, by which I mean detailed attention to both the content and style of a text achieved through close reading, is an excellent way of 'opening up' a text. I supplemented this with an active interest in its production context. Words only have values and meanings within a broader network of terms, which shifts and evolves over time/place/culture. Therefore all texts (regardless of their genre, or 'factual' status) play an active role in the production of meaning.

I read texts both as a trained literary scholar and as a feminist to produce a multi-layered readings. In using the same technique across all the case studies, I am not very respectful of any genre or disciplinary border between 'fact' and 'fiction', instead viewing all the different kinds of text as equally valuable evidence in my enquiry into the relationship between gender, discourse and technology.

I read each text multiple times, looking for different things. On first reading, I skim read the text. At this stage I was looking for broad themes within the content. These themes were organised around my research questions and included paying attention to the kinds of genders and bodies present in the text, the stance of the text towards technology, and the discourses employed in the text.

¹⁴⁷ Gayle Letherby, *Feminist Research in Theory and Practice* (Buckingham & Philadelphia: Open University Press, 2003), p.2.

On the next reading, I moved more slowly. I was looking for clues. Here I was reading for style and structure, because even in the least apparently creative text the content and the style work together to make a point. This reading was organised around an exploration of the metaphors used, the length and rhythm of sentences, and the register and rhetoric of the text. This kind of reading was repeated multiple times examining how the language of the text worked. With feminist literary theory in mind, I also read for gaps, silences and absences, particularly in relation to gender. And with cultural studies of technoscience in mind, I examined how ‘technology’ was discussed/imagined.

Throughout I was reading to try and establish a context, a context for writing and a context for my own responses to reading the text. This contextualising move considered both the discourse networks that make these texts legible, but also the material conditions of production – blog, transcription of a recorded interview, paperback book. What do these conditions of production make possible? What options do they close off?

I don’t ascribe to texts having a single, ‘correct’ meaning, or to the idea that they represent the author’s views, or some kind of universal truth. So, not only did the texts themselves have a context of production, but also a context of reading. My reading. For this reason, in the following section I also reflect on my position in all three case studies.

Cyberpunk

This case study comprised close readings of two fictional texts, and is closest to my previous training as a literary scholar. Throughout I have been interested in the conversation between fictional and factual accounts of technology. There is a long history of this within science fiction, often with surprisingly accurate predictions being made by science fiction authors. H. G. Wells, for example, imagined the introduction of tanks to warfare with uncanny accuracy in his 1903 short story ‘The Land Ironclads’. Cyberpunk shares this interest in future technologies with science fiction, but has a particular focus on info- and bio-technologies. It also shares science fiction’s often innovative use of language and style as part of its disorienting and distancing manoeuvres. In cyberpunk, however, this specifically emerges as a hybrid style from the combination of punk culture, discourse and attitudes, and pro-technology/hacker discourse.

Traditionally, science fiction, and cyberpunk even more so, have rarely been included in the literary canon. They are considered too popular. However, these texts feed and are fed by broader social contexts and scientific developments. As such they bridge the gaps between science fiction and science fact, but are devalued and disempowered because of this hybridity. As H. G. Well's eerily accurate predictions and Gibson's coining of the term 'cyberspace' long before the Internet was available show, these texts do not exist in a vacuum with no connection to the world. Rather, they exist in dialogue. Recognising this dialogue and revaluing the genre accordingly meant that I was particularly concerned to select the most suitable texts for exploring the relationship between gender, discourse and technology.

Early cyberpunk, for example, has been critiqued for the unproblematised connection between man and mind, and woman and body often made in its texts.¹⁴⁸ These texts also seem limited by their use of 'macho' frontier discourse, described by June Deery as representing 'the world of macho, hardboiled console cowboys on the wild frontier, mercenary loners who try to outmaneuver each other with the latest weaponry and gadgetry'.¹⁴⁹

Consequently, I was keen to find texts which in some way were distanced from this problem. Eventually, I selected two texts as my material for this case study: a short story called '(Learning About) Machine Sex' by Candace Jane Dorsey, and a novel called *Snow Crash* by Neal Stephenson. Both of these are more focused on information technologies; half of the action in *Snow Crash* takes place in an online world called the Metaverse, while Dorsey's short story revolves around the creation of a new piece of hardware called the MannBoard and software called Machine Sex. The focus on info- rather than biotechnologies in these texts thus usefully complemented the novel used in my biotech case study. Furthermore, the texts by Stephenson and Dorsey seemed to offer a new twist on the genre; Stephenson's novel is considered 'second-generation' cyberpunk, while Dorsey's short story is explicitly billed as a parody of cyberpunk. Could this distance from classic, 'first-wave' cyberpunk produce more challenging gender representations?

¹⁴⁸ Wendy Wahl, 'Bodies and Technologies: *Dora*, *Neuromancer*, and Strategies of Resistance'.

¹⁴⁹ June Deery, 'The Biopolitics of Cyberspace: Piercy Hacks Gibson', p.91.

Cyberpunk texts often include a range of different topics, but I focused on gender, discourse and technology. In particular, I was concerned with the hybrid discourse of the texts as a means of resisting normative models of technology and gender. A number of critics have noted the interest in innovative style and language demonstrated by both cyberpunk and its 'parent' genre.¹⁵⁰ However, unlike science fiction where the innovative style is often an original creation of the author designed to emphasise the difference (or alien-ness) of the characters and contexts, in cyberpunk this innovative style is the product of the distinctive combination of two existing discourses. Writing in his introduction to *Mirrorshades: The Cyberpunk Anthology*, cyberpunk author Bruce Sterling describes the genre from the perspective of its writers:

... 'cyberpunk' – a label none of them chose. But the term now seems a fait accompli, and there is a certain justice in it. The term captures something crucial to the work of these writers, something crucial to the decade as a whole: a new kind of integration. The overlapping of worlds that were formerly separate: the realm of high tech, and the modern pop underground.¹⁵¹

Sterling's statement highlights the importance of the two 'founding' discourses – technology and punk – which permeate both the content and style of cyberpunk texts. These discourses are, of course, laden with a history and power dynamics of their own. Therefore, reading these texts required not only attention to how the discourses were used, but the potential problems associated with this, in particular the issue of resistance to gender and genre norms.

¹⁵⁰ See for example, Samuel R. Delany, *The Jewel-Hinged Jaw: Notes on the Language of Science Fiction*; Scott Bukatman, *Terminal Identity: The Virtual Subject in Postmodern Science Fiction*; Nickianne Moody, 'Aphasia and Mother Tongue: Themes of Language Creation and Silence in Women's Science Fiction'; Veronica Hollinger, "'A Language of the Future": Discursive Constructions of the Subject in *A Clockwork Orange* and *Random Acts of Senseless Violence*'; Brian Attiebery, "'But Aren't Those Just...You Know, Metaphors?" Postmodern Figuration in the Science Fiction of James Morrow and Gwyneth Jones'.

¹⁵¹ Bruce Sterling, 'Preface from *Mirrorshades*', in *Storming the Reality Studio: A Casebook of Cyberpunk and Postmodern Fiction*, ed. by Larry McCaffery (Durham and London: Duke University Press, 1991), pp.343-348 (p.345).

