PROSTHETIC PROPULSION

MECHANISTIC SCULPTURE
AND INTERACTIVE INSTALLATION

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ABSTRACT

This paper elucidates upon the research processes undertaken and artistic outcomes developed throughout the Masters of Fine Art project, accompanying the exhibition *Pulse*, held at Bus Gallery, Melbourne in November 2008.

This project has focused primarily on interactive art and the role of the machine within works of art. The machine manifests as both an actual, kinetic element and as a symbolic means to explore the relationship between humankind and technology.

The first chapter discusses interactive art, its potentials and difficulties, and relationships between interactive art and installation art. It explores the work of artists such as Jean Tinguely and Olafur Eliasson. At the end of the chapter, the term 'multi-motive' is proposed as a replacement for 'interactive art', to better encompass the work developed during the project.

The second chapter deals with the machine within works of art, and in the broader social context, as both an emancipatory and threatening force. The machine is defined throughout as a prosthetic device. Artists that deal with machines and prostheses are discussed, including Jean Tinguely, Stelarc, Louise Bourgeois, Rebecca Horn, Richard Goodwin and Olafur Eliasson. It also briefly covers concepts such as the machine as parasite, the amputated prosthesis, visualisations of the human body as a machine, and the contemporary cyborg, looking at the work of relevant theorists such as Peter

Weibel and Donna J. Haraway. These considerations lead to a discussion regarding the use of kinetics within this project, and the potential of kinetics as a means of exploring human nature, the human body, and its inter-relationships with technology.

The final chapter explores artistic considerations encountered throughout the project, and experimentation and decisions made in light of these considerations. These include materials, processes, sound, lighting and exhibition within a gallery, referencing artists such as Jean Tinguely and Mona Hatoum.

The investigations put forward throughout the paper bring numerous ambiguities to light. The concept of 'multi-motive' artwork blurs distinctions between artist, artwork and viewer. The machine as prosthesis is considered as an ambiguous symbol, destabilising the roles of prosthesis, parasite and host, thus bringing the pre-eminence of the human body into question. The decisions made in regards to artistic considerations also embrace ambiguity, particularly in the notion of twilight as a state of indistinctiveness. The use of these concepts in artwork created throughout the project led to a final body of work that embraces ambiguity, bringing the nature of humankind and its relationship with technology into question.

CERTIFICATION

I hereby certify that, except where due acknowledgement has been made to other material, the thesis submitted to fulfil requirements for the degree of Master of Fine Art (by Research) comprises only my original work.

Laura Woodward
11 October 2008

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CONTENTS

INTRODUCTION

This paper accompanies the exhibition *Pulse*, shown at Bus Gallery in Melbourne during November 2008. Discussion throughout this paper will elucidate and build upon the research processes and artistic outcomes developed during the Masters of Fine Art project.

The two focal points of this project have been interactive art and the role of the machine within works of art, both physically and symbolically. Throughout this paper, for the sake of clarity, discussions around these two points remain relatively separate. However, it became apparent during the project that these aspects are linked by a common theme: the machine as both good and bad. As the complexity of the project developed, areas of exploration that initially appeared separate slowly became integrated through this theme, to form a multi-layered, multi-faceted and ambiguous outcome within the body of work. The ways in which these aspects interconnected both in the artwork and conceptually are covered in each chapter.

The research methodology used throughout this project has involved two main streams: theoretical research and studio practice. The theoretical research involved research of relevant artworks and other cultural material such as films, and literature relevant to the project. The studio practice involved the creation and exhibition of many artworks, allowing experimentation with various materials, processes and conceptual hypotheses developed during the project. The shifts that occurred through

this research, in both the conceptual and physical bases of the work, and the final outcomes of the project are discussed throughout this paper.

Through experimentation with interaction and installation the body of work matured – from initial attempts to diminish the autonomy of the artwork (and therefore the artist) to prioritise the viewer, to a point where I chose to re-imbue the work with a certain level of autonomy. Research into interactive and installation art covered artists such as Jean Tinguely and Olafur Eliasson. Research undertaken eventually led to a realisation of the artist's ever-present role regardless of a work's interactive qualities. The difficulties encountered, research covered and shifts that occurred within the theoretical and actual application of interaction are discussed in the first chapter.

The second chapter deals with the ambiguous nature of the machine as good and/or bad – as both an emancipatory and threatening force. It investigates the use of the machine in this project and by other artists, as both a symbolic and actual element. This covers artists such as Jean Tinguely, Stelarc, Louise Bourgeois, Rebecca Horn, Richard Goodwin and Olafur Eliasson. It also discusses various concepts of the machine in relation to the human body – including the machine as prosthesis, the machine as parasite, the amputated prosthesis, visualisations of the human body as a machine, and the contemporary cyborg – and relevant theorists, such as Peter Weibel and Donna J. Haraway. These considerations lead to a discussion regarding the use of kinetics within this project, and the potential of kinetics as a means of exploring human nature, the human body, and its inter-relationships with technology.

The third chapter explores artistic considerations, including materials, processes, sound, lighting and exhibition within a gallery context. As a framework for the conceptual and physical aspects of an artwork, these elements are crucial to the works' final success. This chapter discusses artists that are relevant to these considerations including Jean Tinguely and Mona Hatoum, the relevance of these elements to the overall project, and discoveries, experimentation, and testing undertaken with regard to these considerations.

INTERACTIVE AND INSTALLATION ART

A significant focus of this project has been the investigation of the potential of interaction within an artwork. Throughout this chapter, I will discuss the initial basis for this interest, experimentation undertaken, the shifts in understanding that occurred as a result of these experiments, and their final outcomes in the body of work. In discussing relevant references, I will focus particularly on interactive and installation artworks that involve mechanistic elements.

In the context of this project, 'interactive art' no longer seems to be a sufficient or correct terminology. As Margaret Morse states in *The Poetics of Interactivity*, interactivity now means *too* many things.[1] Use of this terminology throughout this chapter is for lack of having found a more satisfactory description. I will, however, propose a re-definition to conclude the chapter, after establishing a suitable definitive framework.

Contributing to my hesitation in using the term 'interactive art' is the fact that it is often mistakenly considered to exclusively involve computer-based interfaces. Whilst some interactive artworks do fit into this category, the term also encapsulates a wide range of other artistic forms and outcomes that focus on participatory engagement with the viewer. Margaret Morse identifies interactivity as a mode of

1 Morse 2003, p. 17

engagement between ourselves and machines, rather than as a specific artistic genre, defining interactive art by its eclecticism.[2] Interactive art usually attributes the viewer a 'role' to play within the work. It often involves a relationship to the human body, and therefore to a certain scale. For this reason interactive artworks are often installations. This correlation reflects a conceptual connection between the two; Claire Bishop discusses activation of the viewer in installation art, differentiating it from traditional art which "simply requires optical contemplation (which is considered to be passive and detached)". This could be said equally of interactive art, particularly as "this activation is... regarded as emancipatory, since it is analogous to the viewer's engagement in the world."[3] The potential for the viewer to encounter the work experientially through direct involvement is the most engaging aspect of both interactive and installation art, and is what I initially aimed to achieve.

