Disabled Monsters

Performing Prosthetic Technologies and Ambivalent Bodies

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Abstract

This practice-led research endeavours to recognise the consequences of dualistic knowledge systems on the way people with disabilities and their assistive technologies are framed, understood, and communicated. The researcher's own hearing 'impairment' and hearing aids are used as a springboard for the research.

A textile-based practice is utilised by the researcher — who here is articulated as *researcher-as-event* — as a vehicle for conceptual and material exploration of the hearing loop, an assistive hearing technology. This practice is used to understand the way in which a making practice might shed light on bodies not as static wholes, but as fragmented, becoming-bodies in motion.

The work delves into the cyborg, an associate of the *monster* — the ambivalent figure that exists at once as self and other, friend and enemy, disrupting binary hierarchies. Science Fiction discourse is employed as an approach to understand the ways in which our fictional representations of the monster/cyborg impact our perception of prosthetic devices, and those who use these. The notion of the *super body* and *the transplantable* body are employed as a method to reveal how these ambivalent bodies lend themselves to reactions of abhorrence and fascination. Through Science Fiction narratives, the prosthesis becomes an emancipating friend, a too powerful enemy, or simply a fearful reminder of the frailty and fragmentation of the body.

Notions of performativity and assemblage are considered in their capacity to address the way in which monstrous/cyborg/disabled bodies might not perform against ambivalence, but *through* and *with* ambivalence. This research presents a way of considering the monstrous/disabled/cyborg body not as partial, but as fluid, connected.

This research does not intend to domesticate the monster, but to embrace it. For if we are all monsters, no one is.

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I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.

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Chapter 1: Introduction

My first hearing aids, acquired at the age of four, were bright pink and transparent. They were at once both fascinating and confusing. Since, I have had four pairs: each has brought me joy, frustration, anger and wonderment. At once they are my greatest enemies and my most enduring friends. As this research will contest, they are *monsters*, strangers: as am I.

My 2013 honours research, *Space/Body/Bits/Atoms*, explored the intermingling of bodies and technologies. The research examined our understanding of digital technology as *prosthesis*, with its own section titled "Extending the Body: Digital Prostheses". Expanding on Katherine Hayles' (1999) notion of the posthuman as *material-informational entity*, sound was exploited as an example of an "informational prosthesis", extending and amplifying my body. My own *disability* and hearing prostheses were not referenced. However, upon reflection, there was a realisation of the implication that such research could have on my own experience of body and technologies, an understanding of my own prostheses. This research intends to expand upon that realisation by seeking to understand the way in which the theorisation of the intermingling of bodies and technologies intersects and speaks to the lived experience of disabled bodies and their technological, prosthetic parts.

We are at a pivotal juncture, sketching out a vision of our intersection with emerging technologies. The term prosthesis is often nonchalantly littered through such visions, becoming a "tropological currency for describing a vague and shifting

constellation of relationships among bodies, technologies and subjectivities" (Sobchack, 2006, p. 19). However, there has been a call to return the prosthetic to the lived body, understanding how the prosthetic is not only theorised, but embodied (Jain, 1999; Sobchack, 2006; 1995).

> With every tool man is perfecting his own organs, whether motor or sensory, or is removing the limits to their functioning . . . Man has, as it were, become a prosthetic god. When he puts on all his auxiliary organs he is truly magnificent: but those organs have not grown on him and they still give him much trouble at times. (Freud, 1930/1962, p. 42 cited in Jain, 1999, p. 31)

Here Freud alludes to one such embodied experience, he enlightens us with his contradictory description of the magnificent god-like enabling of technology, and simultaneously a troubling technology (Jain, 1999). We are shown the way in which Freud experiences his prosthesis[1] not only as a friend, but also as an enemy.

This is not the only paradox the prosthesis reveals — it blurs the line between interior/exterior, machine/body and self/other, upsetting our dualistic understandings of the world. This research seeks to highlight the paradoxes and binary hierarchies that exist when thinking about and existing as bodies in technologies. How does this ambivalent understanding of the prosthesis, and the body who dons the prosthesis, play out in our binary driven society? How do disabled bodies exist in a world that challenges disabled with abled, deaf with hearing, and machine with man?

This research aims to explore this, to trace the joys, frustrations, and experiences of bodies in technologies. It hopes to reveal and question assumptions, to engage with the way in which technologies — and the theorisation of technologies — have the potential to enhance, categorise, and fix disabled bodies. Furthermore, this research seeks to understand how this theorisation might be destabilised in order to allow an alternate consideration of disabled bodies and their technologies, re-evaluating how the either/or notion might be abolished.

This will be explored through a process of both textual and textile practice, drawing together understanding from multiple disciplines, including Disabilities Studies,

1 Freud acquired an artificial palate, after the original was removed in 1923 due to throat cancer. The prosthesis caused Freud immense pain, however he could not eat or speak without it (Jain, 1999).

Sociology, Feminist Technoscience and Science and Technology Studies. E-textiles will be assembled with the theory as a way of exploring an experimental practice that speaks to the universal experience of being in technologies.

This research will integrate knowledge from a wide range of theoretical discourses, beginning in Chapter 2 with an introduction to Theories of Disability. This research is not grounded specifically as Disability Studies, and has no intention on speaking on behalf of all with disabilities. However, it is vital that previous literature is taken into account, to understand how previous ideas might allow us new ways of moving forward in thinking about disabled bodies and technologies.

Chapter 3 will outline the significance of the cyborg figure to understanding how our fantasies of bodies in technologies frame and reference disabled bodies. Enhanced, *super bodies* such as Aimee Mullins', and replacement, *transplantable bodies* such as my own — both considered here as monstrous — are discussed in terms of how such bodies manage feelings of fear and fascination. Notions of the masquerade, passing and parading are introduced as ways of revealing, and concealing and embracing the prosthesis through performance.

Chapter 4 contextualises and frames the research methods. Developing on Judith Butler's (1988) notion of performativity, the research considers how we perform our cyborg, and disabled bodies. Arguing against purely social and purely technical notions of technological development, the research seeks to understand how new methods of approach might disrupt our value-affirming design practices.

Chapter 5 reflects on the practice of myself as *researcher-as-event,* understanding the way in which a textile practice exploring an assistive technology might allow us to rethink the disabled body as a discrete entity; how we might immerse ourselves, through textiles, into the lives, and assemblages of others.

> Disabled people need to introduce the reality of disability into the public imagination. And the way to accomplish this is to tell stories in a way that allows people without disabilities to recognise our reality and theirs is a common one. (Siebers, 2008, p. 48)

This is the purpose of this research: to reveal and trace a shared reality. For, as Don Ihde (2002) asserts, we are all bodies in technologies.

Chapter 2: Theories of Disability

The Individual and the Social

Colin Barnes (2011) points to the complexity and difficulties of defining the term disability as varying contexts and cultures influences its definition. Two principle attitudes towards disabled bodies have been embedded into Western civilisation, which are reflected in the individual model of disability, and the social model of disability. One points to disability as the problem of the body, while the other faults society.

The individual model of disability offers medically elaborate labels of lacking bodies in need of fixing, focused on diagnosing symptoms of individuals. Disability thus becomes a defect in need of curing in order for those with these broken bodies to lead full and normal lives (Siebers, 2008). This medical outlook sees disability as a personal tragedy (Oliver, 2009; 1996; 1990). The model narrows a complex problem into a neat box, where disabled bodies can be simply described, distinguished and improved. Contrarily, the social model of disability, which was argued by disability theorists in the nineteen seventies and eighties, takes a different tact — understanding disability instead, as a product of social injustice (Siebers, 2008). The social model argues against bodies seen as being disabled by their difference, but instead, argues that they are disabled by society's response to their difference: disability is a social construction.

Mike Oliver (2009; 1996; 1990) states that the model was developed from the distinction between disability and impairment made in the Union of the Physically Impaired Against Segregation in the Fundamental Principles document:

> **Impairment**: Lacking part or all of a limb or having a defective limb, organism or mechanism of the body; **Disability**: The disadvantage or restriction of activity caused by a contemporary social organisation which takes no or little account of people who have physical impairments and thus excludes them from the mainstream of social activities. (UPIAS, 1976, p. 3–4)

Impairment is then pre social while disability enters existence when culture "gives the impairment meaning" (Goggin & Newell, 2003, p. 21). This segregation of disability and impairment draws a line between "the material body and its characteristics, and the social response to such a body" (Shildrick & Price, 1996, p. 97). The social model disentangles the social body from the physical, which according to Margrit Shildrick and Janet Price, "implicitly accedes to the binary oppositions of public/private, self/the world" (1996, p. 97).

An attempt to distance from the individual model meant seeing impairment, and in effect the body, as inconsequential, while the now, disembodied subject fought against social injustice (Shildrick & Price, 1996). The social model avoided the admittance of pain and other discomforts felt by disabled bodies. Acknowledging such experiences meant risking "oppressors seizing on evidence that disability is really about physical limitation after all" (Shakespeare, 1992, p. 40 cited in Oliver, 2009, p. 26). Here, we see a hierarchical split between body and mind, where the body is rendered invisible. In effect, the social model silenced the lived experiences of disabled bodies (Shakespeare, 2012; Hughes and Paterson, 1997).

The social and individual models point to an ambivalent attitude towards the body: at once we are told that our bodies matter, that they are in need of fixing, and that they are of no consequence, to be suppressed and ignored. Neither attitude can fully encompass the lived experience of disability. People with disabilities are not exempt from the confines of their bodies, nor are they simply bodies. Drew Leder (1984) highlights the exposure of the organismic body during pain or suffering. This pain or lack brings into focus the lived experience of the body, described by Leder as:

> . . . An irrefutable experience of mind-body unity. That the body is not a mere extrinsic machine but our living center from which radiates all existential possibilities is brought home with a vengeance in illness, suffering, and disability (Leder, 1984, p. 34).

When our bodies don't work as they should, when our palms itch, we stub our toe or our hearing aid battery dies, we become acutely aware of our embodiment: bodies cannot be so easily forgotten. Pain or discomfort "constitutes a moment in which the biological, the emotional and the social collapse into one another" (Hughes, 2000, p. 12). Oliver's (1996) assertion that "impairment is in fact nothing less than a description of the physical body" (p. 4) is now fragile. Impairment is more than its description; it is a complex, discursive interplay between emotional, social, and biological facets of lived experience. Impairment is a part of our daily lives and as Tom Shakespeare and Nicholas Watson (2001) claim, "we are not just disabled people, we are also people with impairments, and to pretend otherwise is to ignore a major part of our biographies" (p. 11). We cannot be considered simply as physical or social just as we cannot be considered simply as mind or body.

Complex Embodiment

One way of acknowledging the complex relationships between the social/psychological and physical body is the utilisation of an embodied ontology, or *complex embodiment* (Siebers, 2008). Unlike the social and individual models of disability, complex embodiment rejects the Cartesian mind/body and body/culture splits, believing rather that we *are* our bodies. Our social and physical bodies are not disjointed: we do not exist in any disembodied sense, extricated from our fleshy organs ,"the body is a vehicle for being in the world" (Merleau Ponty, 1964, p. 84). Complex embodiment explores what a body can do and exploits lived experiences rather than taking them for granted. Rather than attempting to untangle and categorise aspects of disability into separate parcels, complex embodiment acknowledges and examines the evolving relationship between these diverse facets. Disability is not static, but ever changing: "a universal experience of humanity" (Shakespeare, 2012, p. 221).

Technology and Embodiment

Technology has impact on the lives of those who live with disability — their individual, embodied experience of disability and impairment relies hugely on technology. Fifty years ago, my own hearing loss would be experienced in a far more debilitating way owing to the infancy of hearing technologies. It is clear that technology should be included in the account of disability. Previously, technology has remained largely untouched by disability theorists, perhaps because technology is so tied up in lived experience; bringing attention to the use of such technologies might draw attention away from the social discourse in the way that admitting pain might.

While there have been some sound discussions in regards to design for disability[1] and digital technology and disability[2], this research will employ an embodied ontology, opening up the potential to explore disability not as a given category but as a "universal experience of humanity". As Shakespeare and Watson (2001) argue there "is no qualitative difference between disabled people and non-disabled people, because we are all impaired" (p. 27).

Seeking to explore the disruption of binaries, this research returns to the body and its embodiment of technology to critique abled/disabled, body/social distinctions. To begin, the cyborg will be utilised as a means for understanding how disabled bodies and technologies are understood and framed through fictional narratives.

1 Notably Design Meets Disability (2009) by Graham Pullin
2 Notably Digital Disability (2003) by Gerard Goggin and Christopher Newell

Chapter 3: Bodies in Technologies

Technobodies: Cyborgs and Prosthetics

Many scholars refer to our fascination and fear of cyborgs in movies and television series such as *Terminator* (1984), *Six Million Dollar Man* (1973), *Bionic Woman* (1976–1978) and *Robocop* (1987) (Featherstone and Burrows, 1995; De Preester, 2011; Ihde, 2008; Wilson, 1995; Reeve, 2012) recognising how these "splendidly capture the eye bulging, mouth gaping, yearning for cyborgian evolution" (Wilson, 1995, p. 243). Manfred E. Clynes and Nathan S. Kline first proposed the term cyborg in 1960 as "self regulating man-machine systems" (1960, p. 27). The cyborg, as Clynes and Kline defined it, purposefully "incorporated exogenous components extending the self-regulatory control function of the organism" doing so to adapt to new environments (1960, p. 127). Often engaging with the domain of discussion around the cyborg is the disabled body — particularly as it relates to the prosthesis, which can be seen to elevate disabled bodies to cyborg status (Reeve, 2012). The cyborg account has been a way for many scholars to understand and explore the technology/body relationship (Haraway, 1985; Featherstone and Burrows, 1995; Tomas, 1995; Balsamo, 1995; Wilson, 1995; Klugman, 2001; Zylinska, 2002; Muri, 2007). This research utilises the cyborg as a useful lens for thinking about how disabled bodies, might be altered, framed and understood in terms of technologies.

Cyborg as monster.

This research recognises the cyborg as a boundary figure, one that transgresses the borders of assumed binary oppositions. The cyborg, through its inability to be contained within man/machine, nature/culture binaries fractures these hierarchical oppositions (Toffoletti, 2007; Shildrick, 1996; Smits, 2006). Anne Balsamo (1995) stresses, "when seemingly stable boundaries are displaced by technological innovation (human/artificial, nature/culture), other boundaries are more vigilantly guarded" (pp. 216 –217). Cyborgs, as described in writings such as Donna Haraways' (1985), attempt to tear down these vigilantly guarded boundaries: particularly male/female boundaries. Cyborgs can be likened to the monster — ambiguous, borderless creatures which avoid being compartmentalised. Monsters show us the "other of the humanist subject" (Shildrick, 1996, p. 2). While concepts of the cyborg and monster have been exploited by (often feminist) theorists to critique the boundaries of hierarchical distinctions between male and female (Shildrick, 1996; Haraway, 1985; Toffoletti, 2007), in this same vein, they also have potential to challenge and disrupt other dualisms, such as able/disabled, normal/abnormal and medical/social.