The kind of textual analysis I do draws on different traditions within the history of literary study. I simultaneously read for the mechanics and poetics of the individual words or sentences, but also seek to locate the author and context of writing, whilst considering the ever-fraying web of terms which connects these texts to other texts (both sci fi and not). I think these things cannot be separated because they all play a part in my own understandings of the texts. If the mechanics of the text serve to emphasise certain words or phrases, this emphasis also interacts with the conditions of production. For example, Dorsey's text does not use a chronological structure. This can make the text confusing to read at first, as the story is circular. This circularity reflects the cycle of disillusion and revenge which the protagonist Angel appears to travel creating a claustrophobic atmosphere in the text and supporting the cynical voice of the narrator. However, this structural device is distinctive within the genre of cyberpunk which often follows a chronological, detective story model, chasing clues towards a final scene in which the 'truth' is revealed and the heroes win. In using this alternative structure then, Dorsey distances her text from the dominant model within the genre. This distancing manoeuvre makes more sense when taking into consideration that at the time of publication the majority of cyberpunk authors were male and the female characters in their texts were often reductive images of technosexualised femininity.

The emphasis on 'overlapping of worlds' mentioned above in Sterling's preface is relevant not only to the naming of cyberpunk, but also the 'overlap' between theory and fiction in this genre. For example, both the critical commentary and the fiction of cyberpunk display a number of similarities in written style, such as heavy use of metaphor, striking imagery, and fast-paced prose which draws on techniques such as alliteration or assonance to create rhythm and emphasis. This is perhaps most clearly demonstrated by Larry McCaffery's anthology, *Storming the Reality Studio: A Casebook of Cyberpunk and Postmodern Fiction*, in which extracts from cyberpunk fiction are interwoven with extracts from critical writings on cyberpunk. Thus, cyberpunk in both content and style positions itself as questioning any neat separation between fictional and critical (factual) writings. This is particularly clear in the second text I included in this case study: *Snow Crash* by Neal Stephenson. The 'America' which appears in this novel is recognisable, albeit futuristic. Reading this text then requires careful attention to how recognisable contemporary anxieties about technology and bodies give the text greater

urgency and relevance than perhaps Dorsey's short story. Stephenson's text gains authority through its believability and use of the plot structure associated with the genre. Sensitive reading, however, was required to see the ways in which it risks reproducing and reinforcing the norms governing bodies in an attempt to manage these anxieties.

I supplemented my close readings of these texts with readings from a wide range of other cyberpunk texts and critiques. These ranged from 'classic' science fiction from authors such as H. G. Wells, to contemporary science fiction and cyberpunk such as Tim Pear's story about genetically modified vegetables,¹⁵² or Justina Robson's *Silver Screen*¹⁵³ which addresses perennial anxieties about artificial intelligences.

Blogs

In 2003, following completion of my initial literature review and project outline, I started to consider possible case studies for this dissertation. At that time, weblogs were starting to receive increasing coverage in the media, and, as a literature scholar with a keen interest in autobiography, I was immediately interested to see what impact these online personal narratives would have on a well-established genre.

Following links from blog to blog, by chance I found a blog called 'A Little Pregnant'¹⁵⁴ written by a woman in the United States about her experiences of infertility. This blogger writes in a strikingly open and detailed manner about the medical procedures, bodily experiences and feelings she undergoes. For me, there was a crucial crossing of the public/private boundary in what she wrote that made me realise my own preconceptions about what is 'appropriate' to discuss publicly, particularly in relation to the female body. This blogger listed other blogs written by women in similar situations to her which I started reading. These blogs were also strikingly open about women's experiences of infertility. I had never read first person accounts of the female body which were so graphic, so honest, so messy. These blogs appeared remarkable because they provided accounts of both the female body and medical technologies which were detailed, reflexive and personal. These blogs prompted questions about how and why blog technology made

¹⁵² *Wake up* (London: Bloomsbury, 2002).

¹⁵³ (London: Macmillan, 1999).

¹⁵⁴ <<http://www.alittlepregnant.com/>> [Accessed 24 February 2010].

visible and accessible narratives which were traditionally silenced. The (in)fertility blogs appeared to offer an example of how technologies might rework experiences of the gendered body, and thus they became my next case study.

After deciding to focus on (in)fertility blogs, I read extracts from approximately twenty blogs in this genre until a small group of blogs emerged as the ones to which I repeatedly returned. I was drawn to those in which the bloggers were more reflexive about their writing practices or where the narratives seemed particularly open about the blogger's experience. I read in particular ways, looking for particular things. I rejected blogs by husbands, male partners, siblings or parents of women struggling with infertility. My primary interest was in the ways the women wrote about their changing experiences of their gendered bodies and how they wrote about the medical treatments they received.

I then 'lurked', reading my chosen group regularly in order to gain a clearer picture of the individuals' stories, and from reading the comments posted in response to blogs to get a sense of the audience who might read their blogs. Lurking is a particular kind of observation, in which a researcher can observe unremarked and untraced. It is possible to read a blog and never be observed individually. However, blogs are public, so one becomes part of a wider public audience about whom the blogger is more or less aware.

This kind of anonymity made it possible for me as a member of the public to read many blogs in order to find the ones which were most relevant to my research. However, in order to enter the next stage of the research which involved direct interaction with the bloggers, I had to 'de-lurk' myself. As a blogger myself, I had had the experience of becoming aware of who had been reading my blog and the resulting level of caution in my posts. Thus, the act of delurking can change the blogger's own experience of, or feelings about, blogging. This potentially has an impact on the content or style of future posts, but also, due to the constantly editable format of blogs, may mean changes are made to previous posts (thus disrupting the chronological trajectory or producing silences in the narrative in the form of the password-protected post). There are different ways in which a potential researcher can delurk, from openly posting a comment as a researcher to emailing the blogger directly to have a separate, off-blog conversation. I wanted to be open about being a researcher, but I also wanted to include both material from the blogs

and separate, off-blog conversations with the bloggers in my material, so I took a relatively cautious approach to delurking myself.

Using the email address provided in the 'Contact Me' section of the blog, I twice approached the author of 'A Little Pregnant' to request an interview but never got a response. I explained who I was, what my research was about and included links to my university department should she wish to check that my request was genuine. In 2006, using the same email, I emailed the blogger I had followed longest after 'A Little Pregnant' to ask if she would speak to me about her experiences of blogging. The author of *Arwen/Elizabeth* (now called *abc family*¹⁵⁵) agreed and we conducted an email conversation and she also completed at length a questionnaire I sent her about her blogging experience. This questionnaire contained seven questions, ranging from 'how would you describe a blog' to 'why did you start blogging' and 'what contact do you have with other bloggers'. The final question on the survey requested permission to quote responses to the questions and material from the blog itself.

This first contact together with extensive reading of the small group I had selected formed the basis for discussions with colleagues¹⁵⁶ about the next steps to take. At this point, I was particularly concerned about the ethical dimension of the research I was doing. In particular, I struggled with feeling disloyal to the bloggers when analysing their blogs. The topics covered in these blogs (infertility, adoption, miscarriage, families, bodies) are all ones which have traditionally been considered 'personal', and the tone of the posts is often very emotionally-charged. Although these are online narratives and publicly available to all, I was fully aware from my own blogging that the experience of blogging often distances this audience.