My interest in interactive art began with the ideal that in allowing viewers' involvement to complete a work,[4] traditional hierarchical relationships between artist and viewer can be broken down:

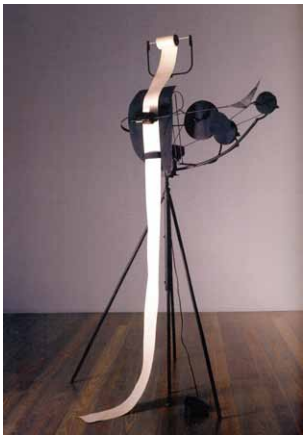
> The utopian claims for interactivity as a liberatory and nonhierarchical praxis are based on the capacity to accommodate multiple and nonlinear links... and the potentially more egalitarian or dialogic relation between artists and their audiences.[5]

In breaking down the artist/audience hierarchy, a work presents the potential for expanded accessibility: "to invite the individual to intervene mentally or physically... is to open the work to multiple avenues of interpretation...".[6] These points of interpretation may be conceptual, aesthetic, bodily or sensory. The artwork's value

2 Morse 2003, p. 23
3 Bishop 2005, p. 11
4 Krueger 1983, p. 50
5 Morse 2003, p. 20
6 Grynsztejn 2007, p. 21

is not based solely on its concept or on visual aesthetics, as can be the case with non-interactive works. Interactive art and installation art are equally grounded in responsive, bodily or experiential relevances: "the work of art itself becomes the interface between site and subject and an emergent property of both."[7]

In discussing Swiss artist Jean Tinguely's interactive *Méta-Matics* [fig. 1], Katherina Dohm and Heinz Stahlhut highlight the artist/audience hierarchical breakdown:



1 Jean Tinguely
Méta-Matic 1959

> The role of the artist as creator is withdrawn in favour of the viewer's interaction, and the work of art is no longer considered a self-contained whole... Only in motion, in the fulfilment of the idea underlying the machine, do they achieve their completion anew, again and again.[8]

Several interactive and mechanistic artworks, including Tinguely's *Méta-Matics,* were displayed in *Art Machines: Machine Art* at the Schirn Kunsthalle, Frankfurt in 2007. A significant drawback of the exhibition was the intervening presence of gallery attendants. The production-line style of Pawel Althamer's *Extrusion Machine (Bottle Machine)*, 1992/2007 [fig. 2], justified the gallery attendant's involvement, as the machine required a 'factory worker' to function. Roxy Paine's *Scumak No. 2 (Auto Sculpture Maker)*, 2001 [fig. 3], on the other hand, was significantly weakened by the attendant's constant presence. Generating several unique polyethylene 'sculptures' each day, the machine's 'creativity' suggested autonomy. Because the machine's functioning was not reliant on human intervention, the hovering attendant dampened the experience of the work.

7 Grynsztejn 2007, p. 15
8 Dhom & Stahlhut 2007, p. 18

2 Pawel Althamer
Extrusion Machine (Bottle Machine) 1992/2007

3 Roxy Paine
Scumak No. 2 (Auto Sculpture Maker) 2001

The attendants' intervention was even more problematic in the interactive works; at every artwork gallery attendants jumped to explain *how* to interact. As my every experience with these pieces was mediated by an attendant, it was difficult to judge how evident interactivity would have been had there been no instruction. It still seemed, however, that many of the pieces would have required explanations as to how to make them 'work'. Margaret Morse comments that the liaison between mind, body and machine requires a translator or interface.[9] This exhibition made apparent that in many interactive works this interface is not inherent to the work, but presented as a mediating attendant. There is something particularly appealing in artwork that does not require this human intervention – artwork where the viewer develops a relationship directly with the piece on his or her own terms.

In *Breathe*, 2007 [fig. 4], I experimented with a direct audience/artwork relationship. When a viewer stepped onto the machine and leaned their head into a cradle, the machine responded with a stream of air against the viewer's neck, just below the ear. If the individual's head was removed, the machine's 'breath' would stop. The machine demanded intimacy for intimacy.

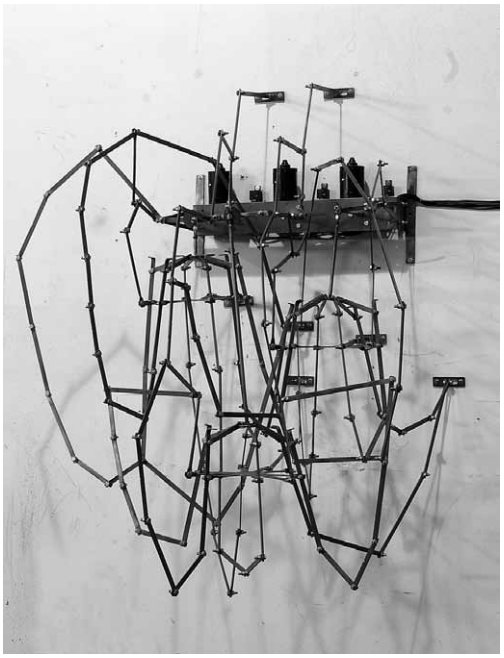
9 Morse 2003, p. 19

This work was not particularly successful. Many viewers did not realise that it was 'functional' and that they were allowed to interact with it, and generally couldn't decipher what to do once they were interacting with it, often requiring instruction. Thus, it completely failed the intent of not requiring mediation. In this instance, any form of instruction lessened the work – taking away from the moment of intimacy that occurred when the individual embraced the machine.

4 Laura Woodward
Breathe 2007

Another weakness was that *Breathe* was a stand-alone sculpture. Sculptural autonomy succeeded in a later work, *Triplets*, 2007 [fig. 5], but not in *Breathe*. Because *Breathe* did not physically 'interact' with its surrounds, it lacked the strengths inherent to installation, thus failing to carry any of the intended implications. *Triplets*, whilst a singular sculpture, still carried the qualities of installation; in 'growing' from the wall, it directly referenced its environment.

Where *Breathe* faltered most, however, was that it lacked any sense that it could be more than its form; though it responded to external stimuli, it was not convincing of any 'life' beyond its own physical, functional state.



5 Laura Woodward
Triplets 2007

Breathe's limitations directly influenced subsequent artworks. It suggested that works not requiring direct viewer action may be more successful. At this point I began to use passive infrared sensors, which are triggered by body heat. I first used these in *Pulse,* 2007 [fig. 6], a tree-suspended work at McClelland Gallery and Sculpture Park. By employing interactive devices that did not require initial viewer-determined action, I hoped to remove the need for external mediation.[10]

Pulse involved a motor-driven mechanism which controlled a circular arrangement of six discs. From the back of each disc, an articulated arm arched up into surrounding foliage. The effect was a spindly, arachnid-like form 'growing' amongst the trees. Four of these 'units' were suspended at varying heights along a forty metre path. When a viewer stepped within a unit's range, it would move, causing the six discs to move in and out, as if attracted to and then repelled from one another, continuing as long as a viewer maintained movement within the sensor's range. The resulting intermittent movement was a strong aspect of the work; the units had presence regardless of their motion, the periods of stillness remaining as important as the action.

10 Olafur Eliasson's work "makes a case for the proactive subject, for the individual's return to a heightened sense of him- or herself in the act of perceiving and acting..." (Grynsztejn 2007, p. 14) In works such as *Notion Motion*, 2005, each viewer's impact is visible to the other viewers – and in this way is similar to my developing approaches to interactivity. In other works, such as *Beauty*, 1993, it is the singular position of the viewer that may allow the image of the work to appear to that viewer only. As such, the viewer's impact upon the work is only visible to him or herself, differing significantly from this project's body of work.

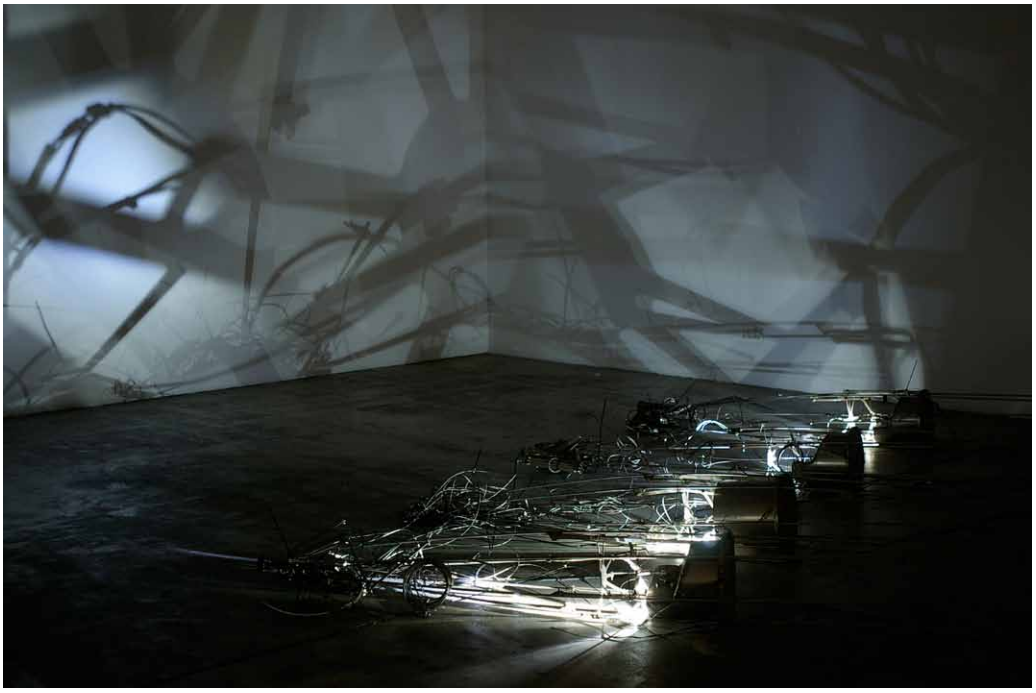
6 Laura Woodward
Pulse 2007

One of the most exciting occurrences with *Pulse* was actually a flaw in the sensors. The use of passive infrared sensors should mean that the motor only receives power when a person is in range. However, a malfunction was, on occasion, allowing the units to move of their own accord.[11] This extra-viewer motion brought a very different strength to the work, suggesting an ostensible autonomy developing within the machine.