Monster can refer to either the cyborg body or disabled body, each avoiding categorical distinction and a perceived wholeness. These bodies threaten to not simply "overrun the boundaries of the proper" but "promise to dissolve them" (Shildrick, 1996, p. 2). Martijntje Smits (2006) aligns the monster with anthropologist Mary Douglas's work on impurity and danger. She indicates the transgression of categorical boundaries allows monsters to be experienced as *matter out of place* (p. 494). The ambivalent nature of cyborg and disabled bodies restricts them from being transformed into *matter in place*, provoking abhorrence or fascination:

> The ambivalent induces fear. Fear is one of our reactions to things or situations we cannot understand or control. Fear is connected to the presentiment of radical unknown dangers. Fascination or reverence is another reaction to the unknown. (Smits, 2006, p. 494 – 495)

Fascination and fear of the monster originates not from complete otherness or detachment. Rather, the monster arouses an emotive response through its likeness

to the self: the monster is "neither wholly self nor wholly other" (Shildrick, 2002, p. 3). If we are to uphold the boundaries of the self we must distinguish the monster as the complete other, however the monster resists rejection through its familiarity. The monster is uncanny, "that class of the terrifying which leads back to something long known to us, once very familiar" (Freud, (1919) 2004, p. 76). Similar to Freud's *unheimlich*, the monster is familiar and unfamiliar at once.

The monster reads similarly to the *stranger* introduced in Zygmunt Bauman's (1991) work, *Ambivalence and Modernity.* "Friends and enemies stand in an opposition to each other. The first are what the second are not, and vice versa" (Bauman, 1991, p. 53). A distinction between friends and enemies allows us to distinguish "truth from falsity, good from evil, beauty from ugliness" (p. 54) and most importantly, self from other. Friends and enemies structure and symbolically order our world and bodies. Bauman asserts that the threat of the stranger is far greater than that of the enemy: the stranger disrupts these binary hierarchies established by the polarity of the friend and the enemy. The stranger avoids being known as friend or enemy, the stranger could be both or neither. It is this unknown that causes discomfort or fascination.

Bauman likens the stranger to Jacques Derrida's *undecidables*, that which "can no longer be included within philosophical (binary) opposition, resisting and disorganising it, without ever constituting a third term" (Derrida, cited by Bauman, 1991, p. 55). Bauman introduces some examples of *undecidables* — one of is which applicable to this research — the supplement. In French, the supplement refers to both an addition and a replacement. Hearing aids, glasses and wheelchairs may be considered supplements. At once, the prosthesis represents a site of excess and a site of loss, it simultaneously marks a body that lacks, and a body that is whole. The prosthesis is a monster, a stranger: neither friend nor enemy, self nor other.

A local playground has a wheelchair swing for disabled children, a sight rarely seen. It is familiar, in stature the swing stands as though it belongs. Its vivid, primary colours announce its status as a children's plaything. The swing acknowledges its membership to the playground; yet, simultaneously it is marked as unfamiliar, unsure of its place. Spatially, it stands apart from the rest of the playground, fenced off, and segregated. The swing is both and neither a friend nor enemy to the

playground. The swing is different, yet the same, a site of excess and a site of lack: it is the playground's monster. The child who uses the swing is too marked out as monster: the disabled body cannot escape monstrosity. Technological prostheses used by disabled bodies — such as wheelchair swings, hearing aids and walking frames — promise to redeem the body from its ambivalence by enabling the disabled body to more closely resemble the norm. Instead, the supplement swaps one stranger for another. The disabled stranger becomes the cyborgian monster: an ambiguous amalgamation of machinic and biological parts.

Cyborg fictions.

The cyborg-monster is approached through imaginative storytelling, for, as Shildrick states, "the monster operates primarily in the imaginary" (Shildrick, 2002, p. 9). Narratives, discussed here in the form of Science Fiction, trace the fascination and fear of the unknown. Storytelling often flags a return to a comforting dialectic where cyborg and technology are wrangled into friends or enemies. Through utopian and dystopian narratives we attempt to befriend or antagonise the cyborg. The research seeks to understand how cyborgs are framed in these fictions, and the impact of these fictional subjects has on the attitude towards disabled bodies and technologies.

Locating the cyborg.

Science Fiction has portrayed the cyborg in a number of different configurations. Craig M. Klugman (2001) offers a taxonomy of cyborgs across the Cartesian/non-Cartesian spectrum, which he cross references with the enhancement/replacement spectrum (enhancement adds, while replacement simply restores bodies). These bodies are defined as:

The transplantable body. This body is a replacement body, which use machinic parts to restore function. These cyborgs are already evident in medicine — those who use devices such as "cochlear implants, eye telescopes, and dental implants" (Klugman, 2001, p. 46) are transplantable bodies. In this sense my own body could be considered a transplantable body. The transplantable body utilises its prosthesis more as a replacement, than an addition.

The super body. The super body is much like the transplantable body, but rather than restoring function, the super body gains enhanced capabilities. This, according to Klugman, "comes closest to Clynes and Kline's original meaning of cyborg" (Klugman, 2001, p. 49). Like transplantable bodies, super bodies already exist, some who will be discuss presently. Just as the transplantable body utilises the prosthesis as replacement, we could perceive the prosthesis of the super body more as an addition.[1]

The disembodied mind. The disembodied mind goes a step further than the transplantable body whereby the brain can be removed from a body and placed into a new machinic body. This cyborg represents a Cartesian split between body and mind where one is able to exist without the other.

The linked body. The linked body is one, which remains unaltered, however, is able to be connected to computers via a machinic interface. This body can be seen as being disembodied through cyberspace. It upholds the Cartesian duality whereby the mind connected to the network renders the body irrelevant.

These cyborgian visions of the body, evident in Science Fiction, point to a paradox that underscore our longing for escaping bodily limits, while simultaneously perfecting the very bodies we wish to escape. This same paradox, evident in the contradiction of the social and individual models of disability, was revealed in Chapter 2. Narratives charting the disembodied mind and the linked body reveal a desire to escape bodies, while the super body and the transplantable body narratives emphasise an urge to perfect and enhance the human form. As Tobin Siebers states, "we are capable of believing at once that the body does not matter and that it should be perfected. We believe at once that history charts the radical finitude of human life but that future promises radical infinitude" (2008, p. 8). This drive to, at once, perfect the body and to overcome the boundaries of the skin has potential to upset our perception of disabled cyborgian bodies.

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1 Super bodies and transplantable bodies are evident in the bioethical "enhancement/ therapy" debate. Enhancement "is about boosting our capabilities beyond the species-typical level or statistically normal range of functioning for an individual" and therapy is concerned with "treatments aimed at pathologies that compromise health or reduce one's level of functioning below this species typical or statistically-normal level" (Lin and Allhoff, 2008, p. 253).

Transcending boundaries.

Thinking of technology as a tool to transcend the boundaries of the body rejects the lived experiences of the bodies with disabilities, or, in fact, any body. In *Beating the Meat / Surviving the Text or How to Get Out of This Century Alive* (2006) Vivian Sobchack criticises Jean Baudrillard's misreading of *Crash* (1973), written by J.G. Ballard. Sobchack accuses Baudrillard of forgetting his lived body, succumbing to the "brutal and erotic and technological" (Sobchack, 1995, p. 206). Sobchack claims that Baudrillard ignores the cautionary tale of Ballard, who warns of the death of affect. Rather, Baudrillard represents a body that is "thought always as an *object* and never lived as a *subject*" (Sobchack, 1995, p. 206). This research follows Sobchack's lead, grounding itself not in a body that is simply thought about as an object, but a body that is lived as a subject. Cyborgian narratives, such as those in the disembodied mind, and linked body spectrum, that seek to disembody through technology, show the same ignorance that the social model of disability did to lived bodies. However, the flesh cannot to easily be forgotten, as Sobchack stresses: "I have not forgotten the limitations and finitude and naked capacity of my flesh — nor, more importantly do I try to escape them" (Sobchack, 1995, p. 210). Focusing more in depth on cyborg bodies that more closely parallel lived experience — bodies of the transplantable body/super body spectrum — will further the importance of the embodied subject.

Adding and Replacing.

The notions of enhancing and fixing the body found in the accounts of transplantable bodies and super bodies are problematic for disabled bodies. Similar to the way in which the individual model of disability focuses its attention on fixing the physical ailments of disability, these narratives focus on making bodies better. Furthermore, the role that the prosthesis holds in the fixing of the body tends to elevate its value in these narratives, gaining an unwarranted perceived importance over that which it supposedly fixed (Sobchack 2006; 1995; Ihde, 2006; Wilson 1995). According to Sobchack, the prosthesis is "seen to have a will and life of its own" (Sobchack, 2006, p 23). Challenging this, she argues that her prosthetic leg "will never go out dancing without me" (Sobchack, 2006,

p 18). An elaboration on the fear and fascination that the prosthetic supplement lends to the body is important moving forward, for, as Shildrick (2015) remarks, "prostheses are rich in semiotic meaning and mark the site where the disordering ambiguity, and potential transgressions, of the interplay between the human, animal, and machine cannot be occluded" (p. 14). Here, the prosthesis will be framed from either side of its addition/replacement contradiction to unpack how both transplantable bodies and super bodies arouse fear and fascination.

Fascination: addition.

Fascination of the prosthesis as addition is evident in the case of cyborg Aimee Mullins. Mullins is a double lower leg amputee, fashion model, actress and sportswoman who has acquired over 12 pairs of legs (Mullins, 2009). By exhibiting her prosthetic legs — often alluringly across magazine spreads — Mullins attempts to redefine what a body is and can be. From her "glass legs" to her "cheetah legs" she indulges in the aesthetic and functional potentials of a cyborgian super body. Mullins believes that the conversation surrounding disability and technology should no longer simply be about fixing bodies, but about exploring the potential of bodies:

> A prosthetic limb doesn't represent the need to replace loss anymore. It can stand as a symbol that the wearer has the power to create whatever it is that they want to create in that space. So people that society once considered to be disabled can now become the architects of their own identities and indeed continue to change those identities by designing their bodies from a place of empowerment. (Mullins, 2009)

Here, Mullins clearly attempts to identify the prosthesis as an addition rather than a replacement: a liberating one at that. Though her attempt is earnest, some are critical that her body does not fracture any boundaries, but rather, she is established primarily as an "eroticised cyborgian sex kitten" (Smith, 2006, p. 47). As Marquard Smith postulates, "ultimately, her differently abled body does not challenge any esthetic conventions of beauty or offer (as some work in Disability Studies would have it) potentially disruptive possibilities in and of itself" (2006, p. 59). In an attempt to highlight the disabled body and to pass as disabled Mullins has paradoxically created circumstances whereby she can no longer be disabled, gaining status instead as a super body. This utopian exploration of her body seemingly contradicts her goal to bring disabled bodies to the foreground of

debate. Instead she destabilises the disability identity by equating it with the super body. Here, we see one monster swapped for another.

Fascination: replacement.

Mullins' body engenders a *technology as liberator* narrative, which is also reflected in the way "Deaf Person Hears for the First Time" videos spread like wildfire around social media sites. On these videos, comments from enthralled viewers enthuse over the amazing potential of these replacement technologies. These videos, however, show only one side of the story. Shinohara and Wobbrock (2010) cite how users of assistive technology, or transplantable bodies, acknowledged that contrary to the "stubborn belief that technologies are liberating for their projected user" (Goggin and Newell, 2003, p. 41) assistive technology did not "level the playing field" (p. 708). Technology cannot always replace limitation, let alone enhance. As Siebers indicates: "I know the truth about the myth of the cyborg, about how non disabled people try to represent disability as a marvellous advantage, because I am a cyborg myself" (Siebers, 2008, p. 64). The cyborg narrative too often forgets that technologies do not always overcome.

The technology as liberator attitude assumes that transparency exists between prosthesis and body — that the prosthesis overcomes to the point in which it is no longer experienced by the body. This is not the case. My hearing aids are not experienced as transparent. In fact, ironically, in this very moment, my hearing aids, in an attempt to connect to my unwilling Bluetooth device, have just blasted an uncomfortable static sound into my right ear. Prosthetic technologies are not seamless. They do not disappear, but become quasi-transparent (Ihde, 2007). Don Ihde (2007) accounts his experience of wearing hearing aids for the first time in *Listening and Voice: Phenomenology and Sound.*

> At first, I have to admit, while I recognized the improvement my devices provided, particularly in the conversation settings of home and seminar, the overall experience of hearing was clearly not anything like optical transparency with eyeglasses. My audiologist confirmed that this was, in fact, the normal experience for first-time users and urged me not to constantly remove the aids when I was not in the situations where they functioned best. He used the now-popular "the brain must relearn the process, so it needs the constant use to do this," also translated into, it takes a long time to become accustomed to hearing aids. (Ihde, 2007, p. 247)

Others, such as Sobchack (2006; 1995), have expressed this same yearning for transparency, not granted by their prosthetic technologies. New hearing aids always sound different to the last, each new set creating seams where there were none before. While Ihde's audiologist implies that this disruption is a normal experience for first time users of hearing aids, as someone who has worn hearing aids for (close to) an entire lifetime, this issue with transparency is not limited to first time users. Each new pair must be worn continuously for at least a month until the slightest resemblance of transparency exists. To understand that technologies fix and overcome disability means disregarding their seams, pretending that these don't exist, when lived experience indicates otherwise.