In an effort to understand the bloggers' experience of the medium, I had started blogging myself in 2005 and had experienced firsthand how safe a blog feels. I constantly surprised myself by writing more, and in more personal detail, than I thought I would. I negotiated the disorienting feeling of initially being an anonymous blogger, and then some friends finding out that I blogged. What happened on a small scale in my own research blog,

¹⁵⁵ <<http://ennorath.typepad.com/>> [Accessed 24 February 2010].

¹⁵⁶ Thanks to Kerstin Sandell in particular for useful discussions on this.

seemed to be happening in a larger scale in the network of infertility blogs I started to find. These personal feelings affected my behaviour as a researcher. I did not want to take advantage of the 'safe' feeling of the blog space; I realised I had concerns about using such personal narratives for research purposes.

This experience produced some revisions to the process I followed when contacting more bloggers. I emailed nine more bloggers in November 2007, and received responses from four of them agreeing to complete a questionnaire about their experiences of blogging. At that point, the questionnaire was refined to include more specific questions about negotiating changing experiences of the body in the blog, and also how comfortable the bloggers felt about writing online. Once again I requested permission to quote from their blogs, but in addition I carried out follow-up conversations with the bloggers. All four completed my questionnaire, often responding at length and in detail. Finally, when I wrote up the chapter for the first version of my dissertation, I sent it to them and offered them the chance to comment. I felt nervous about what the bloggers would think about my work, and in particular I was anxious that they might feel misrepresented or that my academic writing style might be off-putting. Despite these worries, the bloggers were encouraging about the text and requested no changes.

This process of gathering material worked well in this case study, allowing lengthy email conversations with the bloggers in which they offered a great deal of information about their personal experiences and motivations for blogging, and in particular why they chose this medium for recording their stories. Supplementing these conversations and questionnaires with my own blogging gave insight into the actual act of blogging. I continued to write my blog throughout this period and I still continue to read the blogs I followed when conducting this research.

Biotech

The starting point for this case study was once again rooted in my interest in literature. A few months after starting my research I was given a copy of Margaret Atwood's then recently published novel, *Oryx and Crake*. This novel gives a dystopian view of a near-future situation in which most of the world's population has been killed by a virus engineered by a biotech company. The creator of this virus, Crake – disillusioned with

what he sees as ‘design flaws’ in human beings – has also designed a new race of genetically engineered beings who are intended to repopulate the Earth following the global virus catastrophe. The narrator, Jimmy/Snowman, was Crake’s best friend and has been left alive in order to guide the new beings, the Crakers, from the biotech compound in which they were raised to a safe home after the virus. This is a world populated by genetically modified or hybrid plants and animals, where pharma/biotech controls all the basic aspects of existence. Resistance to the global domination by major pharma corporations is tackled with extreme violence which is then broadcast on TV as a form of entertainment.

Atwood’s novel picked up on many of the hopes and anxieties about biotech which were then and still are appearing in the media. In particular, Atwood’s careful use of language, spanning parody of scientific discourses, playful hybrid words and judicious use of different rhetorics resonated with Haraway’s critique of big pharma/biotech. My original intention in this case study was to compare and contrast ‘fictional’ and ‘factual’ texts about/from biotech. The ‘fictional’ text was Atwood’s novel, while the ‘factual’ one was a document produced by the World Health Organisation (WHO) about naming of biotech products. Both texts were concerned with managing new risks or challenges perceived to be posed by biotech. Both used distinctive rhetoric to convey their individual perspectives on the industry. As a pair, these texts are strikingly different in style, length, format and content. However, using close reading skills more usually associated with literary studies, my intention was to unpick the texts, using the contrast between the two to contextualise and challenge each other. This contrast was focused around particular themes, namely: the discourse of biotech, the gene and changes to the disease/health boundary caused by increasing knowledge of ‘inherited’ diseases, and by the redefinition and recategorisation of diseases and treatments caused by the extremely innovative methods of biotech.

Some of these themes also resonated very strongly with my own job. Shortly after commencing my research for this dissertation I started work in the Communications Department of a UK biotech company called Antisoma. My initial exposure to the WHO documents was as part of a task I was assigned during my time at Antisoma. This task involved coordinating a group of employees to develop an INN for a new drug that the company was developing. The guidelines surrounding development of these names are

made by the WHO and in the process of developing the new name, I first read the document which was to be the partner to Atwood's novel for a comparative textual analysis: 'International Nonproprietary Names (INN) for Biological and Biotechnological Substances'.

During this process, however, I attended a lecture given by Professor Julia Goodfellow, then head of the Biotechnological and Biological Sciences Research Council. Part of her presentation was devoted to the balance between men and women in science, and the ways in which this balance is tipped in favour of men as scientists ascend the career ladder. Following her presentation I approached her to request an interview to talk in more detail about this issue. This was the first in a series of four interviews I conducted in Spring 2007 with women in biotech who have an active interest in promoting or supporting women in this field. My intention was to use these interviews to gain more knowledge of the UK biotech industry, but also to root my textual analysis in contemporary experiences of biotech with a particular focus on women's experiences as both producers and subjects of biotech.

Interview participants were identified through an organic process: I approached Professor Goodfellow after attending her lecture. Francetta Carr was a professional contact I had made at the Biotechnology Industry Association who recommended that I also speak with Claire Wilkinson of Omega Fund Management and Sue Bright of the Institute of Cancer Research. In all four cases, I initially approached them via email, explaining my dual role as PhD candidate and biotech employee. All four of the women I approached agreed to an interview with me. In three cases, I met them in their own offices, except Julia Goodfellow whom I interviewed in a seminar room at Birkbeck, University of London. Each interview lasted between one hour and two hours, and I recorded and later transcribed all interviews.

These were semi-structured, qualitative interviews, with the conversation based around nine questions which were provided to participants in advance. The same questions were used in all interviews:

1. How would you define 'biotechnology' to someone who has never heard of it?

2. What is distinctive about the culture of the biotech industry?
3. How accurate is the media representation of the biotech industry?
4. What is the most common misconception about biotech that you find yourself faced with when talking to the press or members of the public?
5. One of the biggest biotech-related topics in the press is genetic modification. In your opinion, is genetic research viewed by the majority as positive or negative? And has this changed over time?
6. Do you think that the boundaries between health and illness are blurred by the ability to modify genes, or by any other biotechnologies?
7. Do you think that the focus on the gene has been at the expense of other approaches to medicine?
8. How successful are biotech companies at communicating scientific or medical information to the layperson?
9. Why are there so few women at the top level of biotech? Do you think this is related to the combination of science and finance that epitomises the biotech model?

Due to the relatively short period of time in which I conducted the interviews (all four took place during one month), there was little time for me to reflect on them between interviews. For this reason, these interview questions (unlike in the case of the blog questionnaires) remained the same throughout. In hindsight, the questions cover a wide range of topics and reflect the early stage of the research process I was at in this case study. Following my initial literature survey, I had identified genetic research as a possible focus for the case study. However, my interest in the contrasts between different representations of the biotech industry sparked by my own experience and from reading Atwood's novel is also visible in the questions.