In the second manifestation of *Pulse – Pulse (Reiteration)*, 2008 [fig. 7] – the units retained a direct viewer-unit relationship via sensors, which, unfortunately, no longer displayed aberrant behaviour. In removing *Pulse* from the trees, each unit was tightly bound with cable ties – the arms folded back upon themselves and the suspension cables and wiring wound up and affixed to the units. In *Pulse (Reiteration)*, the units were installed still-bound in a white space, laid alongside each other on the floor. The space was dark, except for a singular LED (light emitting diode) placed in each unit. When a viewer entered the space, the units attempted to move, but their bound movement was severely limited. In contrast to their graceful pulsing in the trees, they struggled weakly. One viewer related this motion to the contraction of frogs' legs caused by electrical input – that which Bruce Mazlish named the 'galvanic twitch' after the scientist Luigi Galvani.[12] The LEDs cast large shadows of this struggling onto the walls and ceiling in a faint, bluish-white light.

Whilst overall this installation was very successful, the sensors' predictability weakened the unnerving combination of motion, sound and shadow. I felt that the combination of interaction and autonomy – that which occurred accidentally in the sensor failure – would create a more potent installation, blurring the viewer-artwork relationship. By altering the circuitry between sensor, motor and relay, I allowed each unit to be both self-driving and viewer-responsive.[13] By obscuring interaction

11 This was either due to the low quality of the sensors, or the use of them in variable weather conditions.
12 Mazlish 1993, p. 40
13 During the nineteen-fifties, Paris-based artist Nicolas Schöffer formulated a concept for kinetic artwork that was not only active and reactive, but also autonomous and proactive. His work *CYSP 1*, 1956, is generally accepted as the first simultaneously reactive and autonomous sculpture. (Brown 2008, p. 265)



7 Laura Woodward
Pulse (Reiteration) 2008

and adding autonomous movement, cause and effect becomes strained. The illusion of an autonomous machine is heightened. As Justin Hoffman states: "the more autonomous a machine seems to act, the more astonishing the results...".[14] Apparent autonomy results in a destabilised relationship between viewer and machine, reflective of the constantly blurring, ambiguous relationship between humankind and technology. This was the direction that I decided to take in subsequent work.

A major shift that occurred in relation to interactive art was the developing realisation of my role as artist. The initial intention in using sensors was to allow an unmediated, 'purer' viewer-artwork relationship. However, devices which implement interaction before decisive viewer action actually perform a completely different function; once a work has been 'activated', the viewer becomes an accessory to that work. Thus, the use of such devices is highly manipulative, contradicting the previously discussed reasoning of both interactive and installation art. The fact that nearly every example of interactive art involves an artist-determined outcome also brings the utopian

14 Hoffman 2007, p. 32

premises of interactivity into question.[15] The work perhaps no longer functions as 'emancipatory', as Claire Bishop hoped, but the complete opposite. By manipulating the viewer and presenting predetermined outcomes, the work once again embodies the artist/viewer hierarchy.

However, I propose that these two aspects – that of both forcing the viewer into complicity and leaving the work open for multiple points of access – are not necessarily mutually exclusive. The work may manipulate viewers into particular positions, actions, or roles, but it may simultaneously present a more experiential, 'emancipatory' experience than a 'passive' artwork. Olafur Eliasson calls this "a relationship of co-production" in which the viewer produces the work but is also produced as a subject by the artist's constructed environment.[16] These coexistent factors of the emancipatory and the manipulative layer the work; the roles of artist, viewer and artwork shift and change, blurring in and out of focus.

It is for this reason that 'interactive art' no longer seems satisfactory to describe this body of work.

> *interactive* (adjective) (of two people or things) influencing each other.[17]

This term defines a clear relationship between two distinct entities. It does not allow for the lack of clarity, motive and shifting roles which have developed in this body of work. I propose that a more appropriate description is 'multi-motive':

> *multi-* (combining form) more than one; many.
> *motive* (noun) a reason for doing something.
> (adjective) 1. producing physical or mechanical motion.
> 2. causing or being a reason for something.[18]

15 Morse 2003, p. 27
16 Birnbaum 2007, p. 138
17 Oxford University Press 2005
18 Oxford University Press 2005

Using *multi-* to replace *inter-* expands the term beyond two singular, directly related entities, to any possible plurality of relationships and positions. The definitions of *motive* resonate with this body of work – in the ambiguous motives behind the works, and in the ambiguous relationships that the work facilitates between artist, viewer and artwork. It is not clear what the reasons or causes may be, but there is a definite outcome – a physical or mechanical motion caused by the 'multi-motive' relationship between viewer, artwork and artist.

The ambiguity engendered in 'multi-motive' is pertinent to the mechanistic aspects of this body of work, which are discussed in the following chapter. 'Multi-motive' reflects the machine's ambiguous role in the existence of humankind as both an emancipatory and manipulative force. Whilst empowering humankind to fulfil otherwise unattainable potential, the machine forces its own agenda. The machine makes the existence of other machines imperative; in a cycle of constantly evolving reliance upon reliance, one technology demands another – another which creates a new need, or problem, for humankind. This need then demands another technology, and so on. In *Technopoly*, Neil Postman describes this difficult and ambiguous relationship: "Every technology is both a burden and a blessing; not either-or, but this-and-that."[19] An artwork that gives choice but simultaneously takes choice away may at first appear to be contradictory – but in the context of humankind's codependence with technology, this contradiction simply plays into the ambiguous, layered realities of the humankind/machine relationship.

19 Postman 1992, pp. 4-5

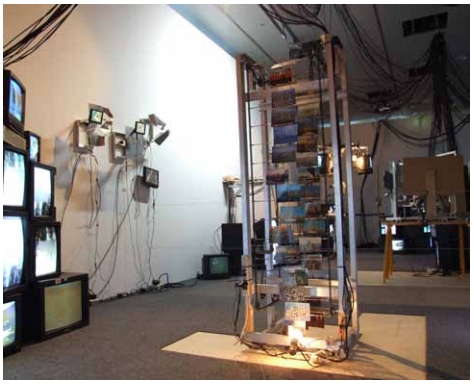
THE MACHINE

This project has involved the creation of kinetic, mechanistic sculptures. The use of the mechanical in an artwork reflects the ambiguous role that technology plays in humankind's existence, as an emancipatory and manipulative force. This chapter discusses theoretical bases for the use of machines and kinetics within this body of work. It briefly explores various relationships of the body to the machine – the machine as prosthesis and parasite, prosthetic amputation, visualising the body as machine, and contemporary cyborgs. These considerations lead to a discussion of the use of kinetics and prostheses within this project, correlations between kinetic art and film, and the potential of kinetics and prostheses to explore humankind, the body, and its relationship with technology.

This project commenced with attempts to quantify human emotion by creating 'machines for joy' – apparatuses to emulate or generate 'happiness'. Through these machines, I wished to delve into conceptualisations of emotion and the location of emotion within the body.[1] With a growing understanding of the machine's symbolic power, emphasis shifted from 'machines for joy', to the creation of machines presenting symptoms of mental illness, and finally to the current position where the sculptural machines' 'functions' remain elusive, even to myself.