Fear: addition

On the other hand, the stronger, bigger, better view of technology portrayed in the narratives of super bodies cultivates a "cyborg anxiety" (Swartz and Watermeyer, 2008) where fear and horror arise from technology "catapulting a formerly disadvantaged person to an advantaged status" (Silvers, 2010, p. 5). This anxiety was palpable in the case of runner Oscar Pistorius. Like Mullins, Pistorius uses carbon fibre cheetah legs and can be considered a super body. His endeavour to participate in the 2008 Olympics lead to wide debate pertaining to whether his cyborg legs made him too powerful to compete with his non-disabled counterparts (Foley and Ferri, 2012). Such bodies disrupt what it means to be normal, playing on our fear of power and weakness. When disabled bodies become super bodies, normal bodies become vulnerable.[2]

Fear: replacement

While the super body creates a fear of powerful bodies, through addition, by disabling and making what were once able bodies vulnerable, replacement, transplantable bodies play on the fear of the lacking body. Prostheses used by transplantable bodies are always symbols of lack, the representation of a not-whole body. Robert Rawdon Wilson claims that "prostheses cause disgust as they indicate the collapse of the body, its fall from integrity" (1995, p. 250). Cyborg

2 Recent blockbuster movie Kingsman (2014), based on comic book The Secret Service (Millar & Gibbons, 2012), plays on this fear. The movie portrays a villain who quite literally slices and dices her victims with her sword-like prosthetic legs. While we might applaud the representation of an overly capable "disabled" individual, whether it reflects well on disability is questionable.

narratives fantasise so easily about the body as a machinic entity. However, the fact that machines lose parts as easily as they gain them is too frequently overlooked. Wilson sums this up:

> Would you (would anyone) choose to have yourself enhanced by the addition of prosthetic parts when that process, however it begins, must disintegrate your body, dissolving its boundaries and batter down the fortified castle of your identity? (Wilson, 1995, p. 251)

Furthermore, not only do these exhibit a site of lack, but they also illustrate a dependence on technologies that troubles our Western vision of the "sovereign autonomous self" (Gibson et al., 2012). Gibson, Carnevale and King (2012) assert that the binary distinction of independence/dependence arises from the assumption that our bodies are "separate and distinct from other beings and things" (p. 1895). The dependence of disabled bodies on technologies highlights, that perhaps, our own bodies are not the distinct, whole subjects we thought they were.

Depictions of cyborgs in Science Fiction instigate and reveal a fascination and fearfulness of the cyborg. The super body and transplantable bodies' prosthetic devices become emancipating friends, "too powerful" enemies, or simply a fearful reminder of the frailty and fragmentation of the body. However, as Rosemarie Garland Thomson asserts, it is the job of the disabled individual "to relieve the non disabled of their discomfort" (Garland Thomson, 1997, p. 13). So how is the ambiguous dealt with? How do transplantable/super bodies manage fascinated stares and salient discomfort?

Managing Cyborgian and Disabled Bodies.

Smits (2006) presents four ways of dealing with ambiguous subjects: exorcism, adaptation, assimilation and embracing. These four methods all resemble performances in which transplantable/super bodies implement themselves daily. Through passing, masquerading and parading, the prosthesis is revealed and concealed, banished and celebrated.

Exorcism/Passing

Exorcism attempts to expel the ambiguous subject completely. As Bauman states, "the prime choice is, of course, a radical cutting through the tangle of incongruencies by forcing the stranger to leave" (1991, p. 66). Evident in the attempted expulsion of Pistorius from the Olympic games, exorcism is the most straightforward, yet unethical, way of dealing with transplantable/super bodies. While these bodies might not be fully expelled from society, it could be argued that the development of invisibilised and discrete prosthetic devices is an attempt to eradicate and conceal their existence[3]. These technologies allow and encourage 'passing' by the transplantable/super body who is able to perform an identity of wholeness: transforming stranger status to friend. By concealing both prosthesis and disability, the monster and ambiguity is (seemingly) expelled.

Adapting/Masquerading

Adaptation endeavours to mutate the ambiguous body into a "phenomenon that will better fit into existing categories" (Smits, 2006). In similar vein, Bauman suggests building a "cultural fence", transforming stranger into "untouchable" (Bauman, 1991, p. 66). This is achieved "by discrediting the stranger; by representing the outward, visible and easy to spot traits", (Bauman, 1991, p. 67) doing so in order to other the stranger or to better fit it into an existing category. The fence has significance to the playground described earlier; the purpose of the fence is to make the swing untouchable to non-disabled children, prompting them to distinguish the swing as other.

The masquerade,[4] as it is described by Siebers, allows bodies to be in control of the revealing of "outward, visible and easy to spot traits", as a way of claiming "disability as a version of itself rather than concealing it" (Siebers, 2008, p. 101). Rather than minimising ambiguity by hiding the prosthesis as passing does, the masquerade exposes the prosthesis and its stigmatising mark — allowing non-

3 See Deafness in Diguise: Concealed Hearing Devices of the 19th and 20th Centuries (http://beckerexhibits.wustl.edu/did/) for an extensive history of such invisibilised hearing technologies.

4 This research only considers masquerade context of Sieber's description. The masquerade is understood in a number of different ways. See Tseelon (2001), Masquerade and Identities: Essays on Gender, Sexuality and Marginality for a wider discussion of masquerade.

disabled, non-cyborg bodies to apprehend the marked body as *matter in place*. Siebers accounts artist Joseph Grigely's experience of his own ambiguous deaf body, who remarks, "perhaps I need a hearing aid, not a flesh-colored one but a red one . . . a signifier that ceremoniously announces itself" (Siebers, 2008, p. 102). Grigley wishes to outwardly, visibly, don prostheses in order to reduce ambiguity. As Seibers claims, "he feels compelled to out himself as disabled, so that non-disabled people will not be confused" (Siebers, 2008, p. 102). Adaptation is about performing otherness, through revealing the prosthesis as a site of lack, reducing ambiguity.

Assimilation

Smits' preferred method for dealing with ambivalence is assimilation. The style of assimilation "is open to considering anomalies and monsters as a creative challenge to reconcile new technology (or bodies) and existing categories by adapting both" (Smits, 2006, p. 501, own note in parentheses). Assimilation shows how cultural categories may be adapted to fit the ambiguous subjects. Smits asserts assimilation as the most successful method of confrontation. This mode understands that cultural boundaries are fluid — here, not only does the transplantable/super body alter their performance, but also cultural boundaries must make way for them. The importance of this thinking is that it removes the problem of the ambiguous from being one that is dealt with by the individual, to recognition of the agency of the social in its approach. This approach might be seen in the outlook of the social model of Disability — rather than expecting the persons with disabilities to adapt to society, society too must learn to adapt to them.

The issue with assimilation is that it still upholds hierarchical binary distinctions — while the cultural categories are themselves critiqued, hierarchical boundaries aren't removed. Instead they are shifted to make way for the ambiguous. The goal in this research is to contest the existence of these rigid borders altogether. Assimilation does not allow strangers to be strangers, monsters to be monsters, cyborgs to be cyborgs, but resumes the hierarchies that these hybrids resist. As Bauman asserts, assimilation is vital "to the recognition of the extant hierarchy, its legitimacy, and above all its immutability" (1991, p. 105). While recognising the importance of understanding categories as "not set in stone" (Smits, 2006),

assimilation is not the goal of this research. The purpose, rather, is to understand how strangers, the monstrous, bodies with disabilities, cyborgian bodies, are not merely assimilated, but recognised as they are. The method of embrace could perhaps be seen as a more valuable approach.

Embracing/Parading.

Rather than simply concealing and revealing the ambiguous in an attempt to make it fit, embracing instead permits the phenomenon to be upheld as is. The subject "is eagerly seized and placed on a pedestal because of its exceptional status… The monster becomes a miracle or a saint" (Smits, 2006). This kind approach can be likened to the way in which Mullins embraces her status as super body. Mullins' performs a number of identities and bodies through her experimentation of the aesthetic and function of the prosthetic limb. She marks herself out as a marvellous monster, allowing the body to be seen not as a stable or fixed object, but a changeable, fluid subject. Mullins defies what it means to be abled or disabled, human or machine. Unlike masquerade or passing, Mullins' parading of her body does not seek to divert ambivalence, but to revel in it. She does not perform otherness to relieve the non-cyborg and non-disabled of their discomfort or fascination, she does not shy away from the stare but rather opens herself up to it, to rethinking the possible relationships between body and prosthesis, between other and self.

The parade is a presentation of the imaginary and the real, man and machine, self and other. While, as earlier mentioned there are some dangers in the fantastical, fictional and metaphorical displacement of prosthetic technologies and bodies, it could be argued that this enactment of the cyborg-monster might highlight new ways about thinking through and with bodies and technologies — not as hierarchical binaries, but as a fluid, ever-changing components. Following, I wish to outline an approach to this research that might be used to perform the monster.

Chapter 4: Approach to the Research

This section presents the underlying framework behind the practice-based work — the disassembly and reassembly of hearing loop technology, through a textile based making process (See Appendix A, Appendix B, and Appendix C for documentation of the practice).

Performing Identity

Judith Butler's (1988) essay "Performative Acts and Gender Constitution: An Essay in Phenomenology and Feminist Theory" argues, "gender is in no way a stable identity…. rather, it is an identity tenuously constituted in time — an identity instituted through a stylized repetition of acts" (p. 519). Butler asserts that gender is not something given, or something that we are, rather, it is something that we do, ingrained in the mundane acts and performativity of everyday life. Perhaps similarly, we can understand the previous highlighted notions of passing, masquerading and parading all as performative acts — a transplantable body/ super body identity is not fixed but rather a "regulatory fiction" (Butler, 1988, p. 528), constituted through repeated acts. Here, the performed acts are of masking and unmasking, the concealing and revealing of the prosthesis in order to deflect and exploit an ambivalence that it is similar to the revealing and concealing evident in the way in which over time Disability Studies has covered and exposed parts of its subject in order to control the way in which it is portrayed, thought about and discussed. Where these performances differ to Butler's understanding of performativity is that they are not unconsciously performed, but rather controlled

and regulated by the transplantable/super body.

The notion of performativity, as Butler examines it, allows consideration to how a different repetition of acts might produce other identities, for as she highlights, "its very character as performative resides the possibility of contesting its reified status" (p. 520). If masquerading and passing are acts that mask and reveal to divert ambivalence, how might we subvert the performance to instead instigate and face ambivalence? Mullins' parading allows us a way forward in thinking about how performance might be harnessed as a method of approach to embracing the monster. The disabled/cyborg identity, like gender, could be seen as not being something we are, but something that we do.

Performativity denies a true and whole identity, indicating that identity is not singular, but can be multiple — just as we see in Mullins' performance of various prosthetic bodies. This research contains, in both writing and in practice, the identity of researcher and researched, of subject and object, of self and other: multiple performed voices. There is the voice of researcher, of disabled body and of the monstrous-cyborg.

Estelle Barrett (2006) highlights the usefulness of such multiple voices in practice-led research. She explores Foucault's notion of 'the dispersed selves of the author' in his essay 'What is an author'. Foucault highlights that an author's name does not suggest a purely individual subject, but can be understood as several selves, each coming from different positions. These, Barrett asserts, provide "a springboard for reflecting on the multiple positions the researcher must occupy when reporting and writing up the studio process and its outcomes" (2014, p. 140). In this research, my dispersed selves have leaked through practice and text, blurring into each through an exploration of methods of doing, or performing research.

Performing Technology

Perhaps too we might be able to think about the development of technology as a part of this performance, for we are not simply bodies that perform solo, but we perform through and with our technologies.

So how does our technology come into being? The notion of technological determinism suggests that technologies are neutral and form the values of society; technological advancement has "an automatic and unlinear character" (Feenberg, 1999, p. 3). Society simply follows technological innovation. Critics of this theory propose the antithesis: technology does not simply shape society but rather is shaped by society — the social constructivism approach (Pinch and Bijker, 1987; MacKenzie and Wajcman, 1999; Feenberg, 1999).

These opposing approaches in a sense echo the social and individual models of Disability in their segregation of the material and the social. Neither seems to be able to describe technological development single-handedly: the social approach asks the material to adapt to the social, while the technological approach asks the social to adapt to the material. Haraway, however, has a different view: technology is "where the social and the technical implode into each other" (1993, p. 299). Technology cannot so easily be defined as a social or technical activity, just as bodies cannot be defined purely as social or material.

The values inherent in our technologies shape and order the way we come to understand the world as Langdon Winner (1999) claims: "the things we call 'technologies' are ways of building order in our world" (p. 32). Elizabeth DePoy and Stephen F. Gilson (2014) argue that rather than disability being "a real and stable entity" it is an "artefact of design and branding" (p. 3). Like Butler's notion of performativity, this calls out disability not as a given but as something enacted. Gerard Goggin and Christopher Newell (2003) suggest that prosthetic technologies end up contradicting themselves by generating solutions to problems that they themselves have created. Technologies such as hearing aids and cochlear implants "demonstrate how disability may be constructed by such systems, which are then appealed to, relied upon, and promoted as a way of ameliorating the situation which they are in part responsible" (Goggin and Newell, 2003, p. 10). The prosthetic device points to the site of lack and then attempts to fix it.

This research seeks to understand a method of design activity that disrupts this, to understand how prosthetic technologies might be designed in such a way that they do not illustrate or generate disability. What ways might the research approach technological development in order to uplift disability and turn it on its head?

Critical Design

Anthony Dunne and Fiona Raby (2001; 2013) refer to value endorsing design activity as affirmative design, that which reinforces cultural, economic and technical understandings of the world, or norms. They stress the importance of design activity that, instead of upholding these notions and normative understandings of the world, questions our assumptions. This, they consider, as Critical Design. Critical Design speculates by creating alternative scenarios that are pitted against our present to challenge our ways of thinking. Dunne and Raby stress that the purpose of this indulgence in exploring future outcomes is to "unsettle the present" rather than to predict the future (Dunne and Raby, 2013).

Our experience of technology seems to be increasingly transparent — "resurrected" only through fear or defamiliarisation (Wilson, 1995, p. 241). As long as our technologies are "ready-to-hand" (Heidegger, 1962 cited in Leder, 1984, p. 35) they remain hidden from view. This familiarity with technologies Dunne (2005) equates to technology as *pets*, that which we unquestionably allow into our lives. Our acquaintance with technology means we no longer interrogate values inherent in their use, which in turn creates a behavioural circuit (Dunne, 2005, p. 32). The role of Critical Design is to contrast the *pet* to its antithesis, the *alien*, which seeks to disrupt this behavioural circuit through user-unfriendliness.

Critical Design in practice.

While Critical Design was initially proposed as an approach to this research, it became problematic to utilise within context, as it does not embrace the monster. Critical Design rivals the pet against its other, the alien. Conversely the monster is at once both alien and pet. This research initially attempted to employ Critical Design, seeking to critique the discrete 'invisibilised' design of the hearing aid — protesting the way in which the design of small hearing aids implied that hearing impairment was something that should be hidden, something to be ashamed of. My own ear was moulded, and clay modelling was used to explore the aesthetic of the hearing aid (See Appendix D). Mullins' legs and quote (see page 14) were used as inspiration in an attempt to become the architect of my own identity.

This utilisation of Critical Design was unsuccessful in generating any new knowledge or ways of moving forward in the research. The intention simply came before the objects were created; nothing was revealed in the making process. Critical Design had the capacity to critique and disrupt the outcome, but wasn't able to disrupt the process or systems in place that made that object. Critical Design thus could be understood as practice-based, rather than practice-led research. Practice based research is concerned with the contribution of new knowledge through the production of artefacts, whereas practice-led research utilises practice, rather than the outcome of that practice, as its focus (Candy, 2006). This realisation meant changing tact — the research moved from being artefact-focused to practice-focused.