Despite the list of pre-supplied questions and the formal, professional spaces in which the interviews took place, the questions often produced long responses. The conversation flowed easily and the participants often volunteered personal experiences or opinions. Following the interviews, I emailed the transcript to each participant for checking and comment. With the exception of a few small edits the transcripts were left as I had provided them by the participants. The small edits made included correcting the spelling of people's names or drugs, and on one occasion modifying a personal opinion after the participant was embarrassed about how strongly she had expressed a negative opinion. Permission to quote from the transcripts was also requested and granted by all four participants.

The interviews provided rich material about the experiences of four women working in the biotech industry in the UK. One was head of a research council, one a corporate lawyer working with biotech companies, one works in media relations for the Biotechnology Industry Association and one for a charity researching cures for cancer. Two of them trained as scientists. Between them they have decades of experience in the industry either working within biotech companies or for companies which provide supporting services (such as public relations or legal advice) specifically for biotech companies. At the time of the interviews, none were directly employed by biotech companies. All have an active role in promoting women in biotech.

The primary difficulty was the level at which to pitch the questions. Although all of the participants have an interest in gender issues in biotech, none of them displayed any familiarity with the critical approaches to science and technology which I had been using in my analysis. For example, in the case of question six, the consequence of changes to the boundary between disease and health for the gendered bodies of patients was not clear. In all cases, this question required more explanation from me, and provoked lots of discussion. This was the result of me inaccurately estimating the places from which the participants were speaking, meaning that the questions are partly framed for an academic audience and partly for a non-academic audience. It also suggests that despite the popularity of approaches such as 'situated knowledges' within gender studies/STS/feminist theory, the focus in industry remains on tangible markers such as the number of women in high level positions within science.

The interview process revealed a number of boundary tensions in play, primarily between personal and professional – how ‘factual’ are their accounts, where was I in the interviews, where were they? Throughout the interview process, I felt very inexperienced as a researcher and that the participants had more knowledge/experience of the field than I did. Consequently, I did not question their narratives, rather seeing them as speaking with some kind of authority derived from experience. Their narratives are consistent in some respects, for example, biotech was represented as a male-dominated industry, and the identification of specific genes for certain conditions was viewed as a mixed blessing. The narratives are inconsistent in that the women come from very different backgrounds and thus give different perspectives on each question.

Seated in professional settings (three out of four in their own place of work) and dressed accordingly, these women often volunteered personal information about themselves and their bodies. In ‘The Interview’ Fontana and Frey suggest that the interview is a ‘means of contemporary storytelling’.¹⁵⁷ Three of the interviews in particular took the form of personal histories and contained personal information about the women. At these points, the interviews ceased to be accounts of ‘professional’ experience within biotech and become more intimate narratives about how biotech has affected bodies. This had important parallels with my interest in the permeable boundary between ‘fact’ and ‘fiction’ which resonated throughout my project.

The women knew me as both a PhD candidate and biotech employee, and I did not volunteer any similar personal information. Throughout I struggled between my critical feminist perspective on medicine and my loyalty to the biotech company for which I worked, a situation that was given an extra twist by the confidentiality agreement by which I am bound. This came to a head in the interviews I carried out where I approached the women as a researcher, but many of them knew my company or me professionally.

Their responses to the questions were detailed, rooted in many years experience and knowledge of the biotech industry in the UK, their narratives littered with names, places,

¹⁵⁷ ‘The Interview: From Structured Questions to Negotiated Text’, in *Handbook of Qualitative Research*, 2nd ed. by Norman K. Denzin and Yvonna S. Lincoln (Thousand Oaks, London and New Delhi: Sage, 2000), pp.645-672 (p.647).

corporate deals, drug launches. It made me realise that biotech is full of stories – infamous stories about drugs that worked, drugs that went wrong, CEOs and companies. Although there were similarities between the interviews in how the biotech industry was perceived, overall the different backgrounds of the women produced rich, differing narratives about biotech. In effect, the interview process was the first step in recognising my own ‘god’s eye’ position’ and it provided a more multi-faceted, sometimes contradictory picture of UK biotech.

Through the process of doing the interviews I realised that my initial areas of interest within biotech were too broad, and I chose to focus primarily on nomenclature. Ultimately, I chose not to use the interview transcripts directly in my case study because this was one of the few areas we had not discussed in depth.

Section 4: Final discussion

This is my discursive skin. What you see on the front cover of this dissertation is my own skin. I too materialise through entanglements of gender, discourse and technology. The shape on the cover is a knot. More specifically, a trefoil knot. This knot is a metaphor for the way in which the relationship between gender, discourse and technology is understood and used in this dissertation. In mathematical theory, knots such as the trefoil knot are distinct from everyday knots such as those used to tie shoelaces in that the two ends are fused, making it impossible to undo.¹⁵⁸ The trefoil knot is distinctive in having three ‘lobes’ which I use here to represent gender, discourse and technology. The interlocking lobes and the fused ends of the knot are used here to represent the interconnectedness of gender, discourse and technology and the symbiotic, co-constitutive nature of the relationship between the three as it is envisaged in this dissertation.

This study centres on the relationship between gender, discourse and technology as it is understood in a particular way. It is concerned with thinking about the three strands as partners in constant dialogue. It thus, for instance, does not consider technology as the ‘new’ factor in the equation whose arrival changes gender or discourse. To illustrate the relationship between gender, discourse and technology, I use the image of the trefoil knot, a picture of which appears on the cover of this book. There are three distinct ‘lobes’ or parts to this knot. Each is understandable as a separate part, but, on closer inspection, is connected to, and constructed by, the other two. In this mutually sustaining relationship, an understanding of any one of the three ‘lobes’ is not possible without taking the other two into account.

As discussed in Section Two of this kappa, my use of a knot as a means of thinking through the relationship between gender, discourse and technology is inspired by Haraway’s ‘imploded knot’. One of the strengths of the imploded knot is the way in which it can be disentangled to denaturalise the object of research. Disentangling the

¹⁵⁸ Definition of ‘Knot Theory’ from Wikipedia. <http://en.wikipedia.org/wiki/Knot_theory> [Accessed 28 July 2009].

material-discursive threads that make up a gene or a chip shows how their materialisation is the result of a long and ongoing process including multiple discourses and practices. The imploded knot thus foregrounds the material-discursive aspect of these entities. The knot of gender, discourse and technology as it is envisaged here is my focal point within each case study and the thread that links them together.

There is a cross-cutting dimension to consideration of this knot in the form of the material body. The norms governing what constitutes viable or unviable bodies are here considered as produced by the entanglements of gender, discourse and technology. This understanding starts from Judith Butler's suggestion that 'bodies only appear, only endure, only live within the productive constraints of certain highly gendered regulatory schemas',¹⁵⁹ schemas which encompass both discourse and technology. The repeated reciting of bodily norms is a political practice in which what 'counts' or does not 'count' as a body is constantly renegotiated. Comparison of the construction of these norms across different times/places/media reveals the situatedness of these norms, and of the discourse networks through which they materialise. However, these bodies are also 'generative nodes'.¹⁶⁰ The repeated performance of bodily norms that is required for a coherent (or 'viable' to use the Butlerian term) body is a generative process that takes place through gender, discourse and technology, but which changes them as it does so.