1 Early research covered theoreticians working in the area of machine consciousness such as Isaac Asimov, Peter Weibel, Jean Baudrillard and Lewis Mumford.

Since the Industrial Age the machine has intervened both metaphorically and directly in all areas of daily life.[2] Symbolically, the machine represents a dual nature, both power and lack, control and chaos – the machine is good and/or bad. It has been used as both symbolic metaphor and actual mechanical device by many artists including Jean Tinguely, Rebecca Horn, Stelarc, Olafur Eliasson, Cameron Robbins, Jon Kessler, Tim Lewis, the collective *robotlab* and Antoine Zgraggen. Interestingly, nearly all individual examples of machine art can be classified into one of two categories – which reflect the symbolic position of the machine in Western culture – the machine as a threat and the machine as a means of emancipation.



8 Jon Kessler
The Palace at 4 A.M. (detail) 2005-7

9 Rebecca Horn
Knuggle Dome for James Joyce 2004

In recent works, Jon Kessler contextualises machines in chaotic installations. Incorporating video cameras, motors and mixed media, his model-like devices are confusedly juxtaposed, like museum dioramas-gone-wrong. *The Palace at 4 A.M.* [fig. 8], exhibited at ZKM (Centre for Art and Media) in Karlsruhe, Germany in 2007, spanned several rooms and included dozens of mechanical components, engendering feelings of hysteria.[3] Kessler's machines are violent, destructive and disconnecting devices. Similarly, Rebecca Horn's mechanistic sculptures appear dangerous and threatening. The methodical movements in works such as *Knuggle Dome for James Joyce*, 2004 [fig.

2 Dhom & Stahlhut 2007, p. 18
3 *The Palace at 4 A.M.* exemplifies the concept of 'multi-motive' discussed previously. The viewer is "always implicated by the dozens of surveillance cameras," but the viewer's relationship to or impact upon the work is characterised by ambiguity: "the viewer... becomes the work: the viewer incarnates the image as its one consistent variable." (Lee 2007, p. 86)

9], display an ominous patience. In their violent and random performances, ink-on-wall machines such as *Les Amants*, 1991, present images of chaos and loss of control.

For Stelarc, who defines the machine as prosthetic apparatus, the prosthesis allows the body to move beyond its physical confines. This release from the body's limitations positions his prostheses as emancipatory, and therefore positive, devices. In their relationship to the viewer, Olafur Eliasson's artworks, such as *The Endless Study*, 2005 [fig. 10], are also emancipatory. *The Endless Study* is a contemporary harmonograph, a drawing apparatus which allows relatively unskilled individuals to create beautiful geometric images.

10 Olafur Eliasson
The Endless Study 2005

Much of Tinguely's oeuvre positions the machine as an emancipatory device. His famous drawing machines collectively titled *Méta-Matics* allow viewers to participate in the artwork's production, an experience which Tinguely associated with pleasure:

> The man in the street can watch my machines for hours.
> And the time he spends watching them, is spent merrily and he feels happy. [...] Isn't that enough?[4]

4 Dhom & Stahlhut 2007, p. 130

In releasing viewers from their roles as mere observers the *Méta-Matics* are emancipatory. In contrast, Tinguely's *Dance of Death*, 1986 [fig. 11], embraces the machine as symbolically threatening. However, his individual works do not appear to explicitly embrace the duality of the machine as both good and bad.

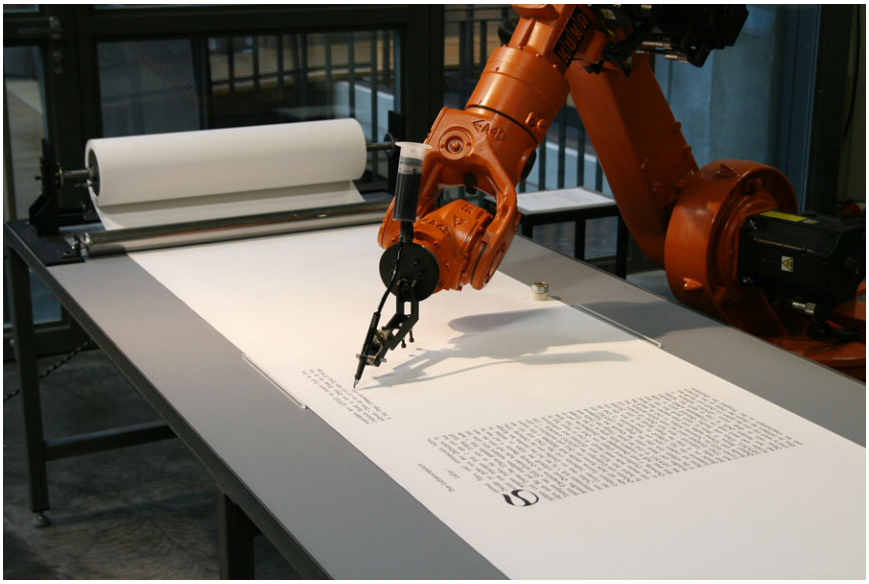
11 Jean Tinguely
Dance of Death (detail) 1986

The work of Swiss artist Antoine Zgraggen achieves this duality. *Die Zerquetscherin*, 2005 [fig. 12], exhibited in *Art Machines: Machine Art*, is emancipatory due to its destructive nature – a hydraulic jaw crushes every-day objects, freeing humankind from its obsession with 'stuff'. Other works such as *Der Groβe Hammer*, 2005 [fig. 13], and *Marie Antoinette*, 2005, offer various violent means of freeing oneself, thus embracing the dual nature of the machine as good and/or bad. The work *Bios (Bible)*, 2007 [fig. 14], by the *robotlab* collective also subtly achieves this duality. In a calligraphic hand, an industrial robot methodically scribes the Old Testament and the books of Moses.[5] The assignation of a spiritual task to an industrial robot reflects the dual nature of the machine as an emancipatory and usurpative – and therefore threatening – device.

5 Serexhe 2007, p. 7

12 Antoine Zgraggen
Die Zerquetscherin 2005

13 Antoine Zgraggen
Der Große Hammer 2005



14 *robotlab*: Matthias Gommel, Martina Haitz, Jan Zappe
Bios (bible) 2007

The works I have created throughout this project have tended towards the machine's threatening nature rather than directly exploiting its duality. As I will discuss further on, this threat comes not so much from the artworks' overt forms, as in Zgraggen's work, or from the use of symbols of death, as in Tinguely's *Dance of Death,* but from the presentation of the artworks as partially destroyed machines. Aspects of the emancipatory are maintained in their 'multi-motive' and immersive qualities. However, the artworks' symbolic nature tends towards the machine as an overt threat, rather than fully embracing its dual potential. I intend to experiment with exploiting this potential in future works.

The machine's emancipatory symbolism derives from its existence as a prosthetic device, allowing the body to surpass physical limitations. The Oxford Dictionary[6] defines prosthesis as such:

> *prosthesis* (noun) an artificial body part, such as a limb, a heart, or a breast implant.

This definition physically attaches the prosthesis to the human body. However, at the current technological stage, most prosthetic devices exist beyond direct bodily contact. Therefore, I expand upon this definition:

> *prosthesis* (noun) a device that directly or remotely extends the human body. Implies the existence of a host body at any proximity, with some form of lack, dysfunction or need.