Another concern with Critical Design is that it felt as though my aim was simply to design "outward, visible and easy to spot traits" to "claim disability as a version of itself". The process of creating these purely aesthetic objects was concerned with masking and masquerade — adapting the monster into something that could be put-in-place more easily, as discussed previously (page 18). The process was working against ambiguity rather than with it, taming the monster rather than colluding with it.

Furthermore, Critical Design fell short as it upholds hierarchical binary distinctions by pitting alien against pet. The alien/pet binary reads much like Bauman's friend/enemy distinction: upholding dualist notions of what constitutes truth and falsity, good and bad, right and wrong. While the ambition of this research is similar to Dunne and Raby's — the disruption of the norm — this was not to be done through an antagonism to its other. Rather than simply critiquing what that norm *is,* as Critical Design seemed to do, the existence of the norm altogether was in need of critique.

What was taken from Critical Design is its spirit of subversion and disruption. However, the purpose of this disruption differs from Dunne and Raby's. Disruption here is not to domesticate the monster, to create a new norm where the monster might fit (and then may be disrupted again) but to disrupt the very notion of the norm to the point where disruption itself is obsolete. My intention is to explore how we might think of pets and aliens, facts and fictions, as not separate binary

distinctions, but how they leak into each other as they do in Haraway's (1985) cyborg where "boundary between science fiction and social reality is an optical illusion" (p .117). The cyborg blurs social reality, fiction, man and machine allowing the structuring of "any possibility of historical transformation" (p 118). As a strategy for exploring the fluidity of bodies, Critical Design is too categorical and ceased to be an effective tool for this exploration. Furthermore, my inspiration drawn from Mullins' was misguided; Mullins' body is not interesting because she wears unusual and imaginative legs, rather, Mullins' body is interesting because of how easily she moves between her legs. What is important, to this research, is her fluidity.[1]

Changing Tact.

One of the shortcomings of my exploration of the hearing aid as a physical object was that it did not speak to the actual connection between my body and monsters/ hearing aids. This connection is not inherited in the outward appearance of my prostheses, but in their function. Don Ihde (2007) refers to *embodiment relations* as a way of describing objects that we accept into our embodiment. These objects are those that we come to understand the world with — much like Merlau-Ponty's blind man's stick:

> The blind man's stick has ceased to be an object for him, and is no longer perceived for itself; its point has become an area of sensitivity, extending the scope and active radius of touch, and providing a parallel to sight. (Merleau-Ponty, (1962) 2002, p. 256)

Unlike the walking stick in Merlau-Ponty's writing, it is not simply the form of my hearing aids that constitute them as a relational embodiment — it is the function afforded by their form: the electronics, the integrated circuitry, the programming. I experience my hearing aids not as objects attached to the side of my head, but as a relational connection to the world. Focus was moved from what hearing aids looks like to what they do. Using a practice-led approach, the research experimented with the basic electronic generation of sound, creating simple speakers with magnets and coiled copper wire.

1 While the objects that came from the Critical Design practice did not suggest any new directions at the time, on reflection I have noticed that the aesthetic of these objects speak to a fluidity and fragmentation. (See "Appendix D: Critical Design Approach" on page 55)

This exploration lead to an investigation of hearing loops. The hearing loop, or an audio induction loop, is an assistive technology for hearing aid users, which uses mutual inductance in order to transfer energy — in the form of sound — from one coil to another. One coil (or loop) is placed around a room, which is attached to an amplifier that amplifies current. This amplification in the loop creates a magnetic force, which then induces a voltage in another coil. This pick up coil is encased within the hearing aids. By turning a switch to the *t-coil* setting, the hearing aid can pick up the sound from the amplifying loop.[2]

A hearing loop's simple configuration allows it to be pulled apart and reassembled. Being drawn away from the rigid form of the hearing aid led me to the fluid folds of textiles. Textiles lent a process of gathering, stitching and weaving together which allowed thinking in connections, rather than in objects. Using a number of different textile techniques (See Appendix A) the research explored new ways in which the pick up coils could be fabricated.

Assemblage and the researcher-as-event

> Any objects or persons can be reasonably thought of in terms of disassembly and reassembly; no natural" architectures constrain system design. (Harrway, 2008, p. 129)

The practice-led research became about pulling apart and reassembling. About applying textile-based techniques to an engineering-based practice in order to explore the intermingling of these diverse parts, bringing them together. This practice, as suggested by Haraway, showed how objects, and bodies, could be disassembled and reassembled.

Shildrick (2015) considers a similar notion to which Haraway refers, the Deleuzian concept of assemblage in which all distinctions between self and other, human and machine are "troubled" (p. 14). This Shildrick asserts is the value of the assemblage to Critical Disability Studies. Interpreting Giles Deleuze's assertion that there are no such things as *solid bodies*, only *becoming-bodies* (Shildrick, 2015), Shildrick argues that bodies are enacted through different practices, supplements, actions

2 Hearing aids such as my own — the Phonak Nadia S — do not always have t-coils and are incompatible with hearing loops, utilising other types of wireless technologies such as Bluetooth.

and technologies. As in Butler's performativity, Shildrick's Deleuizian body is not a static given, but an ongoing performance of becoming.

> On the one hand it is a machinic assemblage of bodies, of actions and passions, and intermingling of bodies reacting to one another; on the other hand, it is a collective assemblage of enunciation, of acts and statements, of incorporeal transformations attributed to bodies. (Deleuze and Guattari 1987, cited in Shildrick, 2015)

Developing this further, Shildrick proposes the notion *athlete-as-event* as a way of conceiving the paralympian athlete not as a singular body but a "process of making and unmaking" (Jackson and Mazzei cited in Shildrick, 2015). Reconsidering the parade of Mullins' body as an instance of an *athlete-as-event* [3] — we might understand Mullins' body not as singular or static, but as a body in the course of becoming. In Shildricks's understanding of such bodies, it is the relationship between its incongruent parts that creates meaning, rather than the discrete parts inscribing meaning themselves.

Shildrick asserts that bodies-as-assemblage do not affirm particular parts over others; rather they concern themselves with the mutual meaning making of the various elements. Proposing that within an assemblage, dependencies are not "negative or positive but becomings that we all move in and out of", Gibson et al. point to a way in which dependence/independence might be reconceived (Gibson et al., 2012, p. 1897). Independence and dependence become productive connections between parts. Thus our reliance on technology no longer reveals the failure of the "self sufficient individual", but rather speaks to a body in motion, a *connectedness* (Gibson, 2006).

Thinking of the research as a connected becoming sheds light on the positive implications of dependencies. My own hearing loss has instilled a desire for independence — a motivation to do things on my own and not be seen as a less-than-whole subject. When, part way through this research, it was pointed out to me that it was "okay to ask for help", I was able to relax my desire for independence by reflecting on the research itself as a fluid becoming. This meant understanding that there were more parts to the research than myself. It was this insight that enabled

3 All the more relevant as Mullins herself is a "disabled" athlete.

me to enlist the assistance of an engineer.[4]

More than simply being assisted by practitioners from other research disciplines, the research became an assemblage of multiple discourses — a process that Haraway (1994) likens to a Cat's Cradle:

> Cat's cradle is about patterns and knots; the game takes great skill and can result in some serious surprises. One person can build up a large repertoire of string figures on a single pair of hands; but the cat's cradle figures can be passed back and forth on the hands of several players, who add new moves in the building of complex patterns. Cat's cradle invites a sense of collective work, of one person not being able to make all the patterns alone. (Haraway, 1994, pp. 69 –70)

Here, my research opened itself to understanding that "asking for help" did not threaten an independent, whole body. Rather than seeing assistance as a dependency, it treated it as positive inter-connections, setting the research in motion, allowing this assistance to become part of a complex pattern of knotting together practices, ideas, and tools. The body was no longer static, but a fluid *researcher-as-event* (Shildrick, 2015).

Assemblage as universal.

This move away from thinking about bodies as discrete, to being expandable through enacted relationships points to a realisation that there can be no longer be a norm:

> Once it is acknowledged that a human body is not a discrete entity ending at the skin, and that material technologies constantly disorder our boundaries, either through prosthetic extensions or through the internalization of mechanical parts, it is difficult to maintain that those whose bodies fail to conform to normative standards are less whole or complete than others. (Shildrick, 2015, p. 24)

This line of thinking allows us to see *all* bodies as monster-cyborg-assemblages: "strangerhood has become universal... If everyone is a stranger, no one is" (Bauman, 1991, p. 97). Bauman highlights the way in which in a world with fluid parts it is easier to be a stranger:

4 Craig Baguley assisted me in testing the efficiency of the pick up coils created through my practice, and helped me in understanding how these coils might be enhanced. See "Appendix C: Testing Inductance and Coupling" on page 52 for more information.

> Much less than before does it feel like an unbearable condition, one from which one has the duty to redeem oneself. Difference now bears no guilt; and the shame of being guilty of difference no longer prompts the culprit to escape from estrangement. (Bauman, 1991, p. 97)

I understand my writing and practice as part of a wider assemblage. Here, to borrow Shildrick's term, I understand myself as *researcher-as-event*. This research asks how parts work together, rather than simply against each other. What follows will be further discussion of my practice — an intermingling of hard/soft/engineering/textile/wires/stitches/metal/yarn/body/technology/doing/thinking/writing/future/present/fiction/fact/pet/alien/friend/enemy and how this process of gathering, of making and unmaking might lend compassion to the monstrous.

Chapter 5: Reflections

The work presented is an exploration of an assistive technology — the hearing loop — through a practice likened to assemblage, which harnesses textile as a vehicle for material and conceptual exploration. The culminating practical output for this research will be documented in Appendix E. This chapter seeks to highlight some of the main parts to this assemblage and how these make, unmake and explore our universal condition of being monsters, cyborgs, and disabled bodies.

The Hearing Loop

What sets apart the induction loop to other forms of wireless technologies available to hearing aid users is that it is built into a public space — blurring the lines between public and private, personal and social. Unlike my Bluetooth and FM hearing technologies [1] which use one-on-one pairing, the hearing loop opens up the potential of assembling multiple parts and bodies, bringing together not *this* and *that*, but multiple and infinite bodies. Here, the assemblage can be harnessed as a gathering place for bodies and technologies.

This exploration was drawn to the hearing loop not only for its ability to speak to blurring of the private and public, but because it is an 'open' technology. Unlike FM[2] and Bluetooth, which are closed systems that cannot be so easily hacked, the open nature of the hearing loop allows its configuration, or assemblage, and meaning

1 Phonak iCom Bluetooth receiver, and Phonak FM Zoomlink+. See Phonak (2009), and Phonak (2010) for more information.

2 FM is referred to here only in the context of hearing technologies, not including other radio technologies.

to be reconsidered. This open nature allows critique over whether it might be considered a simple assistive technology or a universal technology. [3]

Texxture: exploring seams.

Eve Sedgwick's reading of Renu Bora's *texxture* might provide a way of thinking about the hearing loop. Sedgwick (2003) understands *texxture* as "the kind of texture that is dense with offered information about how, substantially, historically, materially, it came into being" (p. 14). In a way the hearing loop can be traced and understood through its configuration or *texxture*. The textural materiality of the technology — its loops and coils — bleeds the edges between the form and its function, material and immaterial.

On the other hand, closed technologies such as Bluetooth and FM transmitters and receivers, exhibit a different kind of texture, one that, "defiantly or even invisibly blocks or refuses such information" (p. 14). Our full apprehension of Bluetooth and FM technologies are blocked by a glossy texture, smoothing and masking where function and form meet. This research utilises textile techniques as a way of further enhancing the *texxture* of the hearing loop, rethinking the form of the inductive coil through knitting, weaving, and embroidery techniques

Textile as Monster

> It is the uncanny, the troubling anxiety of familiarity and otherness which generates the heightened ambivalence our culture has about cloth and clothes, ranging from the worship of garments as temples of the soul, to contemptuous derision about the "rag trade". (Pajaczkowska, 2005, p. 232)

While my research has been engaged with textiles for a number of years, particularly in e-textiles, a true monster — at once soft and hard, historical and contemporary, it has never focused on wearable technology. Wearable technology is often a rigid or semi-rigid device that is simply attached to the body, like Google Glasses, whereas e-textiles drape over the body, layering technology over skin. My hearing aids as wearable technology are not of interest to my research. In contrast what makes textiles, and in particular e-textiles, interesting to this research

3 The T-coil was initially developed as a device to pick up signals from telephone speakers; see http://www.ampetronic.com/History-of-Hearing-Loops, for more details. It is a requirement, under the New Zealand Building Act, 2004, that all public buildings are equipped with assistive hearing technologies, such as the hearing loop.

is that their relations to the body is that of the monstrous assemblage. Claire Pajaczkowska (2005) refers to the nature of textiles as *thingness* or unspecified materiality, in articulating our ambivalence towards it. How might the ambivalent status of the textile shed light on the issue of binary hierarchies?

Soft logics.

The notion of soft logics introduced by Michel Serres, and explored by Pennina Barnetts (1999) in her work "Folds, Fragments, Surfaces: Towards a Poetics of Cloth", might help in understanding why I am drawn away from wearable technologies, towards e-textiles:

> Rigid little boxes fit inside a big one, but the reverse isn't true. It is impossible to put the big one... in any of the smaller ones... Now if there is a logic of boxes, perhaps there is a logic of sacks. A canvas or jute sack... is supple enough to be folded up in a sack with all the other folded sacks, even its former container. I believe that there is box-though, the thought we call rigourous, like rigid inflexible boxes, and sack thought, like systems of fabric. Our philosophy lacks a good organum of fabrics. (Serres, cited in Barnetts, 1999, p. 25)

Wearable technology privileges *box thinking* — the material rigidity of wearable technologies lend themselves as wholes existing separately to their other. When my hearing aid is taken off and placed on the table in front of me it can be recognised as a whole without me. However, textiles lend themselves to a *soft logic*. Materially, e-textiles do not seem to exist as a whole without its other, but instead "contain while aspiring to be contained" (Taragan, n.d., unpaged). When we take off our clothes they fall to the floor. Their flexible, malleable nature indicates that meaningfulness of e-textiles transpires from their relation to the body, their agency within the assemblage. E-textiles might be seen only to "exist in relation to the interminglings they make possible or that make them possible" (Deleuze and Guattari 1987, p. 90 cited in Shildrick, 2015, p 18).

Soft logics allows us to not think of either/or but in "the realm of the and/and, where anything can happen... *Soft logics* are to think without excluding" (Serres, cited in Taragan, n.d). Perhaps my being drawn to e-textiles can be articulated as a resistance to the rigid, dualist logics that constitute the relationship between my hearing aid and body. This move towards e-textiles and away from wearable technologies, signals a shift in thinking, from rigid to soft. This change indicates

a way of thinking that privileges monstrous/cyborg/disabled bodies by allowing them to exist without sitting outside binary distinctions. Not only does textile generate a *soft* philosophical approach to bodies, textile and other making practices also have the potential to show how assemblages might exist in practice.