The three case studies of course do not exist in isolation. The convergence of info- and bio-technologies that permeates contemporary society underpins this dissertation. This convergence demands attention to the lived body and its discursive skin. All discourses shape or influence what is understood as the material, gendered body. Following Butler, we cannot know about our bodies what is not in discourse. However, as that 'discursive skin' is being stretched into increasingly cyborgian shapes, the entanglements of gender, discourse and technology appear more visible than ever before. The advantage to examining such apparently disparate case studies is that it provides a potent reminder of just how many ways in which the knot of gender, discourse and technology play a role in the birthing of these material-discursive bodies we inhabit, or as Smelik and Lykke

¹⁵⁹ Butler, *Bodies That Matter*, p.xi.

¹⁶⁰ Haraway, 'Situated Knowledges', p.200-201.

elegantly put it in the Introduction to *Bits of Life*: that ‘inextricable entanglement of material, biocultural, and symbolic forces in the making and unmaking of the subject’.¹⁶¹

This dissertation assumes that none of the case studies are separate, existing in individual, unconnected spheres. Rather, they feed one another, as similar cultural hopes and anxieties are worked through in different contexts. This study assumes that disparate contexts cannot and should not be studied separately, given that the same conceptual knot lies at the heart of each. Instead, placing them alongside one another suggests approaches or insights that might not come to mind if they were examined in isolation. This adds a richness to understandings of these contexts (and also of the knot itself) that strict adherence to disciplinary borders or particular fields would otherwise limit.

In this closing section, I will summarise the main findings from each article before returning to my two research questions to trace the differences and similarities *across* the case studies.

Article 1: ‘Gender resistance: interrogating the ‘punk’ in cyberpunk’

The first article in this study is entitled ‘Gender resistance: interrogating the ‘punk’ in cyberpunk’. In this article, I examine two cyberpunk texts to assess whether their apparent resistance to mainstream society includes resistance to gender stereotypes. Cyberpunk combines the technophilia of cyberculture with the anti-establishment attitude of punk. Here I suggest that much of the disruptive potential of this genre is derived from its integration of ‘punk’ as a discourse or practice of resistance to social ‘norms’. Punk explicitly sets out to upset preconceived notions of identity, subscribing to values which highlight ‘alternative’ ways of being.

I focus on Candas Jane Dorsey’s short story ‘(Learning About) Machine Sex’ – a feminist parody of cyberpunk – and Neal Stephenson’s novel *Snow Crash* – a ‘second-wave’ cyberpunk text. Dorsey’s text centres on female protagonist Angel, who creates a piece of software designed to programme the human body to orgasm. In so doing, Dorsey exploits the sexualised rhetoric of technology often seen in early cyberpunk, resulting in an ironic,

¹⁶¹ Anneke Smelik and Nina Lykke, ‘Introduction’ to *Bits of Life*, p.xiii-xiv.

open-ended narrative. Stephenson's novel provides an interesting counterpoint to Dorsey's text, bringing together 'classic' cyberpunk concerns about on/off-line life with contemporary social anxieties about bodily boundaries, religious fundamentalism, migration and global corporatisation. I deliberately chose texts whose relationship with first-wave cyberpunk is complicated either by an explicitly feminist standpoint (Dorsey) or a generational distance (Stephenson), in order to assess whether these authors avoid or succumb to the same critiques levelled at early cyberpunk about gender representation.

Cyberpunk is replete with hybrid figures, from subcultures generally associated with non-mainstream behaviours or attitudes, and both Dorsey and Stephenson's texts provide good examples of figures such as these. However, as my critique suggests, these have often been co-opted by the mainstream, or their disruptive, deviant appearance functions only as a mask for the reproduction of gender and bodily norms, this is particularly so in Stephenson's novel, where, despite elegant use of parody, the main characters ultimately reproduce the stereotyped gender roles of earlier cyberpunk texts.

As a parallel line of enquiry, this article is concerned with who and what these texts are resisting, and how this resistance is performed. This approach, however, also demands a closer examination of the positive connotations attached to 'resistance' in cyberpunk, and, consequently, to ask whose interests are not represented. To do this, I used the disruptive associations of 'punk' as a tool, looking not only at particular themes of resistance within the text, but also how the authors' innovative stylistic manoeuvres resist genre conventions. The biggest problem here lay in the way in which a simplistic binary between mainstream and subculture seemed to have become established within the genre, in which subculture was always 'good', and mainstream always 'bad'. This separation produced a mask under which reproduction of hierarchised gender roles, or reductionist connections along the lines of men/mind vs women/body were allowed to lurk. In the same way that punk could be said to 'depend(s) on boundaries and regulatory fictions staying in place to define itself as oppositional'¹⁶² so too could cyberpunk.

¹⁶² Daniel S. Traber, 'L. A.'s "White Minority": Punk and the Contradictions of Self-Marginalization', *Cultural Critique*, 48 (2001), 30-64 (p.32).

Article 2: 'Online negotiations of infertility'

In 2004 weblogs (or 'blogs') made the front cover of *New York Times Magazine*, marking them as the latest internet-based trend to take popular culture by storm. Although now used for a wide range of functions such as education, soft marketing and political commentary, blogs were originally a space for narrating personal life stories and as such have much in common with the autobiography or diary genre. Blogs have thus emerged as the leading technology for individuals to narrate their stories in a digital, public form, in dialogue with other bloggers and blog visitors. One of the best examples of this is (in)fertility blogs, which represent a distinctive subgenre of blogs in which women write about their experiences of trying to conceive, undergoing fertility treatments, adoption and pregnancy.

The second article focuses on personal narratives written by women trying to conceive, examining the ways in which these stories are told and shared through personal weblogs. 'Online negotiations of infertility' is the result of a series of email conversations and questionnaires with a small group of women bloggers. Together with extracts from their blogs, this paper asks: how does blogging allow these women to 'make sense' of their experiences of infertility? These blogs make visible personal narratives of infertility through their distinctive content, style and format.

These blogs are notable for their unflinching and detailed reporting of the medical tests and procedures which the writers undergo in their attempts to conceive, and the resulting emotional challenges they negotiate. The deeply personal content of the (in)fertility blogs suggests how new media technologies may allow women to challenge 'traditional' restrictions regarding publication of personal narratives of the body. As in many blogs, the (in)fertility bloggers negotiate the perceived public/private boundary through anonymity and password-protected posts where necessary. However, part of this negotiation also takes place through the interweaving of 'scientific' information about infertility with personal narrative. Although many of these procedures are complicated or technical, they are written about in a way which renders them comprehensible and accessible to the layperson. This 'translation' of the medical discourse provides information to other women going through the same process, but also reintroduces the lived body into what can seem like a very clinical experience. This sharing of

information through translating medical discourse, together with comments from readers and links to other sites, plays an important role in the community formation around these blogs. The communal, collaborative aspect of blogging was stressed by almost all of the women I spoke with, who cited support and information sharing with peers as one of the primary reasons for writing a blog.

In the second part of the article I turn my original question around to ask how the context and use of these women's blogs is shaping blogging? In doing this, I am following the feedback loop model as outlined by Lister *et al.*¹⁶³ In this model social dynamics influence the design and introduction of media technologies, the use of which then changes society as well as feeding back into the design of the next generation of media technologies. By re-examining the content, style and format of the (in)fertility blogs, I suggest that these women's use of blogs does expand on previous uses of blogs, moving as they do between the purely personal, unlinked narratives of early blogs and a more outwardly focused, link-heavy style of blog that has evolved more recently. However, it remains the case that the reception of these blogs and the understandings of the body they produce are limited by both contingent socio-historical conditions such as the continuation of a gendered public/private divide, as well as by the requirements of technical literacy, Internet access and the self-confidence to write a blog.