As an addition to or extension of the body, technology is *always* prosthetic. In *Civilisation and its Discontents*, Freud describes the human being as a prosthetic God.[7]

6 Oxford University Press 2005
7 Freud 1995, p. 738

From its earliest beginnings, humankind has never been without technology,[8] and thus has co-evolved with its prostheses. In *Virtual Worlds: The Emperor's New Bodies*, Peter Weibel considers the mutual simulation of human and machine a natural result of evolution.[9] Le Corbusier suggested that prosthetic artefacts are subject to the same evolutionary laws as the body itself, and that therefore the designs are outside the control of human consciousness.[10] This evolutionary coexistence of humankind and technological prostheses makes each inseparable from the other. Sydney artist Richard Goodwin often deals with concepts of the prosthesis. In discussing Goodwin's work, Michael Tawa references this inseparability:

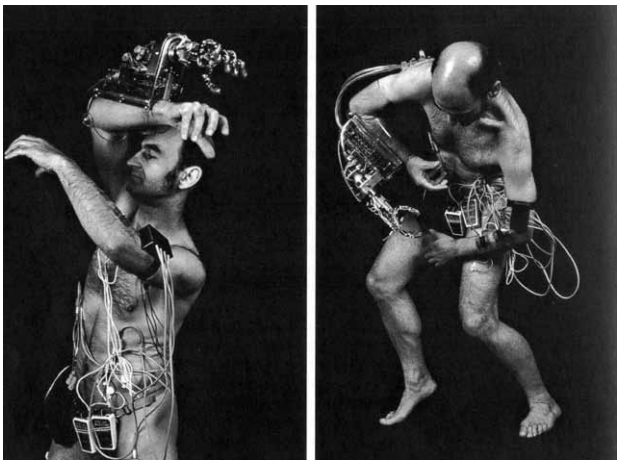
> Ultimately, the pervasiveness of prosthetic apparatus is a function of the technological condition to which human existence is subject... Human beings are... fundamentally technical beings, and everything they make or produce... is prosthetic...[11]

The machine is the ultimate culmination of the evolving prosthesis; a device that not only extends the body beyond its own fleshy limits, but has inherent potential to usurp that to which it is prosthetically attached. In doing so, the machine turns the host upon itself – host becomes prosthesis and prosthesis host. It is in this ambiguous capacity that the machine maintains such an interesting position. Freud clarified his notion of the prosthetic God by conceding that despite humankind's magnificence when cloaked in auxiliary prostheses, the prostheses have not grown onto the body and still give it much trouble.[12] In this concession, he positions the machine as a magnificent hindrance.

8 Mazlish 1993, p. 216
9 Weibel 1999, p. 210
10 Goodwin 2006, pp. 8-9
11 Tawa 2006, p. 118
12 Freud 1995, p. 738

As prosthesis, the machine's primary role is to aid humankind. However, the machine's capacity to destabilise the positions of host and prosthesis symbolises loss of control. Prostheses "... signify the determination to survive at any level. They are, ultimately, a response to the fear of annihilation."[13] An ambiguity lies in the fact that, as a response to the fear of annihilation, the prosthesis-cum-machine develops an even greater fear of annihilation. Mazlish questions the logic of such a stance: "If humans insist on their separateness and superiority in regard to machines... viewing them as a threatening new 'species,' rather than as a part of their own creation, will they, indeed, bring about the very state of alienation that they fear?"[14] Humankind's position as self-determining agent is crushed by attempts to maintain self-determination. Prosthesis becomes host and humankind's worst fears come to fruition.

The prosthesis as a device and an ambiguous symbol has been used by, amongst others, Stelarc, Rebecca Horn, Louise Bourgeois, Richard Goodwin and Tim Lewis. In many of these artists' early works, and in initial ideas for my own work within the project, the prosthesis manifested as a hand-based device. Perhaps this interest in the hand as a site for prosthetic development comes from its position as the body's most significant tool, both in itself and as an interface with the world.

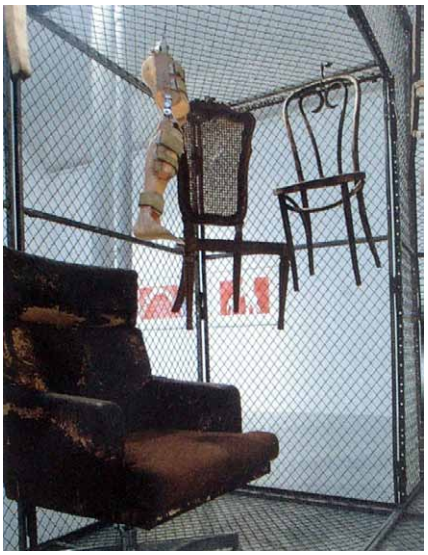


15 Stelarc
The Third Hand 1980-1994

13 Lyon-Wall 2007, p. 226
14 Mazlish 1993, p. 44

16 Stelarc
Exoskeleton 1999

Having dealt with prostheses throughout his career, Stelarc has, from very early on, "held the view that we've always been prosthetic bodies." He sees these prostheses in a positive light, describing them as bodily amplifications.[15] He has created several 'devices' driven by the body, notably *The Third Hand*, 1980-1994 [fig. 15], and *Exoskeleton*, 1999 [fig. 16]. He considers his prostheses as bodily extensions rather than prosthetic replacements.[16] He claims his work as a celebration of the machine as prosthesis, of its potentialities for the amelioration of the human body.[17]



17 Louise Bourgeois
Passage Dangereux (detail) 1997

In contrast to Stelarc, Louise Bourgeois' prosthesis is a device "to control and ensure full bodily function in the face of physical and psychological disorders."[18] Often actual medical prostheses, such as in *Passage Dangereux*, 1997 [fig. 17], her prostheses exist to manage the body's failures.

15 Goodall 2005, p. 1
16 Stelarc 1991, p. 592
17 I have often felt that there is a discontinuity between Stelarc's outspoken rhetoric and what his artwork actually achieves. It seems that his claim of the body as 'obsolete' (Stelarc 1991, p. 591) sits in sharp contrast to the very bodily responses that his work invokes. Amelia Jones presents an engaging discussion on this topic in *Stelarc's Technological 'Transcendence'/Stelarc's Wet Body*, (Jones 2005, pp. 87-123), in which she argues that his writing contradicts what his work embodies. In discussing specific examples of his work, she reinstates his body – that which Stelarc claims as 'obsolete' and 'hollow' – as a fleshy, 'wet,' fluid entity, and in doing so argues that his dismissal of the subjectivity of the body is an attempt to escape the body's ultimate limitation – death.
18 Lyon-Wall 2007, p. 226

Rebecca Horn's prostheses definitively act as threatening devices. Works such as *Head Extension*, 1972 [fig. 18] – in which a five and a half metre 'horn' balances upon a woman's head – enhance the body to the point of physical endangerment:[19]

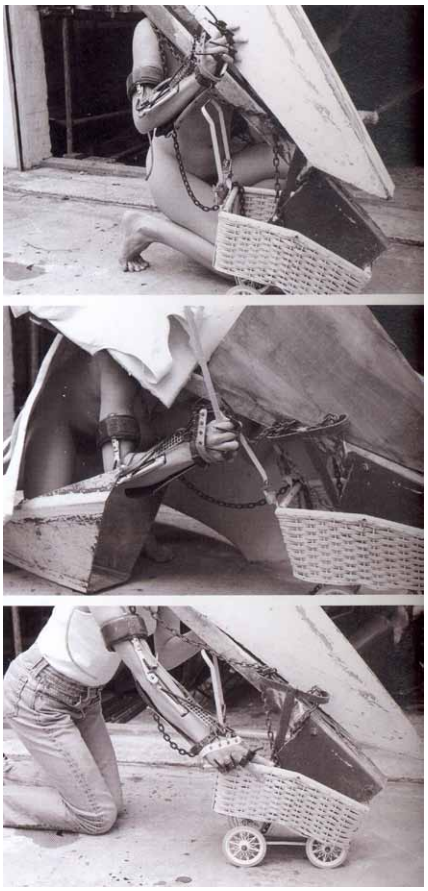
> [Horn's] early instruments and prostheses deal with the... extension of the senses... Fitted, clamped, or strapped to the body, they echo the properties of medical devices and forcefully demonstrate the torture of body and mind through constricting violence.[20]

Goodwin also presents a darker view of prostheses, stating that "the argument for any form of prosthesis is predicated on the notion of incompleteness which then requires attachment."[21] Like Bourgeois, Goodwin's prosthesis exists because of a lack in its host.