Practice as Assemblage

> Does making proceed through the hierarchical assembly of preformed parts into larger wholes, and these latter into still larger ones, until everything is joined up and complete? Or is it more like weaving a pattern from ever unspooling threads that twist and loop around one another, growing all the while without ever reaching completion? Is making a matter of building up or of carrying on? (Ingold, 2013, unpaged).

Making practices — such as textile practices — are ways of drawing together diverse, eclectic parts as an assemblage does. Rather than seeing the world as *building blocks*, the making practice utilised in this research sees the world as knots and weavings as introduced by Tim Ingold (2013). Ingold's notion of the practice as a knotting process might be understood synonymously to Haraway's *Cat's cradle*.

Conversely, *building block* logic implies that totality exists (Ingold, 2013). Perhaps the modelling process, described in "Chapter 4: Approach to the Research", lent itself to 'rigid logic' thinking — the objects were already preformed parts, blueprinted in my mind before the making process even began. Understanding the textile process of embroidery, weaving and knitting shows how "the form of a thing emerges from the process itself, within a field of forces" (Ingold, 2013, unpaged). These forces are produced through the material engagement of the practitioner, or perhaps, the *researcher-as-event*, to return to my notion borrowed from Shildrick. Ingold's description of the textile process resembles the assemblage, the infinite coming together of varying materials, practices and forms through relations, dependencies and connectivities. The making practice indicates a practice of *becoming*. This research highlights an assemblage of parts that are in an infinite process of becoming. Here practices, materials, fiction, fact, memories and text are at play.

Touching the Monster

Ways of dealing with the ambiguous, highlighted in Chapter 4, reveal the perceived

danger of being in close proximity to the ambiguous subject. In the masquerade the revealing of the prosthesis marks the body, enabling non-disabled, non-cyborg bodies to create distance between themselves and the ambiguous, "for fear it will ooze through, obliterating the border" (Young cited in Shildrick, 2002, p. 88). Similarly Mullins' parading of her body puts distance between herself and her spectators through the objectifying stare and othering of her body. These modes of approaching ambiguous subjects prioritise specular detachment.

Sobchack's assertion of the value of the sensate flesh mentioned in Chapter 3 (See page 13) needs to be returned to here. The notion of the assemblage might seem abstract, however, the value of flesh to the body-assemblage must be noted. Shildrick claims, "it is through touch that we may come face to face with our other selves" (2002, p. 113). To touch means to *be* touched. Touch blurs the distinction between self and other, between exterior and interior, distance and proximity. While the stare objectifies and fixes bodies in place, the touch speaks to the fluidity of the body, allowing the incorporation of parts to the *researcher-in-action* assemblage. My own unaided body does not sense the skin as the ultimate border, but opens itself up to the world. While my glasses and hearing aids allow my perception to extend much further, in a sense, they objectify my body, separating and distinguishing me from the world. Conversely, the skin brings me closer and more intimately to the world around me:

> Through felt feelings, we sense that our flesh is open and that our bodies are intermingled with the bodies of others and with the bodies of the world. In touch, our bodies overstep their bounds; our flesh is in flux…. The palpations of touch create openings in the Flesh of our bodily space, openings within which tangible significances slip under our skins, unfold, and are "gathered". (Cataldi, 1993, p. 126)

In this practice the skin is seen as one of the gathering place of bodies and technologies.

Touch allows us to return to the meeting place of the prosthesis and body, and not attempt to smooth over the seams, but to understand them as the meaningful connections that assemble the body. The assemblage does not seek transparency or seamlessness. Through the texxture of the assemblage, stitched, woven and knitted, we might be able to explore, trace and understand not only how the body came into being, but also how it is still-*becoming*. Here seams are to the assemblage what

borders are to the binary hierarchy — however, while borders segregate and push things apart, seams rely on the relationship between the two parts: seams gather or 'stitch' things together.

Respect for the other.

I would like to return to the wheelchair swing described in Chapter 2 (page 10). On one passing occasion, able-bodied children were gleefully playing on the wheelchair swing (despite a sign prohibiting them from doing so). The touch of these children, their small hands grasping, holding, exploring the swing struck me. The touch of a non-disabled body with an assistive technology is powerful — it blurs the boundary of them/us, of ours/yours. An accidental touch of my hearing aid against someone else is meaningful as it breaks down the barrier between what exist as mine, and theirs. As Shildrick highlights, "to touch and be touched speaks to our exposure to, and immersion in, the world of others" (Shildrick, 2002, p. 123).

This research utilises textile as a tool to invite the touch of the other with the monster, to recognise themselves in the monster, to immerse themselves in the world of the monster. Here, touch invites the other into the assemblage of the *researcher-as-event*, to "sustain a reciprocal sense of solitude and intimacy that is grounded in the mutual instabilities and unpredictability of our corporeal becoming" (Shildrick, 2002, p. 123). Touch is understood here as a form of respect and acknowledgement of the monstrous. Touch does not recoil from the monster or will it to transform into something else.

> One needs to honour the otherness in the other, the strangeness in the stranger ...`the unique is universal', that it is being different that makes us resemble each other and that I cannot respect my own difference but by respecting the difference of the other. (Bauman, 1991, p. 235)

The touch allows one to recognise our universal condition: that we share a common reality in our difference. While Shakespeare (2012) asserted that disability is universal, this research asserts that this no longer the case. We are not all disabled, but rather, we are all cyborgs, all monster and all strangers. No longer are we simply bodies *in* technologies as Ihde (2002) asserted, we are all *assemblages* of bodies and technologies.

Chapter 6: Conclusion

This research has cast its net wide, assembling a vast array of theories, ideas, and materials: exploring the seams between Science Fiction and social realities, text and textile, technologies and bodies. The purpose of this research was to understand the theoretical and lived understandings of disabled bodies in technologies — understanding how the ambivalent nature cast onto these bodies by technologies altered the way they were seen, and thus performed.

If, as a society, we could embrace the monster, and move towards a 'soft logic' outlook, we might be able to open ourselves up to ways of not simply performing our identities to avoid ambivalence, passing and masquerading as though these identities are truths, but perform *with* and *through* ambivalence. This research promotes a practice that thinks about how we might allow our bodies not to be understood as static, singular beings, but fluid *bodies-as-events*.

Once we understand that upholding boundaries and binary hierarchical distinctions are not the aim, we can look at the creative potential of the relationship between bodies and technologies: to celebrate the seams that gather one thing and another. How might prostheses be designed for people with disabilities look and behave if there is no longer a concern for wholeness? How might my own hearing aids be designed? This practice-led research highlights an attempt to explore an assistive technology through assemblage — a space of knots and weavings, of seams and stitches, rather than boxes, and rigid edges. No longer is the *supplement* a paradox of addition and replacement, but a relationship, connectivity.

The importance of this understanding of bodies as assemblages does not only touch those with disabilities, but extends to all bodies. The research lends a hand, attempting to encourage the reader and viewer into the assembled body of the *researcher-in-action*, to understand that our bodies are not that different, or rather as Shildrick puts it: “The point is not that we are all alike, but precisely that we are all different” (Shildrick, 2015, p. 16).

My hearing aids are at once my friends, my enemies. But in the folds and weavings of my practice they no longer are strangers, monsters. When everyone is a monster, nobody can be.

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Appendix A: Textile Techniques in Copper

Appendix A highlights the making techniques of the research practice: exploring the textile techniques of creating coils – used as pick up coils within the induction loop.

Figure A-1 Machine knitted samples with copper

Machine Knitted Samples

These samples were knitted on the Accessories Machine at the Textile Design Lab at Auckland University of Technology. Machine knitted samples are created with a fine copper wire — 0.125 mm — into a tubular structure. The advantages of the machine knitted samples is that they can be knitted very finely, which means there are more turns within the "coil" creating a stronger inductive coil. The downside is that the copper can be particularly fragile, and causes pulls and breaks in the sample. This could be deemed acceptable if the textile were purely for aesthetic purposes, however, because the wire needs to be continuous to create a successful inductive coil even a single, barely visible break in the structure will stop the sample from operating correctly.

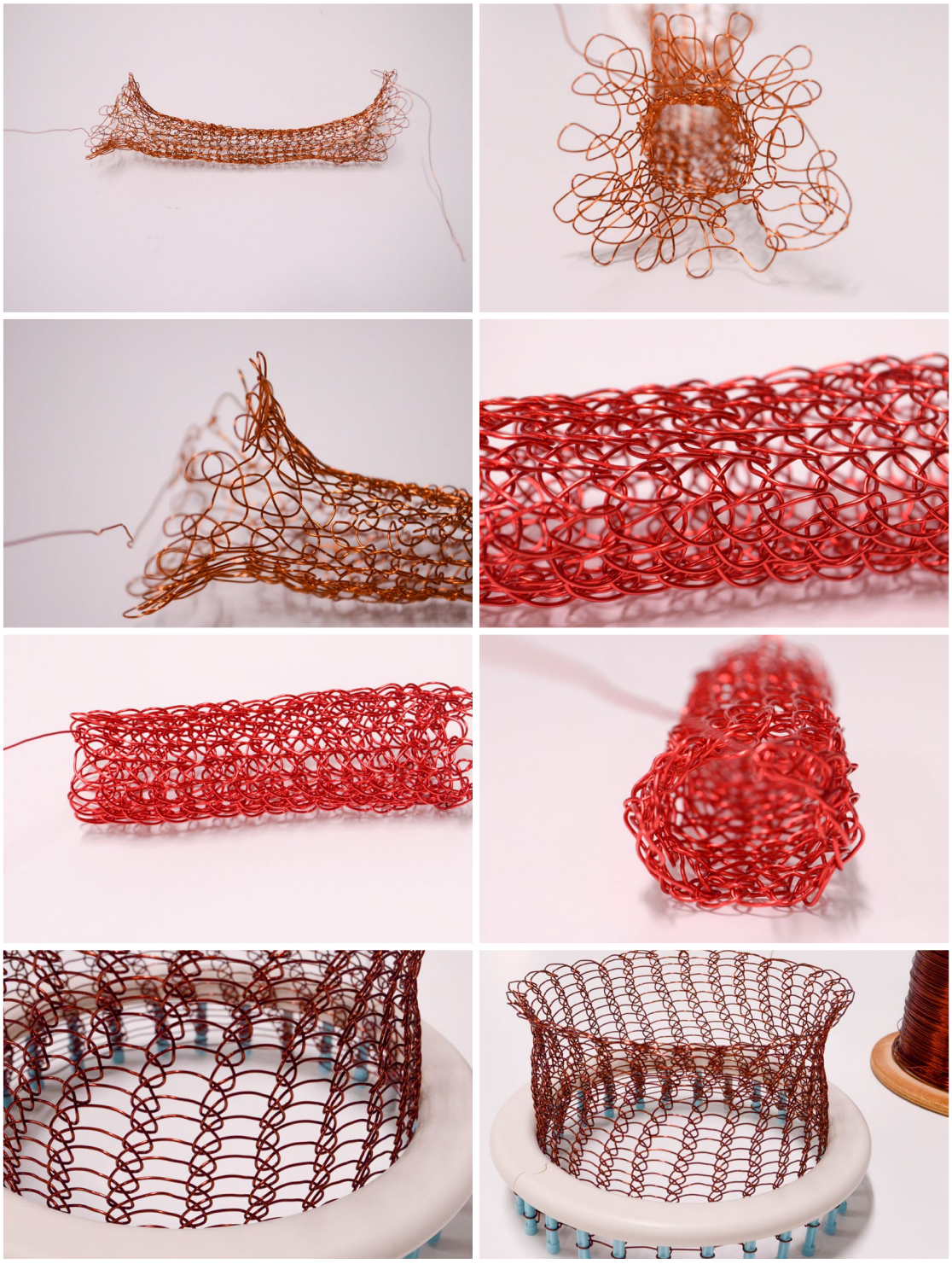

Figure A-2 Hand knitted samples with copper

Hand Knitted Samples

The hand knitted objects were created with a larger gauge wire than the machine knitted samples. They were made mostly using a knitting loom, also referred to as “french knitting”. Some pieces were made free form using only a dowel for

wrapping the wire on. This technique is inspired by the work of Ruth Asawa.[1] The organic appearance of the hand knits make them interesting — they appear both "hard" and technological — lent to them by their metallic material, but yet at the same time they are "soft" — organic and fluid.[2]

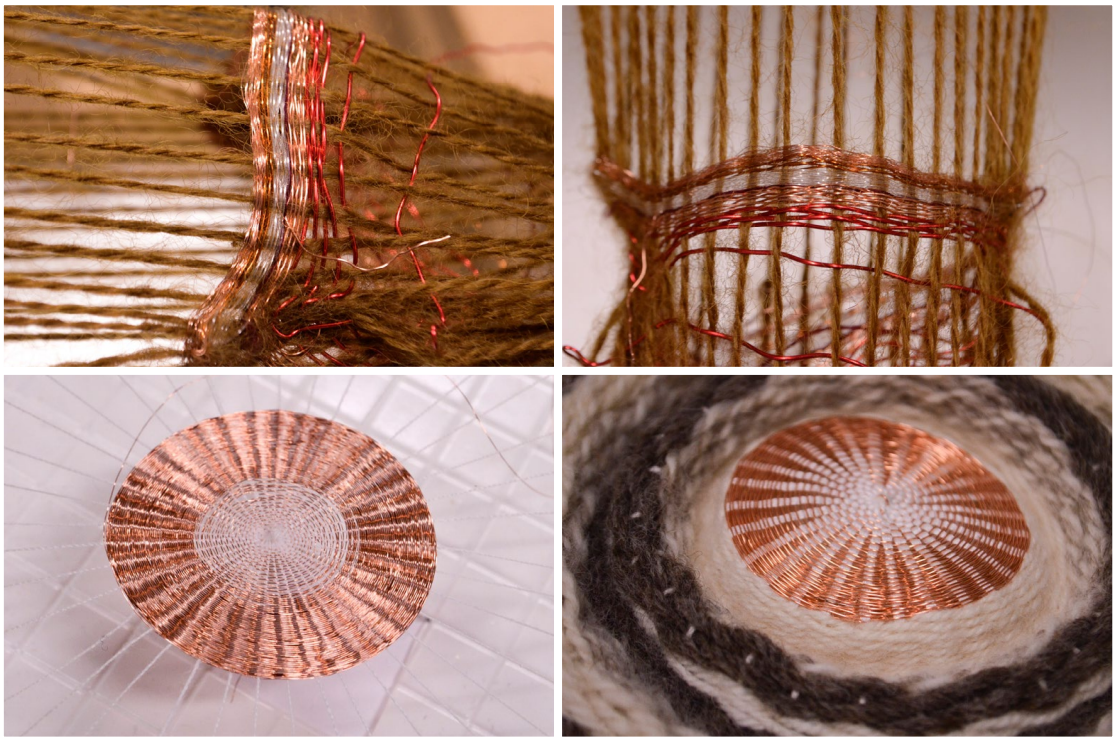

Figure A-3 Woven samples with copper

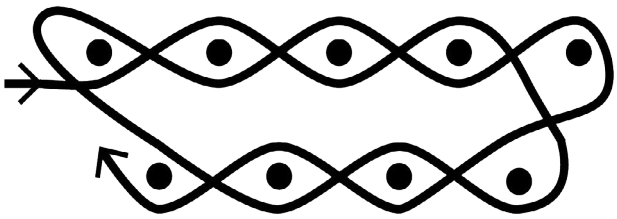

Figure A-4 Diagram of tubular weave structure

Woven Samples

Several techniques were attempted for weaving, creating two different types of woven structures. The first uses a **"circle" weave.** Woven on a circular cardboard loom, these pieces are continuously woven in a spiral shape. The final piece is a flat,

1 Crocheting and knitting with wire is not a new idea: this work was inspired by artists such as Ruth Asawa, Arline Fisch and Anita Bruce.