In this article, I show how the introduction of a new media technology (the blog) has changed the narratives of the body available, but also how blogs are embedded in broader contexts which shape their use and accessibility. Exploring how the (in)fertility bloggers 'make sense' of their experiences through blogging reveals the contingency and limitations of the 'sense' that is produced.

Article 3: 'What's in a name? The importance of nomenclature in biotechnology'

In the second article I touched on the role played by medical technologies in identity negotiation for women trying to conceive. The third article looks more closely at one of the ways in which medical science defines and categorises bodies. I examine the first guidance document published by the World Health Organisation on International

¹⁶³ Martin Lister, Jon Dovey, Seth Giddings, Iain Grant and Kieran Kelly, *New Media: A Critical Introduction* (London: Routledge, 2003).

Nonproprietary Names for biotechnologies, locating this within the broader context of drug naming and suggesting how these discursive mechanisms manage not only popular perceptions of the challenging field of biotech but also the gendered bodies on which these new drugs are used. As a way of exploring this less visible aspect of the biotech industry, I use a fictional representation as a conversation partner for thinking through the implications of these official documents.

In June 2006 the WHO published a review of the issues concerning INN for biotechnologies, reflecting a growing awareness of the challenges posed by novel therapies to the established scientific naming conventions. Like many aspects of the biotech industry, the process of naming and branding new drugs is complex and often shrouded in technical vocabulary. Examining fictional representations of biotech in parallel with analysis of the ‘real-life’ processes for product naming reveals some of the implications of nomenclature whilst rendering the scientific discourse more transparent.

First published in 2003, Margaret Atwood’s novel, *Oryx and Crake*, depicts a world destroyed by a human-made biological virus distributed in vitamin tablets by a biotech/pharmaceutical company. Through a series of flashbacks narrated by one of the few survivors, the events leading up to the global disaster are revealed. This novel paints a dystopian picture of the effects of biotech when controlled by a powerful few, and incorporates many of the themes of fear and distrust seen in popular press coverage of the biotech industry. Throughout the novel Atwood brings language to the fore, emphasising brand names and adapting the creation myth to ironic effect. Atwood’s treatment provides a helpful way into thinking about the current, ‘real-life’ guidelines and processes for naming a new medicine. In outlining these, I draw attention to the implications of defining a new mechanism of action or a new ‘family’ of medicines, and the role that naming plays in validating a novel product.

In particular, this article is concerned with examining how this discursive management of biotechnologies intersects with the construction of gendered bodies. It seeks to highlight those bodies which are rendered unintelligible due to not fitting into newly categorised disease/health boundaries because of limited access to health care or because their choice of gendered subjectivity does not chime with ideas about what constitutes ‘quality of life’.

Thus, this article also suggests how certain bodily norms may be reproduced or reinforced in reaction to the innovation and perceived boundary crossings of new biotechnologies.

Issues of nomenclature and definition remain an important priority for feminism, replete as they are with questions of what is included or excluded from a category. The existing body of work developed by Donna Haraway, Sandra Harding, and others on situated knowledges¹⁶⁴ promotes close examination of all aspects of science, including nomenclature. The biotech industry is a particularly relevant field to consider in this respect, characterised by highly novel therapies and smaller, dynamic companies, where products are often at early stages of development, and where there may be greater opportunities for involvement or intervention.

Article 4: 'Abject/noise: a new tool for feminist analysis of technoscience'

The fourth article returns to the topic of biotech, and to the assignment of INN to biotechnologies. However, its departure point is somewhat different to the previous article in that the focus here is a theoretical one, with biotech providing the empirical material to test a proposed new tool for feminist analyses of technoscience.

This tool is the result of synthesising two existing concepts from different fields: white noise from the field of media theory/information studies, and the abject from psychosemiotics/gender studies. The aim of this article was to create a tool for examining how norms governing viable and unviable bodies are discursively constructed in an increasingly technologised world. This article therefore engages more explicitly with the second aim of the dissertation to look at *how* the regulatory norms which govern viable bodies are constructed.

The understanding of white noise on which this article is based is drawn from the work of Friedrich Kittler. Kittler's work is marked by a strong media determinism which sees him making statements such as 'we can only ever know about people what the media are able

¹⁶⁴ Sandra Harding, *The Science Question in Feminism* (Ithaca: Cornell University Press, 1986); Haraway, 'Situated Knowledges'; María C. Lugones and Elisabeth V. Spelman, 'Have we got a theory for you!', in *Race, Class, Gender, and Sexuality*, ed. by Naomi Zack, Laurie Shrage and Crispin Shartwell (Malden, Mass.: Blackwell, 1998), pp.374-389.

to store and transmit'.¹⁶⁵ He suggests that one of the ways in which media determine our situation is by defining the boundary between what is considered 'sense' and 'nonsense', both literally and metaphorically. In his reading, there are thus two kinds of 'white noise': communications which are rendered 'white noise' because they cannot be captured/processed by inscription technologies and discourses which become 'white noise' because they are rendered nonsensical by the existing dominant discourses and forms of knowledge production.

This article synthesises white noise with the concept of the abject. Here I follow Judith Butler's reading of the abject as that which must be rejected in order to maintain subjectivity and coherent bodily identity. The materialisation of the body that happens through citing of the norms by which one becomes sexed simultaneously produces a 'a domain of unthinkable, abject, unlivable bodies'.¹⁶⁶ In this reading, the abject is positioned as beyond discourse, as a kind of necessary noise against which a viable, embodied subject is defined.

I then used Niklas Luhmann's reading of noise¹⁶⁷ as essential to the evolution of communication as the starting point for synthesising the abject and white noise. This synthesis proceeds as follows: both the abject and white noise are beyond discourse (albeit slightly different understandings of discourse), and rejection of both is a requirement for the emergence of coherence (bodily or discursive). Their disruptive presence on the edge of viable discourse both permits coherence through rejection of noise (i.e. by making it possible to make a distinction between sense and nonsense), but also offers a constant background noise that provides flexibility for change. If discourse marks the limits of what we can know about our bodies, then anything that influences those discourses plays a role in the reproduction of bodily norms. Synthesising the two makes it possible to examine specific examples of changing discourses to see the effect on the production of bodily norms. The synthesised term (abject/noise) both revalues the abject as necessary to changing understandings of gendered bodies over time/space and helps to connect discursive noise to lived bodies.

¹⁶⁵ Kittler, 'Gramophone, Film, Typewriter', p.30.

¹⁶⁶ Butler, *Bodies that Matter*, p.xi.

¹⁶⁷ Niklas Luhmann, *Social Systems*. (Stanford: Stanford University Press, 1995).

Having outlined this theoretical tool, the second part of the article returns to the documents published by the WHO concerning INN for biotechnologies, as a way of demonstrating how abject/noise can usefully aid analysis of how technoscientific discourses construct norms governing bodies. The INN documents concerning names for biotechnologies are one example of how the threats and challenges perceived to be posed by biotech are managed, which, as noted in the third article, often involves reinforcing existing power structures, such as those of gender relations.