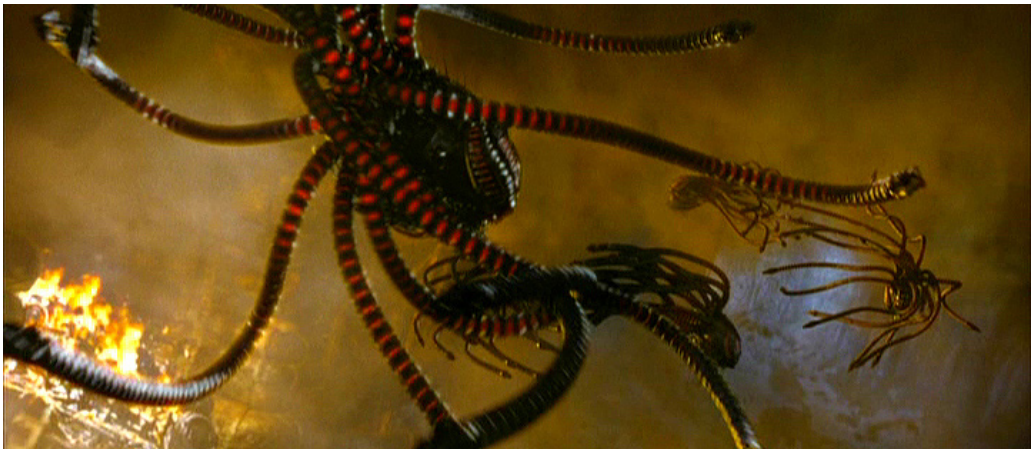
18 Rebecca Horn
Head Extension (film still) 1972

19 Schmidt 1993, p. 70
20 Schmidt 1993, p. 76
21 Goodwin 2006, p. 9

There is another significant similarity in Stelarc, Goodwin and Bourgeois' work, and my own, in the use of exoskeletal, insect-like structures. The relationship of the exoskeleton to prostheses and therefore machines is in the exoskeleton's existence as a supportive or protective casing around the body. Bourgeois considers her huge spider sculpture *Maman*, 1999 [fig. 21], as a protective, positive and reassuring symbol.[22] Goodwin's exoskeletons [fig. 19] are a manifestation of "the poetics of a symbiotic relationship between body and technology."[23] The exoskeleton is also pervasive in fictional representations of parasitic machines, such as in *The Matrix Reloaded*, 2003 [fig. 20]. Greater awareness of the symbolism of the exoskeleton presents an exciting potential for future projects.

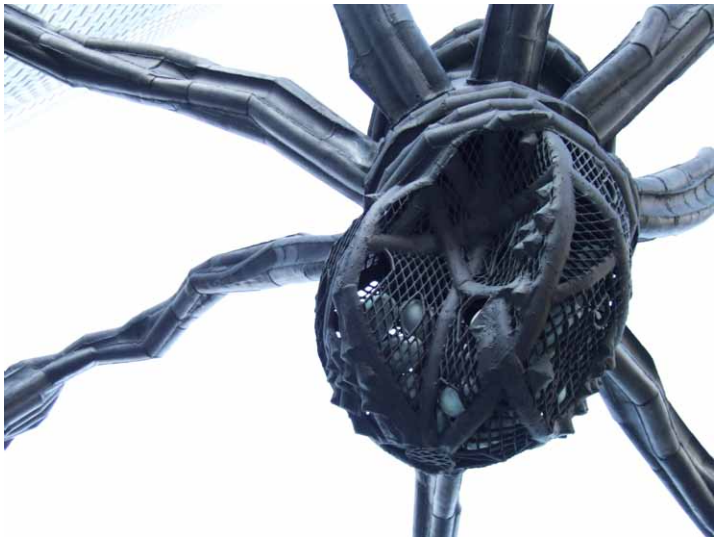


19 Richard Goodwin
Exoskeleton Performance Sequence 1995



20 *The Matrix Reloaded* (film still) 2003

22 Honoré 2007, p. 170
23 Goodwin 2006, p. 8



21 Louise Bourgeois
Maman 1999

Goodwin's work also highlights a compelling similarity between the prosthesis and the parasite. Michael Tawa speaks of this 'uncanny ambiguity':

> If the parasite takes hold... of its host, it also becomes a prosthesis for it – or rather, it transforms the host into a kind of prosthesis for itself. With the parasite, there is a sense of insidious opposition by an adversary... The prosthesis is... an apparatus which extends the body it is attached to, giving it additional power and potency. One occludes while the other advances. Between them, a zone of indiscernability presents itself, a zone in which host, parasite and prosthesis become impossible to differentiate, and in which each interminably alternates and transforms into the other.[24]

This indiscernability became evident in the installation of *Pulse* at McClelland Sculpture Park. The initial intention of *Pulse* was to reference the bodily responses

24 Tawa 2006, p. 117

that we involuntarily experience when approached, such as a quickening pulse. I intended *Pulse* as a proposition for an 'emotional prosthesis'. I was not aware of parasitic interpretations until the units were installed amongst the trees. Quite unintentionally, the forms referenced mistletoe,[25] whilst the installation of multiple units enforced the parasitic implications.

This ambiguity between prosthesis, parasite and host has been extensively explored in science fiction – one could claim that science fiction as a genre uses this ambiguity as the very basis for all subject matter. In *The Will to Evolve*, Jane Goodall discusses the prototypical science fiction narrative, in which "technology evolves to the point where a rival species is generated, fuses human and machine qualities, threatens to become dominant, and so puts biological humanity on the road to extinction."[26] In the film *The Matrix*, each character's struggle is to ultimately defend the borders of the self against invasion by the descendents of their prosthetic-turned-parasitic creations.[27] The robots in Karel Čapek's 1923 play *R.U.R. (Rossum's Universal Robots)* revolt against their creators and claim "man [as] their parasite".[28] *The Book of the Machines* in Samuel Butler's *Erewhon*, the first work of fiction to explore the evolution of human and machine as a Darwinian rivalry,[29] describes "man... [as] such a swarm of parasites that it is doubtful whether his body is not more theirs than his," and then goes on to question whether "may not man himself become a sort of parasite upon the machines?"[30] It also asks: "where does consciousness begin, and where end? Who can draw the line? Is not everything interwoven with everything?"[31] Prosthesis, parasite, host, humankind and machine blur into one another, ambiguous and fearsome.

25 Coincidentally, many of the trees from which *Pulse* was suspended were dying from a parasitic infection that has killed several trees within the park.
26 Goodall 2005, p. 2
27 Goodall 2005, p. 15
28 Čapek 1942, p. 60 – It was actually Karel Čapek's brother Josef who coined the term robot from *r*obota – Czech for drudgery or servitude (Brown 2008, p. 263)
29 Goodall 2005, p. 2
30 Butler 1973, p. 197
31 Butler 1973, p. 191

This blurring is evident in Stelarc's artwork. In his coupling of human and technology, struggle is eliminated, action becoming indistinguishable from manipulation.[32] Stelarc's work presents parasite, prosthesis and host as intrinsically reversible and fundamentally indistinguishable.[33]

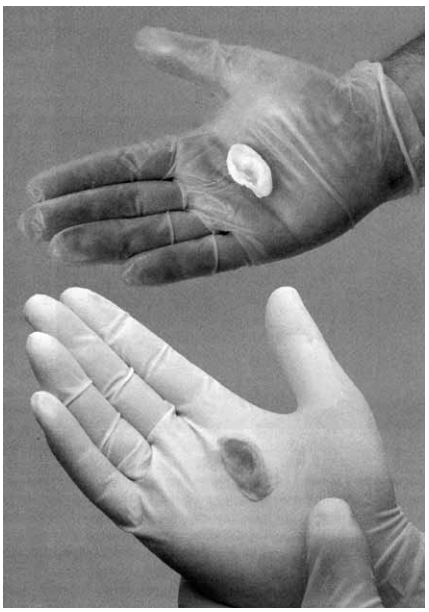
This ambiguity between prosthesis, parasite and host reappeared in *Pulse (Reiteration)*, which evoked strong ambiguities. Outdoors, the units had appeared as 'gestalt' mechanisms parasitically multiplying. Bound in the dark, the units in *Pulse (Reiteration)* appeared as amputated limbs. Whether prosthetic or parasitic, they seemed to have lost their host. They resonated with Goodwin's early fabric-bound, often amputated figures [fig. 22], and with Rebecca Horn's early performance works [fig. 23], in which she prosthetically bound naked bodies: "their bondage to the point of defencelessness conveys the impression of quietly persistent torture."[34] In *Pulse (Reiteration)* the units' autonomy appeared involuntary and unintentional, as if their motion derived from accidental residual power. The success of the ambiguities within this installation led me to focus on these suggestions of loss and amputation in following works. Rebecca Horn speaks of the sense of loneliness and being lost in her machine works, as if "maybe [they're] all that's left... and the human beings are already somewhere else."[35]