2 Research has looked into the organic appearance and mathematical properties of crochet. Particularly in its ability to build hyperbolic surfaces. See http://crochetcoralreef.org/ for a project working with this concept to create a crocheted coral reef.

circular woven textile.

The other weaving produces a “tube” type of weave. This was initially created on a 4 shaft weaving loom using an open double weave pattern. A **double weave** is created by weaving two separate layers of fabric at the same time, in the tubular double weave both selvedges are joined.

However, a cardboard loom was used for the final tubular piece. Weaving around the cardboard loom created a continuous tube shaped object: the wire within the weave essentially became a coil.

While aesthetically the knit objects were more successful, and less tedious to create, the woven objects are more efficient at transmitting sound. This is because a low impedance is needed in order to send a stronger signal. Because the woven objects are created with a shorter length of wire (because they do not loop around into stitches as knitting does) they have a lower impedance.

Appendix B: Prototyping with Electronics

These images show an experiment exploring the how much sound different coils could pick up from a larger induction loop. The induction loop was made with aluminium foil taped to the ground. The loop area was 2m by 3m wide. Figure B-1 shows the basic setup of the receiver:

- 4.5V Battery
- 3.7W Class D Audio Amp (MAX98306 from Adafruit)
- 2W 4ohm speaker
- 5mm LEDs were also connected to the amplifier output as a quick experiment in 'visualisation

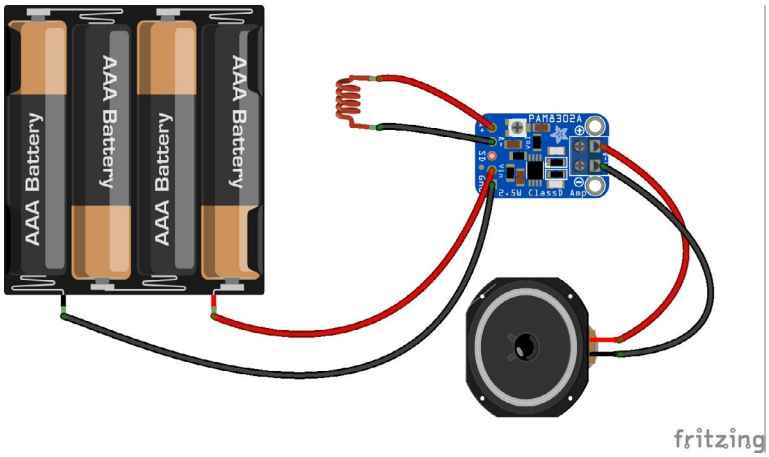

Figure B-1 Basic set up of electronics for testing coils

The purpose of these experiments was to test whether it was possible for me to create my own induction coil to pick up sound from the larger induction loop.

These images are only a few of the coils experimented with. Other coils include an iron nail wrapped in 0.25mm wire, a "spider-web" coil wound on card, a flat wound pancake coil encased in Sellotape.

Findings:

- All of the coils had some sort of success, however the commercial pick up coil — a telephone pick up coil — was the most successful
- The more turns and the larger the coil the louder the sound
- Smaller induction loop created louder sound
- More loops on ground made the signal stronger

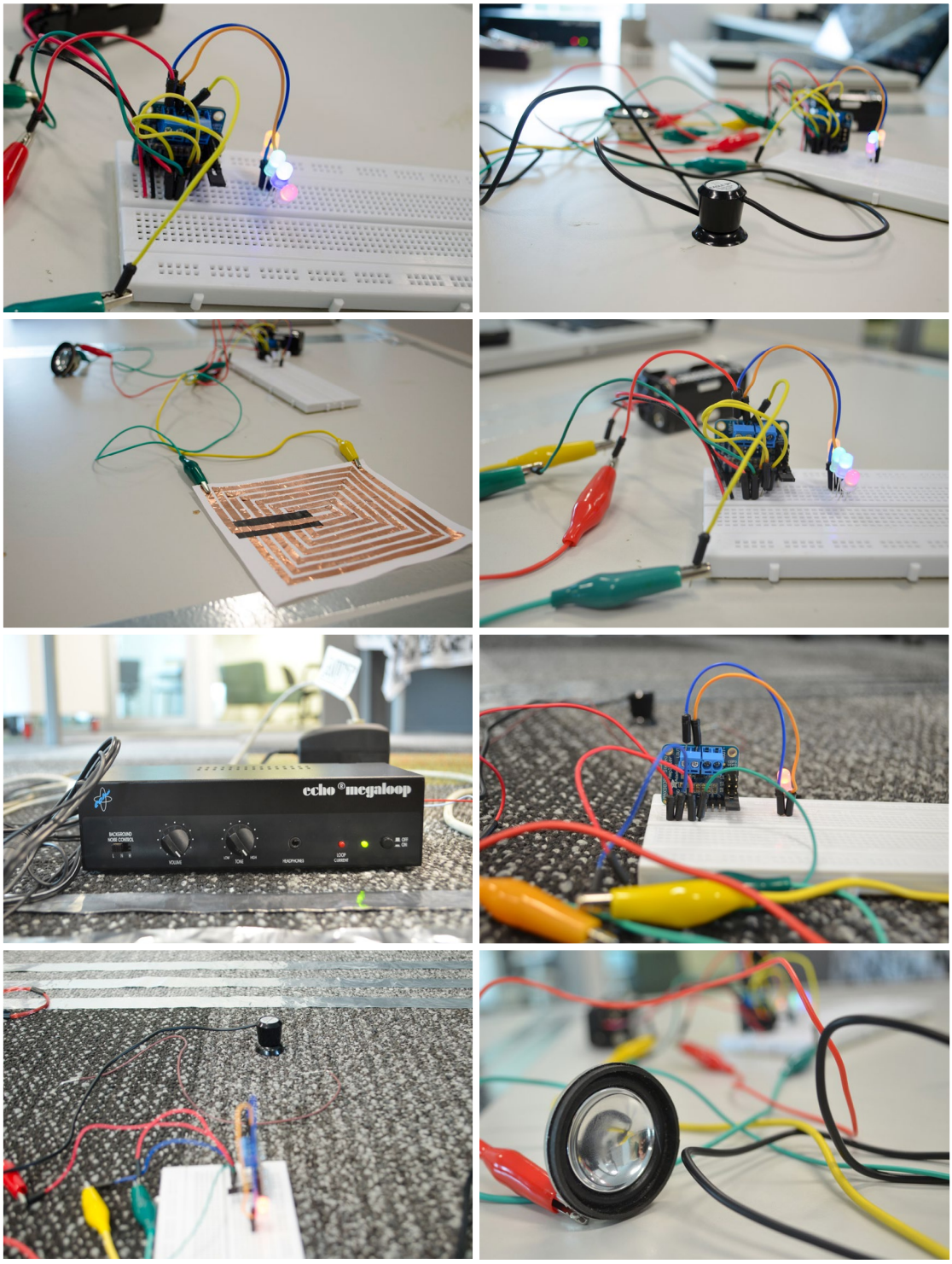

Figure B-2 Testing coils in the hearing loop with sound and light

Appendix C: Testing Inductance and Coupling

Here, a lecturer from electrical engineering — Craig Bauguley — assisted me in testing the strength of coils with equipment in the engineering lab.

The initial set up (See Figure C-1) included:

- A loop on the ground – 3 turns, 1m by 2m — made with magnet wire
- A commercial "T-coil"– a telephone pick up coil
- A 10-turn coil with a diameter of 26cm
- A 50-turn coil with a diameter of 26cm

The purpose of these initial tests was to see if we could make a coil that was stronger than the commercial coil.

For information on mutual inductance see: http://www.electronics-tutorials.ws/inductor/mutual-inductance.html

Essentially, the tests are focused on transferring a voltage/current from one coil or loop (on the ground) to another (worn on a body or in a space).

Mutual inductance relies on (among other factors):

- Area of the coil (cross section), the bigger the better
- Number of turns in the coils
- Size relationship between the coils (simply put)

After initial tests we realised that we could make a more efficient pick-up coil than the commercial "t-coil", or telecoil. The next test was to apply a textile technique to explore whether not we could knit a strong pick up coil.

This coil was knitted on the Accessories Machine at the Textile Design Lab.

We were initially unsure whether the stitches in the knitted coil structure would disrupt the inductance. However, it was successful and proved that textile techniques could create a workable pick up coil.

Results of the tests:

The coils were tested at 3 positions and at two heights: ground and 95cm above ground.

	T-Coil	10 turn	50 turn	Knit Coil
Position 1	9.5mV	11.2mV	59.65mV	42.7mV
Position 2	20.08mV	26.74mV	136.9mV	67.7mV
Position 3	33.74mV	50.34mV	209.1mV	95mV

Table C-1 Testing coils in three positions – ground

	T-Coil	10 turn	50 turn	Knit Coil
Position 1	2.00mV	2.18mV	11.59mV	7.34mV
Position 2	1.51mV	1.79mV	9.42mV	4.12mV
Position 3	1.19mV	1.32mV	7.11mV	2.34mV

Table C-2 Testing coils in three positions – 95 cm above ground

These tables show the tests of different coils at different locations in the inductive loop. The most successful coil was the 50 Turn coil. However this was due to the size of the coil — the diameter of knitted coil was only about 10cm, whereas the diameter of the 50-turn coil was 26cm. At this stage, the copper wire can only be knitted on the accessories machine at the Textile Design Lab, meaning that it cannot be made to the same size as the larger coil. However, if it were, it could possibly be more effective than the 50-turn coil.