This article looks at three different versions of the same review document produced over a two year period, tracing the changes between the different versions as examples of the shifting border between 'sense' and 'nonsense'. Biotech is a space in which bodily norms are being renegotiated due to the challenges it is perceived to pose to categories such as 'human' and 'natural'. I suggest that one of the places in which these challenges to ideas of the 'human' are played out is in regulatory documents such as these. Using abject/noise to analyse these documents highlights a connection between discursive disturbances (as demonstrated by the differences between the three versions of the INN document) and disturbances in the bodily norms being negotiated. Finally, this article asks: if biotechnologies challenge ideas of the human and the anxieties resulting from this challenge can be seen in the INN documents, then what new kinds of bodily norms are being produced from these disturbed discourses? On this point, the documents are strangely silent. Despite one of the primary aims of the INN process being to ensure safe prescription of drugs, the absence of any bodies in these documents hints at a worrying disconnection between the formal, regulatory process of INN assignment and the impact on patients' lived bodies.

Concluding comments

This is not just another piece about gender, or discourse, or technology, or any combination of the three. This is the piece that I wrote. The view from here. The choice of case studies is personal and unique. It could only have been written by me. The conclusions I draw are situated, limited, because of the choices I made. The perspectives on the knot that each case study provides and the bodily norms which are under

construction therein are situated too, by virtue of their socio-historical contingency and my own reading. The case studies are overlapping fragments from a broader picture. This particular combination, this reading is the uniqueness of the study.

One of the advantages of working across disparate case studies, however, is the unexpected connections that can be made, ones which strict adherence to one particular field might limit. The differences between the case studies also demonstrate the flexibility of the knot model as it shifts across different media.

In Section One of this kappa, I emphasised that this study is based upon the idea of gender, discourse and technology as co-constitutive. In the opening paragraphs of this final section I proposed the knot as a way of modelling this entangled relationship. In the last few pages of this kappa, I want to use the knot to answer the two research questions which I posed at the start. I will summarise how the knot of gender, discourse and technology forms, and the ways in which the norms governing the construction of bodies function, in each case study. Following that, I will look across all three case studies to suggest how they are similar and how they differ.

In cyberpunk fiction, the discursive construction of characters' gender and accompanying bodily norms is explicitly played out in 'intra-action' with the technologies described. In some texts (particularly earlier ones), this produced stereotyped or simplistic gendering of characters which reinforced a dichotomy between cerebral masculine identity and embodied feminine identity. For example, 'desirable' women often have technologically enhanced hyper-feminine bodies, such as Molly in William Gibson's *Neuromancer*, while the male characters often gain power or respect by virtue of their mental capabilities. This is reinforced by the ways in which men are often the designers/advanced users of technologies in these texts, while women are predominantly consumers of the technologies (either in terms of bodily enhancements or lifestyle aids). Thus, the depth of engagement with technology is also a way in which ideals of femininity or masculinity in these texts are established and reinforced. The gender of the user thus also determines to some extent what 'counts' as technology in these texts. In this respect, these texts can be seen as products of certain existing discursive constructions of 'technology' and 'gender'. Meanwhile, the anti-mainstream, punk attitude and appearance of the characters mask the

reproduction of existing norms of ‘technology’ or ‘gender’ which were considered to be challenged by the human/hybrids who populate cyberpunk. Technology is here constructed through the gender of its user, and the performance of those genders through technology then reproduces and reinforces certain gender roles and ideas of technology. The bodily norms which emerge are of a techno-sexualised embodied feminine and a cerebral disembodied masculine.

In ‘Gender resistance: interrogating the ‘punk’ in cyberpunk’ I examine two cyberpunk texts which appear to be distanced from these earlier texts. However, as my analysis suggests, one of these texts fares better than the other in shifting the knot of gender, discourse and technology and breaching the norms governing the construction of bodies in these texts. In the case of *Snow Crash*, for example, approximately half of the action takes place online. This is a space in which the main female character is not comfortable, thereby limiting her role to assistant to the main male character who is represented from the opening pages as being equally comfortable on- and off-line. In contrast, ‘(Learning About) Machine Sex’ avoids many of the difficulties which stem from the ‘parent’ discourses upon which cyberpunk draws. This text is less technophilic in style, and has as its protagonist a woman who does not fulfil the ‘typical’ gender expectations of this genre in terms of both her appearance and her relationship with technology. The idea of ‘technology’ is also challenged through the ‘Machine Sex’ program which is the central premise for this text. In seeing the human body as something which can be programmed to orgasm, the ‘Machine Sex’ program redefines the human body as a technology akin to any other computer. Through parody and a fragmented structure, ‘(Learning About) Machine Sex’ departs from the recognised discourse of cyberpunk, thereby making space for alternative kinds of cyberpunk bodies, as epitomised by Angel, a ‘sweaty-smelling, disheveled, anorectic-looking waif’.¹⁶⁸ In *Snow Crash*, however, a technophilic punk discourse provides an appearance of radical alterity that merely masks the reproduction of gendered bodily norms.

In the second article, ‘Online negotiations of infertility’, the (in)fertility blogs represent a contemporary response to the well-established and authoritative genres of autobiography

¹⁶⁸ Dorsey, ‘(Learning About) Machine Sex’, p.81.

and medical narratives of pregnancy. Narratives of autobiography and pregnancy have produced distinctive discourses with clearly gendered limitations on who can speak about what. The result has been an absence of personal narratives about infertility being published/readily available. The user-friendly, flexible format of the blog has been adopted by many groups, including women struggling to conceive. The characteristics of the (in)fertility blogs (written in the first person, linked to a community of bloggers, but with distance between blogger and audience maintained by non real-time posting, the blogger's power to remove comments and remain anonymous if wished) has given a specific group of women the opportunity to write and publish their narratives of (in)fertility. This has not only produced a new hybrid discourse which combines personal experience and medical information, but has also given the bloggers an opportunity to make sense of their experiences in a supportive space and to make these narratives visible for others to read. In this way, new discourses about women's bodies emerge that make public the changing sense of self (and femininity) caused by experiences of infertility. Blogging, however, assumes technical literacy and access, which means that the narratives that are published represent a relatively small group of women's experiences of infertility. In these blogs, bodily norms are constructed in a complex interplay between public and private space, and between medical and autobiographical narratives of the female body, specifically the female body struggling with infertility. The bloggers self-professed difficulties with their own sense of femininity in light of infertility reveals one of the assumptions on which the construction of bodily norms is based for these women. In this case study, the process of renegotiating how to feel like a woman when struggling to conceive is made public through the act of blogging (a new discursive, technologically mediated performance of their bodies). Ultimately, however, the question remains whether their negotiations challenge or reproduce the connection between femininity and fertility.