22 Richard Goodwin
Untitled Doll 1976

23 Rebecca Horn
Arm Extensions 1968

32 Goodall 2005, p. 13
33 Goodall 2005, p. 6
34 Schmidt 1993, p. 69
35 Horn 1993, p. 18

This shift that occurred between *Pulse* and *Pulse (Reiteration)* engendered pathos, but also a monstrous potential. Amputation implies loss, but not necessarily loss of potential. In contrast, it can present a more fearsome potential than in its pre-amputatory position. In discussing Stelarc's *Extra Ear 1/4 Scale*, 2003 [fig. 24], Julie Clarke states:



24 Stelarc
Extra Ear 1/4 Scale 2003

> Although [it] represents a dismembered dislocated body part, it contains potential beyond the scope of the predetermined morphology of the human ear... [it] alludes to the monstrous, the implausible, and the unthinkable. Indeed, the allusion to the monstrous destabilises... what is human and what is considered not human. It points to lives differently configured and imagined – lives that are enhanced and extended by prosthetics. The Extra Ear, then, is an organ without a body – a desiring machine...[36]

Disengagement from host removes any predetermined function – and therefore the amputated limb, rather than weakened by its loss, is imbued with multifarious, possibly monstrous, potential.

36 Clarke 2005, pp. 210-1

The amputated, broken-down prosthesis also highlights a concurrence between my work and Goodwin's:

> Goodwin's take on technology is not felicitous. These apparel, apparatus and prosthesis are inextricably tied to and identified with the broken-down body, with the demise of its flesh... The works register a state of crisis, or emergency. Nothing here is about strengthening, augmenting and extending. Everything names the opposite: spent or uselessly expending, embalmed or museologically exhumed, the apparel they wear and the apparatus they squirm in prepare them for nothing but oblivion.[37]

The visual of the broken-down body and the demise of the flesh resonates strongly with my own work, and also reflects the rupturing impact of technology on the body.

Perhaps the amputated machine is so disturbing because it also reflects humankind's tenuous power. Realistically, the contemporary threat is no longer the grand machine, but minuscule technologies and cyborgs; modern machines are quintessentially microelectronic devices, everywhere, invisible, and pre-eminently dangerous.[38] Thus, the grand machine has lost its symbolic and evolutionary power. In *A Cyborg Manifesto*, Donna J. Haraway discusses this shift in machine power:

> Pre-cybernetic machines could be haunted; there was always the spectre of the ghost in the machine... But basically machines were not self -moving, self-designing, autonomous... To think they were otherwise was paranoid. Now we are not so sure. Late twentieth-century machines have made thoroughly ambiguous the difference between

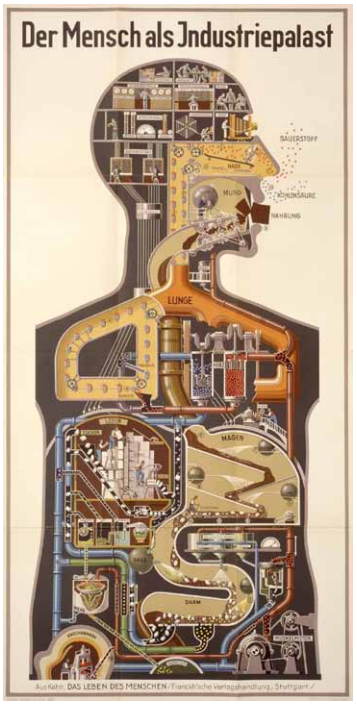
37 Tawa 2006, pp. 130-2
38 Haraway 1991, p. 153

> natural and artificial, mind and body, self-developing and externally designed, and many other distinctions that used to apply to organisms and machines. Our machines are disturbingly lively, and we ourselves frighteningly inert.[39]

The dismembered limb speaks of technology's rupture of the body and of our fears of loss of that body, loss of control, loss of our minds. Haraway identified the relationship between organism and machine as a border war.[40] In *Bad Girl versus the Astronaut Christ*, Hari Kunzru discusses the development of the cyborg – that which Haraway defined as a condensed image of imagination and material reality[41] – as a site for contemporary anxieties about the body's rupture. "Morally continent, aesthetically pleasing, epistemologically single and secure," the impenetrable Western body signifies society's very foundations.[42] For two thousand years the West has made a huge investment in the body, which has "stood sealed... against a torrent of disproportionate, irrational, exaggerated physicality, which, were it to escape, threaten[s] to sweep away the very foundations of civilised society." Dissections during the Renaissance – the literal dismemberment of corpses in the name of truth – and the anxiety it invoked, was an early instance of problems of bodily integrity that technology presented.[43] The seventeenth century saw the body being analysed as intricate gadgetry. Mary Shelley's *Frankenstein*,[44] 1818, embraced general anxiety caused by the onset of the industrial revolution some three decades earlier, envisaging a technologically-enlivened humanoid creature – predecessor of the modern cyborg.[45] Fritz Kahn's chromolithograph *Der Mensch als Industriepalast (Man as an Industrial Palace)*, 1926 [fig. 25], reveals the body as a complicated factory where multiple machines function simultaneously: "seen like this, we are already robots, and skin

39 Haraway 1991, p. 152
40 Haraway 1991, p. 150
41 Haraway 1991, p. 150
42 Kunzru 1999, p. 169
43 Kunzru 1999, p. 170
44 Shelley 1977
45 There is a stark similarity in Frankenstein's enlivening of matter through application of electricity and the 'galvanic twitch' discussed earlier. Mary Shelley was most likely aware of the 'galvanic twitch', and also contemporary examples of automata, as her husband Percy Shelley had been exposed to such in his work at Oxford. (Mazlish 1993, pp. 40-1)

is the removable clothing that camouflages our motorised metabolism."[46] Rebecca Horn's *Overflowing Blood Machine*, 1970 [fig. 26], "demonstrates the historical correlation between man and machine, in which the mechanical is posited as a technological analogue for human physiology... [her] artificial appendages, including highly stylised arm, shoulder, finger, and head extensions, make explicit reference to medical science's mechanisation of the corporeal."[47]



25 Fritz Kahn
Der Mensch als Industriepalast (Man as an Industrial Palace) 1926

26 Rebecca Horn
Overflowing Blood Machine (film still)
1970

The cyborg appeared in the mid-twentieth century as a contemporary manifestation of the representation of human as machine. Early development of the cyborg after the Second World War idealistically presented an opportunity for humankind to relinquish the labour of bodily inconveniences as if "the business of having a body was somehow distracting, time-consuming, laborious."[48] It represented an opportunity to bring the recalcitrant body under the sway of reason and morality.[49]

46 Conrad 2007, p. 458
47 Spector 1993, p. 57
48 Kunzru 1999, p. 168
49 Kunzru 1999, p. 169

However, the cyborg has shifted from this idealistic symbol of means to spiritual transcendence; it is now as ambiguous as the relationship between humankind and technology that it represents:

> The cyborg body... presents an irresolvable paradox – the body must at all costs preserve its boundaries... but must also reveal its mystery in order to... transcend physical limitations.[50]

Once again we see the ambiguous, difficult and contradictory relationship between humankind and technology. The cyborg is not "the smooth, homogenous, impenetrable body of yesteryear... It is constructed, heterogeneous, multiple, shot through with code, sticky to the touch."[51] As such, the cyborg acts as a contemporary vehicle for Western society's popular unease about science.