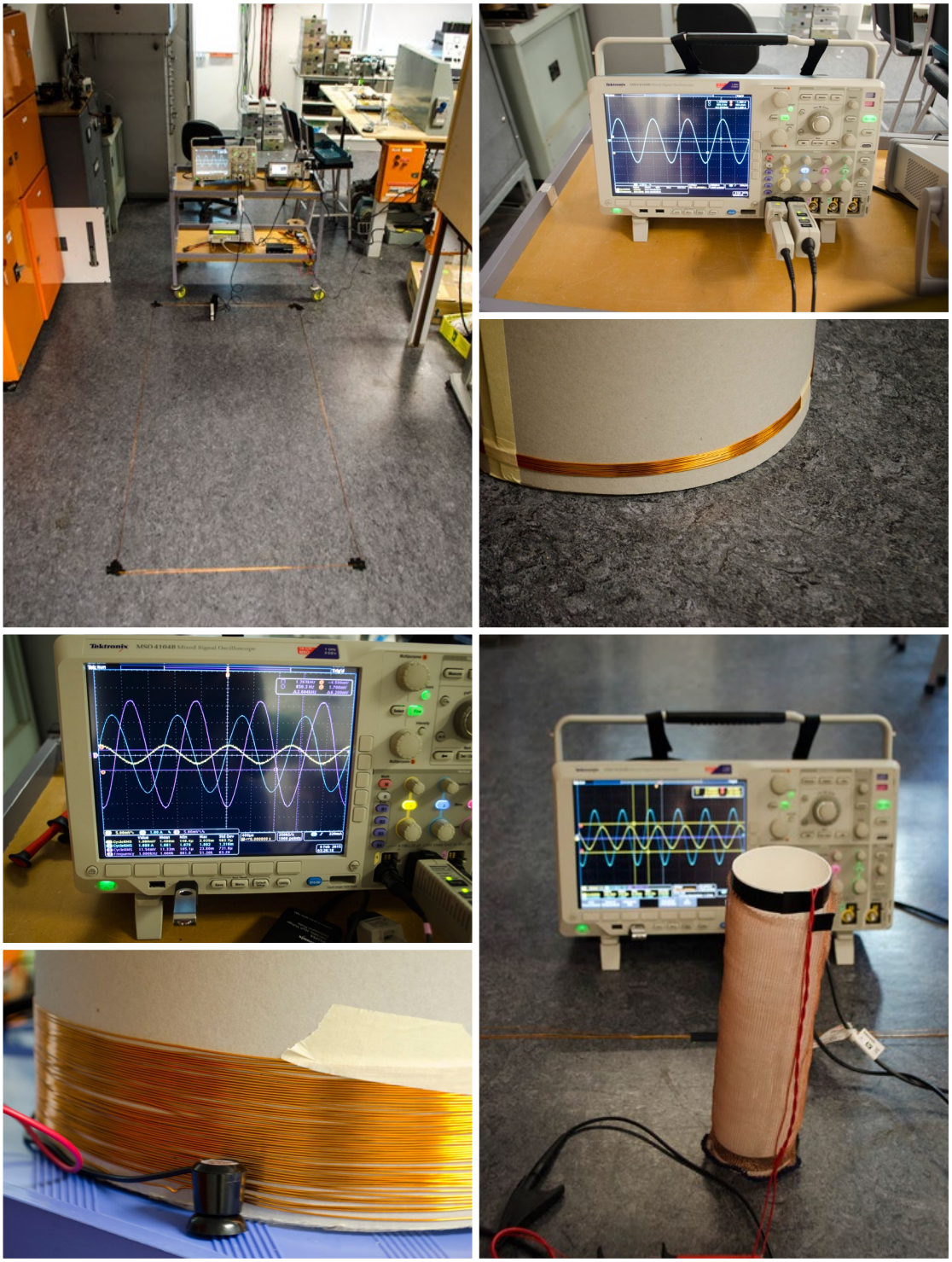

Figure C-1 Experimental set up for testing coils

Appendix D: Critical Design Approach

Figure D-1 Critical Design experiments

Appendix E: Documentation of Final Work

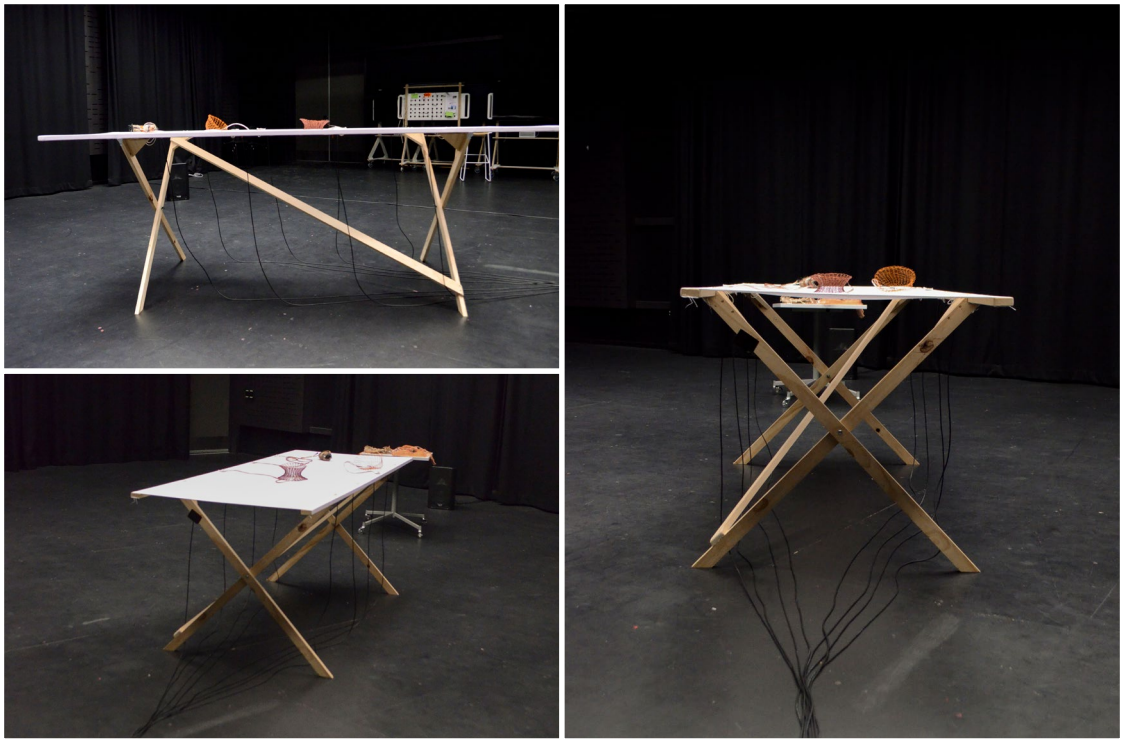

Figure E-1 Table set up - canvas, plywood

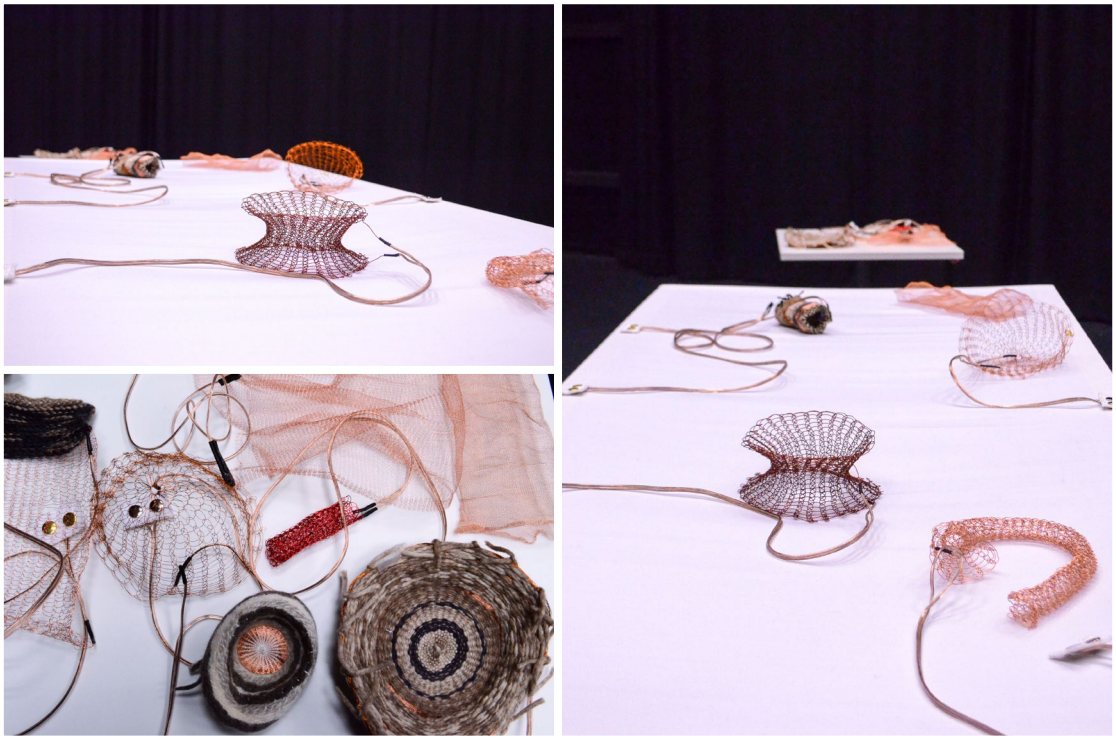

Figure E-2 Textile objects on table

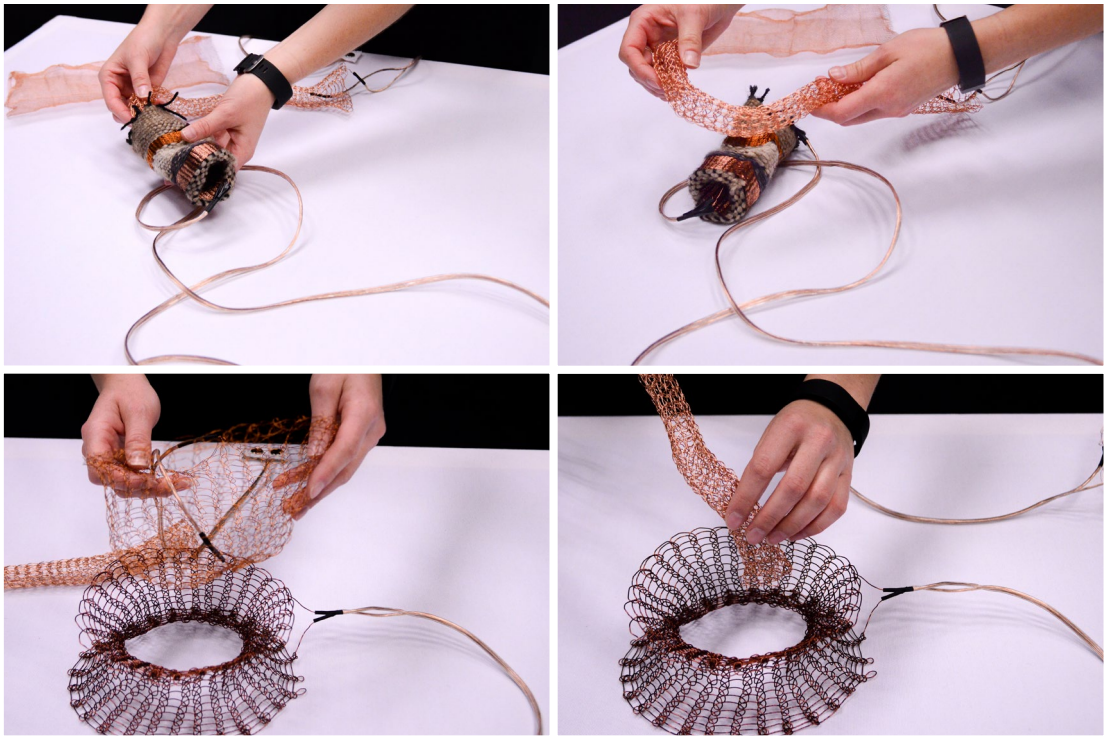

Figure E-3 Interactions with textiles

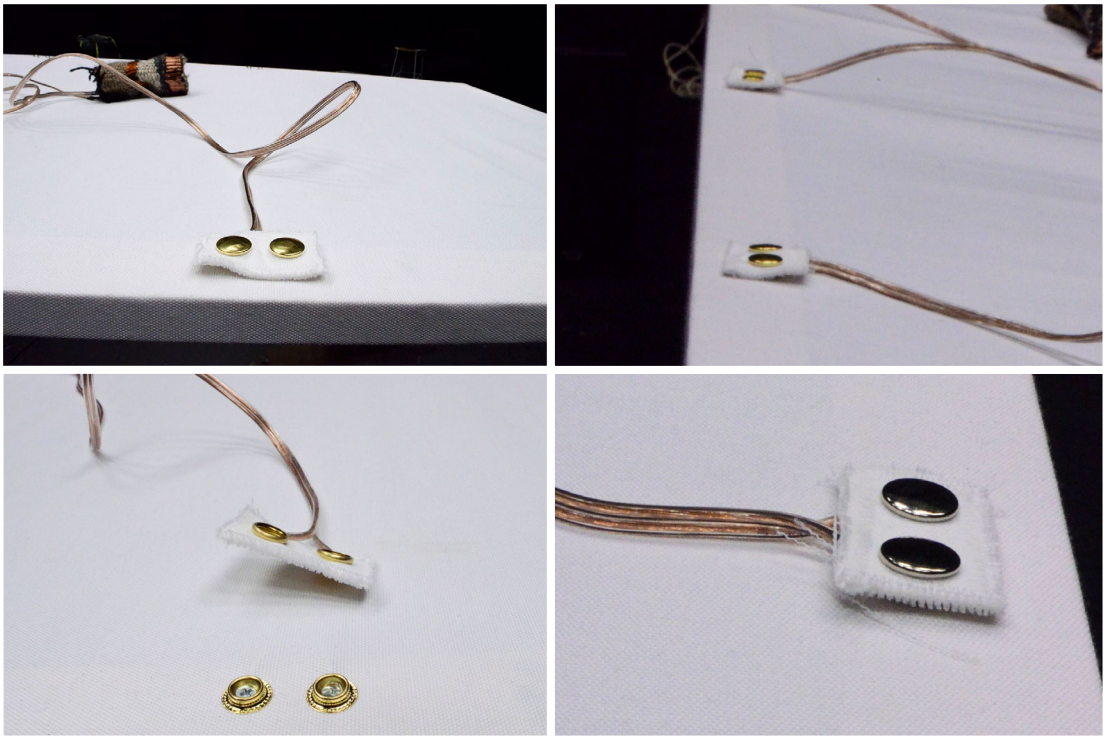

Figure E-4 Fasteners for connecting coils to table

Description of Final Work

Inspired by hearing loop technology, the final work exists as a sound and textile based interactive installation. Sound is wirelessly transmitted through textile objects — woven and knitted with copper wire — using *inductive coupling* (See "Appendix F: Inductive Coupling" on page 65 for more information). Viewers may interact with the work by connecting the textile objects — or coils — to the table using fasteners set along the edges. Coils connected on one side of the table (with the brass coloured fasteners) transmit sound, while the coils attached to the other side (the silver fasteners) will receive the sound. Four sound tracks are sent to four different speakers. By moving the objects around the table an evolving soundscape is created.

Instructions and details for interacting with the installation

- Place different coils into the **fasteners** embedded into the edges of the table. Up to **eight** coils can be used at one time.
- The fasteners are **colour coordinated:**
- **Brass** coloured fasteners are for "**transmitting**" coils — these coils have a sound signal amplified through them from a small 3W amplifier.
- **Silver** coloured fasteners are for "**recieving**" coils — these coils recieve a signal from the transmitting coils, using inductive coupling. This signal is then amplified through a mixing desk and played through a speaker.
- Each set of brass fasteners has an individual soundtrack
- Each set of silver fasteners sends a signal to its own speaker.
- There are four different sounds moving across four different speakers.
- Moving the coils around the table will create a spatial soundscape.

Initial Set up Reflection:

The table.

There were some interesting thoughts that came up after the initial run-through of the work. The primary realisation was that the main structural element — the table — unintentionally appeared as a medical table, or an old fashioned camp cot used by the army.

The table was not built specifically for this particular aesthetic but rather, was designed for practical purposes, including easy storage and transport. The idea for using the fasteners on a textile surface came before designing the table — these were chosen due to their "soft" nature. Initially, the installation was going to be a tablecloth placed on a prebuilt table. However, building the table meant having the ability to incorporate the fasteners and the soft canvas top directly into the design. Furthermore, it gave control over the table height, length and width. The foldable design and lightweight material choices were made to make it easily transportable.

Despite the table being designed to practical constraints, conceptually the aesthetic of the table works in the context of the research. The table insinuates a body that is to be examined. The medical-like appearance speaks to the individual/medical model of disability, referring to the way in which bodies have been marked out and scrutinised as "broken" and in need of repair. The table seems to not only highlight a body to be examined, but also a body to be fixed.

Though, unlike a static table that sits within the walls of a hospital, this table is intended to be mobile. Like the medical stretchers and camp cots, the table references a body that is out-in-the-world: a body on the move. The lightness of the table and the use of interchangeable fasteners points to this movement, a temporality. However, the mass of black wires protruding from the table anchors it: portable, moveable, and yet, it is tethered in place.

We live in a wireless world where we no longer wish to be held in place by our technological devices, we do not wish to be stuck by a wall socket to use our phones. We are mobile, in motion, technology should not hold us back. Wires might remind us of our dependency on technology. Perhaps wireless computing is driven

by our fear of this dependency. Like the hearing aids perched behind my ears, the creeping wires dangling from the table are a reminder that we are reliant on computers, phones, television sets, wheelchairs.

The wires seemingly work against the wireless, *fluid* notion underlying the work. It seems that if we are tethered, we can't be out-in-the-world: we are instead static, motionless, dependent bodies. Wires challenge our belief of the "sovereign autonomous self" (Gibson et al., 2012).

What happens when we reconsider the notion of dependency and replace it with *connectivity,* as in the work of Barbara Gibson (2006)? We are not "dependent" or wired, but we are each connected in different ways to different places, technologies and people. Connectivity does not stop us from being in the world, but allows different *ways* of being in the world.

The sound.

Like the table, the initial sound was designed around practical constraints. Field recordings of bird songs were first chosen as they contained high frequencies. In inductive coupling, transmitting a higher frequency results in a higher voltage received by the pick-up coil, which means louder, clearer sound. In the initial run-through, a range of sounds were played back through the installation, using www.freesound.org as a source. The field recordings were found to be the most effective.