The third and fourth articles both draw on material from my research into one of the nomenclature processes used in biotech; documents about the assignment of INN to biotechnologies by the WHO are used as both conversation partner to a novel about biotech, and also as testing ground for a new analytical tool. Both articles stress that biotech is characterised by the convergence of powerful discourses about the body (legal, medical, regulatory, popular). The assignment of INN to biotechnologies is one aspect of

a larger network of material-discursive practices which manage anxieties about innovative biotechnologies but which also contribute to the management of changing notions of the body, and the ideal patient body. If, as Rosalyn Diprose suggests, ‘biomedical science has a role in the constitution of our being as a discrete entity and is not just a mode of reparation of that being’,¹⁶⁹ then the challenges that biotechnologies pose to ideas of the human as well as to what constitutes ‘diseased’ or ‘healthy’ bodies have significant consequences for the construction of bodily norms. As I outline in the third and fourth articles, responses to these challenges may take the form of incorporation into existing discourses on gendered bodies or erasure of the body. In the biotech case study, the renegotiation of bodily norms prompted by biotechnologies which challenge notions of the ‘human’ is erased from the discourses of INN assignment and the dissemination technologies used by the WHO. The process of assigning INN to biotechnologies is one part of a broader renegotiation of bodily norms taking place in this arena. The un-body necessary for bodily coherence and subjectivity includes here both nonhuman bodies, but also the non-ideal patient bodies whose symptoms do not fit the profile of a drug. Of all the case studies, the norms governing bodies are most heavily regulated in biotech, due to the convergence of powerful discourses. Here questions of responsibility for lives are carefully managed by the discourses which explain and limit the effects of the biotechnologies. Anxiety about biotechnologies is counterbalanced by reiterating existing powerful discourses about bodily norms or by minimising the areas of uncertainty through their absence in public documents.

Similarities and differences

All three case studies demonstrate genre crossing or combination in terms of the discourses which converge therein. In the case of cyberpunk, the convergence of discourses from punk and technology has reinforced the notions of gender and bodies seen in the parent genres. While the content of these texts is characterised by innovative technologies, the ways in which gender and technology are constructed in the parent discourses can undermine the appearance of alterity which the content suggests. Dorsey’s discursive departure from the structure and style of cyberpunk ultimately produces the most interesting challenge to notions of ‘gender’, ‘technology’ and bodily norms. In the

¹⁶⁹ ‘A ‘Genethics’ That Makes Sense’, in *Biopolitics: A Feminist and Ecological Reader on Biotechnology*, ed. by Vandana Shiva and Ingunn Moser (London: Zed Books, 1995), pp.162-173 (p.165).

case of the blogs, autobiography converges with medical narratives about the female body. The content of the blogs, however, departs significantly from the parent genres, and women's personal experiences of infertility are made publicly available. Ultimately, however, it is not restrictions on what content is considered 'suitable' for the public domain which limit the scope of these blogs but rather the value placed upon personal narratives written by women about bodily or domestic experiences. In the case of biotech, the INN documents draw on scientific discourses which use technical terms, the third person and a 'neutral' tone to describe biotechnologies. As a public document written by and for both scientists and non-scientists, however, it cannot be couched in scientific terms throughout. The opening sections, for example, are explanatory and clear, but still impersonal and authoritative in tone. However, as the comparison shows the discourses are disrupted through rapid revision of the documents and moments where the carefully worded statements slip into uncertainty and vagueness. These genre convergences show that the case studies are not isolated, but rather emerge from overlapping, contingent discourse networks. The bodily norms of the parent genres emerge to greater and lesser extents across the case studies, but their presence is felt in all.

Collectively, the case studies suggest that the entanglement of gender, discourse and technology is a shifting yet constant factor in a range of contemporary negotiations of identity. No one of the three strands can be considered without taking into account the other two. Furthermore, gender, discourse and technology are not just linked but co-constitutive of one another. In this sense, this dissertation builds on existing work showing the co-constitution of gender, discourse and technology, bringing the three strands together to examine three distinct case studies from different domains. The case studies show that relationship between gender, discourse and technology holds across any of the arbitrary borders of 'fact', 'fiction', 'science' or 'literature' which could be used to categorise the individual studies.

Comparing the case studies, however, also reveals some important differences between them. The connection between the knot of gender, discourse and technology and the construction of bodily norms is more explicit in the cyberpunk case study than the biotech one, for example. The synthesis of human and machine is a central theme of cyberpunk fiction, and the hybrid bodies this produces have long been part of the genre. However, in

the comparison of the two texts the construction of certain bodily norms becomes more clear. Dorsey's treatment of Angel in '(Learning About) Machine Sex', for example, significantly challenges the unproblematic human-machine synthesis seen in much fiction in this genre, while the different ways in which this synthesis takes place in both this text and *Snow Crash* reveal how discursive constructions of human-machine hybrids produce different norms of gendered bodies. In biotech, however, the bodies disappear either through the close focus on one organ or tissue that is the hallmark of targeted biotech therapies, or in an attempt to manage anxieties about changing notions of the body. Whilst an absence of explicit reference to bodies and bodily norms does not by any means assume a lack of bodies, this absence makes for a more challenging analysis of the construction of bodily norms. I suggest that the process of naming new biotechnologies is an important part of a range of discursive tools employed to construct ideas of the 'human' body and the 'ideal' patient body. Changes to the naming process reflect a broader sense that biotechnologies are somehow 'different' to previous drugs and the 'noise' in the INN documents shows that the WHO is not unaware of this.

These differences in ease of analysis across the case studies in terms of the construction of bodily norms are the result of the differing kinds of regulation under which each one functions. Science fiction and cyberpunk have a long tradition of innovative style and content; the bodies in these contexts can be more easily relegated to the realm of 'fiction'. This perspective has ensured that cyberpunk retains a greater degree of freedom to imagine non-normative bodies, images of which then filter popular consciousness in the form of books, films and metaphors. Biotech is the most heavily regulated of the case studies. The plethora of 'authoritative' discourses which constitute it testify to the cultural weight it carries and contribute to the absence of non-normative bodies. Blogs sit halfway between cyberpunk and biotech in terms of regulation. The (in)fertility bloggers experience relative freedom to write what they want about their bodily experiences and renegotiations, although a few admit to maintaining anonymity for fear of adverse reactions to the opinions they express. Their personal narratives of fertility technologies are regulated by concerns for their loved ones who read their blogs, but also by the peer-review process of adding hyperlinks. In their case, what constitutes 'reliable' information about infertility is determined by the community.

This section has outlined the understanding of the relationship between gender, discourse and technology which underlies this dissertation using the model of the trefoil knot. This knot is made of one thread with three distinct 'lobes'. This knotting together of gender, discourse and technology produces norms which govern the construction of material bodies. The lived experiences of material bodies also feed back into the knot through the challenging perspectives on technology provided by cyberpunk fiction, the 'translation' of medical discourse done by women blogging about infertility, and the changes to existing nomenclature schema of biotechnologies shown in the rapid revision of regulatory documents.

The case studies are specific, contingent examples of the knot, but they are not isolated or disconnected ones. Reading across them shows how the norms governing bodies are repeatedly re-constructed and regulated in these negotiations with technology, albeit in different ways and to differing extents. The women in cyberpunk physically absorb or synthesise the technologies as part of their construction of their gendered, desiring bodies, while the (in)fertility bloggers use technology to literally write themselves a new set of bodily norms. In biotech, however, the technology is held at arm's length from constructions of bodily norms. These differences are not only about regulation, they are also about comfort with technology, and they highlight the somewhat paradoxical relationship that contemporary society has with technology. Fascinated, fixated upon and feared, the crux of the matter is the lived body, the major areas of negotiation are over how these always, already, discursively gendered technologies impact the bodily norms that determine the limits of viable and unviable bodies.

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