At the start of developing the sound I was concerned with *what* the sounds were, and how they sounded through the speakers. Though, as I further engaged with field recordings I gained a heightened awareness that I was hearing from someone else's perspective. What became important was not what I was hearing, or even how well I was hearing it, but *who* I was hearing. I moved away from listening to the objects, and listening as the subject, in somebody else's shoes.

Like the stretcher-table, the field recordings speak about bodies out in the world — the embodied experiences of diverse people. Searching radio aporee, (a global soundmap of field recordings — www.radioaporee.org) I went on a "sound journey", collecting random snippets of the lives of people around the world. These sounds are played back randomly (using Max MSP) through one of four speakers in

the installation, creating an autonomous, dynamic soundscape of diverse embodied experience.

The sounds come together in a way that creates a soundscape that cannot be simplified to its individual parts, and cannot be defined as a whole — it is constantly changing, transforming into something new.

The sounds are foreign, yet simultaneously familiar. The car, the wind, the busy urban setting: familiar, but at the same time the foreignness of the sounds subtly, sometimes starkly, makes itself apparent. The sounds reference a strange yet known body — a stranger, a monstrous assemblage, a body that draws the viewer into the work as both object and subject.

Figure E-5 Map of sound locations

The textile

The textiles invite users to touch and explore. They appear soft and organic yet they are technological and metallic. They are ambiguous, monstrous. The copper wire itself is an interesting material, it is tough and withstanding, yet malleable and soft. The textile objects relate to the body in subtle ways, inviting the viewer to play, to explore the relationship between the sounds, the objects and their own body. The organic appearance of the textile objects insinuate an intimate relationship with the body, they even seem to resemble parts of a body. Imperfections are left in

the textiles, a reminder of our own imperfect bodies. These flaws are the texxture of the textile — they trace the making process and reference human error. Perhaps these missed stitches add humanness to the work, or maybe they simply serve as a reminder of brokenness; of broken body parts laid across the table to be examined and fixed.

While the table indicates an objective body to be laid out and examined, the sounds and the textile draw the viewer into the work as subject. No longer is the work inviting them to objectively consider the "other" body — the body of the *stranger, monster, cyborg* — but their own body. The work oscillates between subject and object, them and I, other and self. The work operates in this in-between space — in the place of the monster-stranger.

Performing the assemblage

While typical methods of designing for and dealing with technologies and bodies tend to eradicate ambiguity, this work seeks to play with it. The work utilises normally opposing binaries — hard/soft, dark/light, constrained/free, tethered/ wireless, self/other. It asks viewers to rethink these dualist notions, and to re-examine their own bodies, and their own understanding of the flawed, broken, dependent body.

The work allows viewers to perform an assembled body — to be in a state of *becoming*. Bodies are not always static, and dependencies are not always negative. This work promotes the understanding of *bodies-as-events* (Shildrick, 2015) - changing, transitional beings, moving in and out of *connectivities*, both tethered and fluid, with people, places, technologies. We are all assembled bodies, with our own ways of being-in-the-world. All *monsters*, *strangers*, all *bodies-as-events*.

Sound Sources and Locations:

“Coqui, Big Island” by Sidorjak licensed under CC BY SA, recorded: Eastern side of Big Island, Hawaii, USA

“Strong Beach Waves” by Rory Smith shared in the Public Domain, recorded: Brighton Beach, East Sussex, UK

“Dining Concourse” by John Hopkins licensed under CC BY NC ND, recorded: New York, USA

“Cathedral Close” by Richard Fair licensed under CC BY-NC-SA, recorded: Norwich, UK

“Owino out” is in the public domain, recorded: Kampala, Uganda

“tondatei.de: schrebergarten köln-niehl” by Andreas Lemke is licensed under CC BY SA, recorded: Nippes, Cologne, Germany

“Winter” by Petra Kap is in the public domain, recorded: Groznjan, Croatia

“On the train” by Wu, Tsan-Cheng is licensed under CC BY, recorded: Zhubei City, Hsinchu County, Taiwan

“Thunderstorm” by Mark Evans is licensed under CC BY NC, recorded: Craigmore, Adelaide, SA, Australia

“Shciff, Luino - Cannobio” by Ursula Bohren Magoni + Claudio Magoni is licensed under CC BY SA, recorded: Cannobio, Verbano-Cusio-Ossola, Italy

“Rain on ice on snow” by John Grzinich is licensed under CC BY SA, recorded: Himmaste-Rasina, Mooste, Estonia

“Bikers’ Paradise” by Maciej Janasik is in the public domain, recorded: Leba, Poland

“Fence/Barrire” by Flavien Gillié is licensed under CC BY NC ND, recorded: Sal Rei, Boa Vista, Cape Verde

“Apulo Marketplace” is in the public domain, recorded: Apulo, Cundinamarca,

Colombia

“La captación del agua” by Fernando G is licensed under CC BY NC, recorded: Valdivia, Región de Los Ríos, Chile

Appendix F: Inductive Coupling

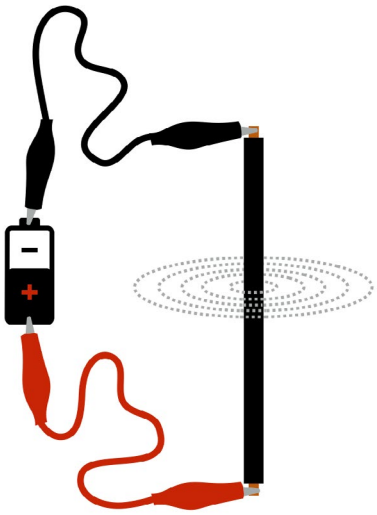

Figure F-1 Electromagnetic field (EMF) around a wire

Inductive coupling refers to the wireless transfer of energy between two coupled coils. Inductive coupling utilises *electromagnetism*.

An electrical current travelling through a piece of wire creates a magnetic field around that wire as seen in Figure F-1.

If the wire is coiled, this field increases (Figure F-2).

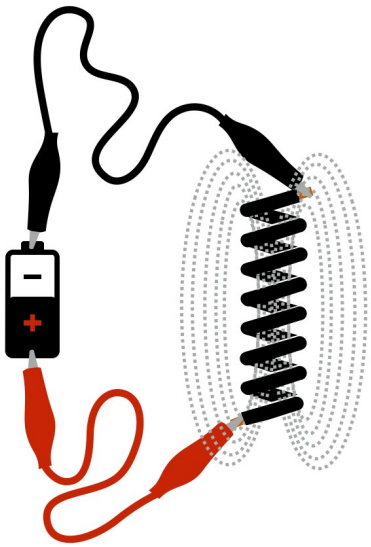

Figure F-2 Coiled wire and electromagnetic field

The electromagnetic field is strongest in the middle of the coil, and increases with the amount of turns in the coil. The more turns, the larger the field.

Inductive coupling occurs when another coil is placed within that magnetic field. The magnetic field *induces* current within the second coil (Figure F-3).

Sound can be sent as a signal in this way. Hearing loop technology utilises inductive coupling — while the transmitting coil loops around the room, sending the signal, the receiving coil sits within the hearing aid, amplifying the sound for the user.

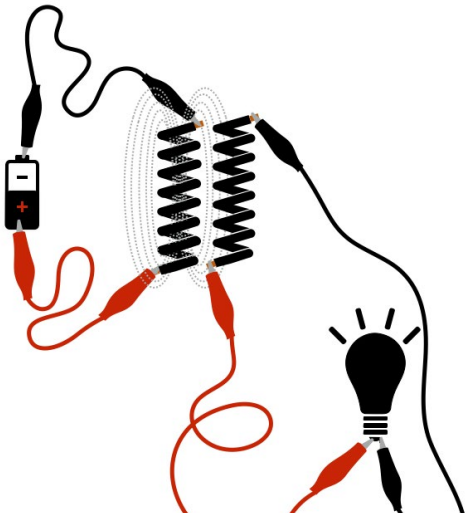

Figure F-3 Diagram of inductive coupling

Expensive hearing loop technology amplifies *current* rather than *voltage.* This minimises interference from other wireless frequencies, such as AM radio frequencies. However, the same principle can be used with cheap audio amplifiers, as used in this work. This interactive installation uses standard audio amplifying circuits rather than those used by typical hearing aid amps.

Textile as Induction coils

Inductive coils need to be created with a continuous length of wire, wrapped into as many loops as possible. Both knitting and weaving techniques can utilise a continuous strand of copper, looped and coiled.

The electromagnetic field of a woven coil is similar to a typical coil — particularly the “tubular” shaped coil. These essentially *are* coils and behave typically (See Figure F-6 on page 67). However, while research into knitted coils is appearing (see The Knitted Radio: http://eyebeam.org/events/the-knitted-radio, by Ebru Kurbak and Irene Posch and betaKnit: http://v2.nl/lab/projects/betaknit-research,

by Peim Wirtz and Karla Spiluttin), there is still not comprehensive documentation of the electromagnetic properties of knit. Therefor it is difficult to know exactly how the stitches of the knitted structure effect the overall inductance and coupling of these objects. “Figure F-4 EMF of single loop” and “Figure F-5 Possible EMF of knitted loops”, indicate a possible EMF pattern for a looped knit structure.

This research highlights knit, and knitted coils, as viable, and interesting subject matter for multidisciplinary research. Further research into knit structures and electromagnetism/inductive coupling could prove to be rather interesting.

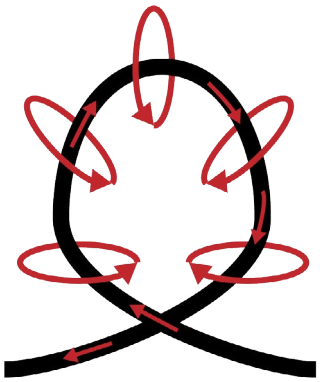

Figure F-4 EMF of single loop

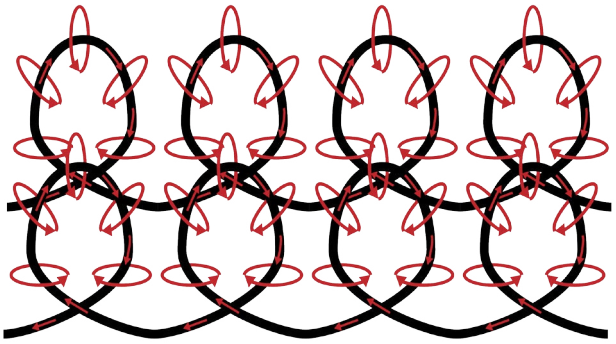

Figure F-5 Possible EMF of knitted loops

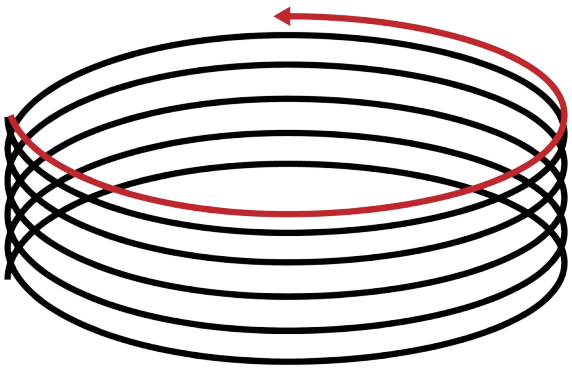

Figure F-6 A tubular weave creates a continuous coil

Appendix G: Images of Final Work

Figure G-1 Final work set up

Figure G-2 Final work set up

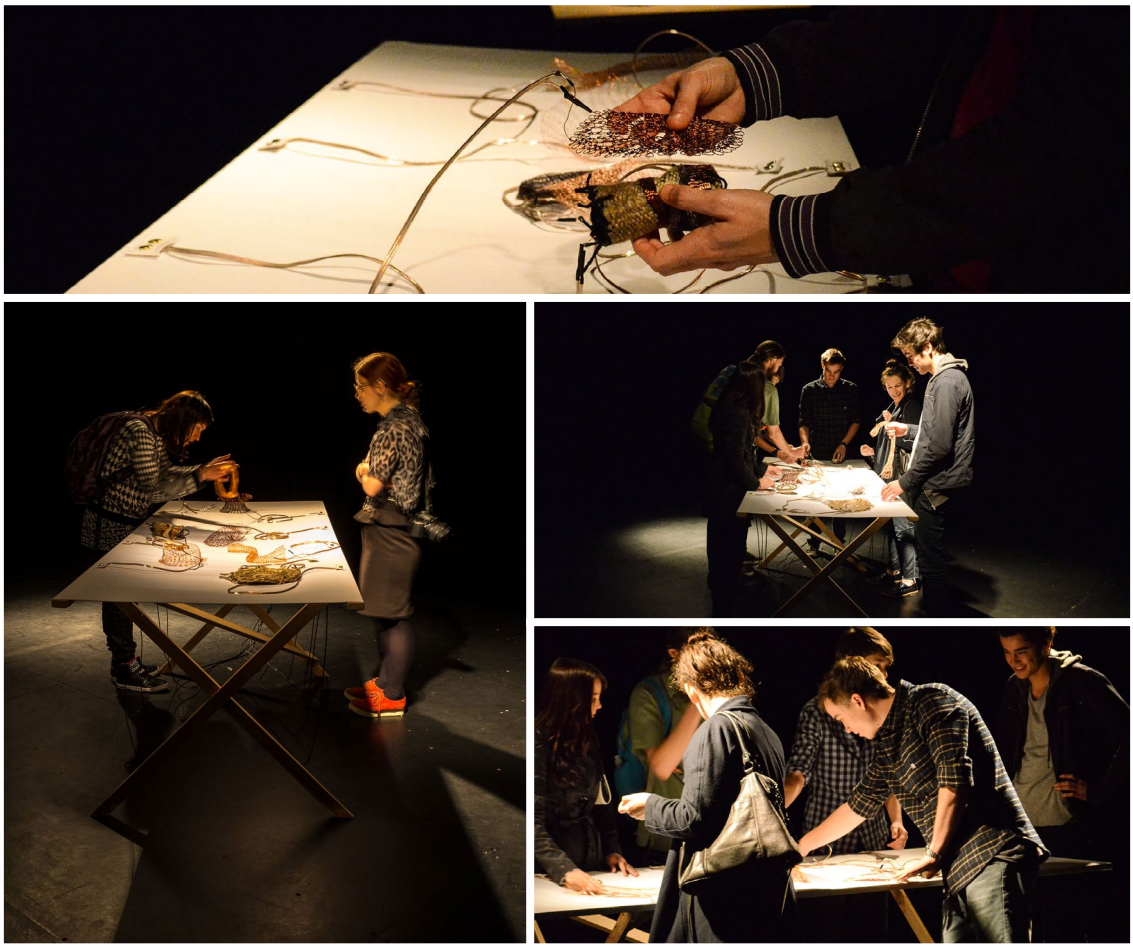

Figure G-3 Audience interaction with final work