Many contemporary creative explorations of this unease have manifested as film, from classics such as *Metropolis*[52] to the contemporary *Blade Runner*[53] and *Artificial Intelligence*.[54] In *Metropolis* [fig. 27], the robot Maria encapsulates the duality of technology:

> This beatific identity is the robot's mask, the cover for a dual nature. The fleshly Maria is an angel; the Maria of metal is a demon, who gyrates through a licentious foxtrot in the nightclub, provokes an uprising with her political harangues, and screeches with laughter on the funeral pyre as the flames lick at her.[55]

50 Kunzru 1999, p. 170
51 Kunzru 1999, p. 171
52 Lang (dir.) 1927
53 Scott (dir.) 1982
54 Spielberg (dir.) 2001
55 Conrad 2007, p. 464

27 *Metropolis* (film still) 1927

In *Creation: Artists, Gods and Origins*, Peter Conrad provides an explanation for this ongoing relationship between representations of technological unease and film:

> Cinema is synonymous with... kinetic power... [the] miraculous enlivening of matter... made visible the buzzing chaos of life itself, with specks of light cavorting in the gloom... Golems and robots belong on film, because like them it relies on artificial animation.[56]

The relationship between film and kinetic art lies not only in film's power to kinetically bring technologically imagined beings 'to life'; film is, essentially, the recording of movement, and is therefore a material sibling to kinetic art. In fact, the terms 'cinema' and 'kinetic' derive from the same origin – the Greek 'kinein' – to move.[57] Rebecca Horn's oeuvre highlights these connections; her kinetic artworks and films are inextricably linked, as her film props become exhibited sculptures and vice versa. In *Interiors: Anatomies of the Bride Machine*, Giuliana Bruno elucidates upon this link between cinema and machine art:

56 Conrad 2007, pp. 467-8
57 Oxford University Press 2005

> Cinema is the last incarnation of a mechanical myth, an imagistic 'android', dreamed and transformed by the machine age... As a corporeal techné, film is an actual prosthesis. A way of experiencing through the camera, film technology intensifies the power of our sensorial apparatus.[58]

As in film, the kinetic in an artwork functions on multiple levels: kinetic involvement of the viewer is an embodied way of seeing;[59] the kinetic directly references machines and industrial influences; it imbues artworks with a sense of vitality – the 'miraculous enlivening of matter'; and it contributes to the threatening and ambiguous nature of the work. In doing so, the kineticisation of non-living matter turns a spotlight onto humankind: "are we a soup of moist, milky feelings and soulful yearnings, like the good Maria, or are we machines driven by unstoppable and irrational cravings, like her bad twin?"[60] In referencing humankind's evolutionary twin – technology – kinetic enlivenment directly brings the nature of the human being into consideration.

The investigations put forward in this chapter have brought to light the ambiguous and difficult relationship between humankind and technology. As the ultimate culmination of the co-evolution of the two, the machine as prosthesis inherently maintains the potential to usurp its host. In doing so, it destabilises the roles of prosthesis, parasite and host, each becoming indistinguishable from the others. Amputation from host merely imbues an amputated limb with a greater potential than it previously held. The machine challenges the body, bringing its pre-eminence into question. Unease related to this challenge is embodied in the contemporary cyborg, many manifestations of which are visible in science-fiction film. Using the machine in my artwork has allowed the creation of works that embrace ambiguity, bringing the nature of humankind and its relationship with technology into focus.

58 Bruno 1993, pp. 85-7
59 Grynsztejn 2007, p. 17
60 Conrad 2007, p. 464

ARTISTIC CONSIDERATIONS

Aside from the major areas of interactive art and the machine previously discussed, a number of artistic considerations were encountered throughout the project. These include choice of materials and material processes, the use of sound, application of lighting and the work's location. This chapter will discuss these considerations in relation to the final body of work. It will cover influences relevant to these considerations, the relationship of these considerations materially and conceptually to the body of work, the experimentation carried out to develop these considerations, and the outcomes of these considerations in the final body of work.

MATERIAL AND PROCESS

Most materials used throughout this project have been steel, stainless steel and electronic components. With its tensile strength and adaptability, steel gives the freedom to build large, lightweight, spindly constructions whilst maintaining sufficient strength to manage the impact of motion.

Throughout the project, I have been aware of the risks of over-engineering, in both the mechanical and material aspects of the work. I have deliberately maintained a naïvety of standard mechanical models. Whilst solutions arrived upon for certain motions are not particularly practical or efficient in regards to mechanical outcome, they maintain an aesthetic value that may very well not have been achievable were they built based on existing mechanical systems. This unique-motion approach is visible in the work of artists such as Jean Tinguely, Tim Lewis and local artist Cameron Robbins, often resulting in similar aesthetic outcomes to this project's final body of work. Guy Brett discusses Tinguely as having "set mechanical parts free from the precise hierarchy of function... not obliged to produce the maximum energy for the minimum work; they can expend themselves in wild spontaneity."[1] Robbins' *Within/Without*, 2008, exemplifies the aesthetic value of artist-designed mechanisms. Combining engineered parts with ad-hoc solutions, Robbins facilitates unique motions, allowing aesthetic experiences in the machine's actions and the drawings it produces. Aesthetic experience is heightened by the artist-engineered mechanism and the implications of this in the actual motion of the piece. In discussing *Pulse*, Robert Lindsay stated that the ad-hoc, improvised qualities of the constructions "ameliorate[d] their often ominous and apparently menacing intention."[2]

Throughout the project I have used a methodology of problem solving mechanical issues through the material itself – that is, designing the machine by building it. This process allows the material to impact on the outcome, the material's 'voice' resonating through the work. In doing so, a more direct conversation occurs between artist, material, intended outcome and actual outcome. The material forces certain solutions, asserting its own translation of the final artwork. Through this methodology, the material maintains conviction, both functionally and aesthetically.

Both machine-building and the use of steel presents opportunities for perfectionism in precisely built, polished outcomes. However, the limitation of a perfect finish can

1 Brett 1968, p. 37
2 Lindsay 2007, p. 9

have a much stronger impact. Tinguely embraced qualities such as rust, ageing and imperfection. Many materials in *Dance of Death* were sourced from a burnt-down farmhouse, and thus were already significantly damaged before he used them. Tim Lewis similarly embraces imperfection [fig. 28]. This honesty to material weakness is a potent aspect of the work. Material degradation increases the aesthetic, aural and kinetic experience and the sense of darkness in the work.

28 Tim Lewis
Auto-Dali Prosthetic (detail) 2000

Within this body of work, I have actively left components exposed, rather than attempting to heighten illusion by hiding them. Mechanical exposure is visible in the works of Tinguely, Horn, Kessler, Robbins, Lewis and Eliasson. Eliasson's work blatantly exposes itself whilst maintaining a sensory experience for the viewer: "... closer approach revealed its facture... interrupting the spectator's full absorption and complicity in an all-embracing experience... The work never disappears into transparency; the illusion is never complete. This dual move, generating an emotional response while unveiling its material basis, is central to the art's content, for it disables our impression not just of the work but also of the world as a naturalised, uninterrupted continuum."[3] Combined with specific lighting, electronic components also become significant additions to shadow, entangling and break-down within the work, as visible in Kessler's *The Palace at 4 A.M.*

Whilst artists such as Rebecca Horn create beautifully engineered 'clean' machines, the darkness and sense of dysfunction and failure that I wish to engender in my work is better served by a rough, 'unfinished' quality, as visible in Tinguely's oeuvre. I have allowed myself to continue working only to a point where the motion is satisfactory. The resulting imperfections are crucial to the work, adding to its overall character.

3 Grynsztejn 2007, p. 22

SOUND

Sound plays a major role in the final body of work. In motion, the mechanical and inherent qualities of each sculptural unit combine to create unique sound-scapes. Though sound developed 'naturally' during the creation of each sculptural machine, I actively maintained, and in some cases enhanced, these sound-based qualities.

Tinguely's kinetic sculptures always display significant sound factors, generated either directly from the mechanical components or from objects such as musical instruments. *Méta-Harmonie II*, 1979, utilises numerous musical instruments to generate a loud, busy noise. However, it is in *Dance of Death* where the power of Tinguely's mechanical soundscapes is most visible; steel flexes and scrapes, motors spin, chains drag, skulls clank. There is a wonderful moment when the motors cease their movement, and the mechanical clanks hang in the air.

In *Thumper*, 2008, I utilised the inherent sounds of its mechanical apparatus. *Thumper* consists of a curved, claw-like arm connected directly to a motor. As it turns, the claw lifts its motor from the floor or wall, shifts it forward a little, then drops it with a loud thump. This action is repeated as the unit moves erratically against the wall or floor. *Thumper* was designed with deliberate inefficiency, exploiting the loud thump to emphasise the sense of violence and futility within the work.

In its initial installation, *Pulse* remained outdoors for ten months. Mechanical sound was always inherent to each unit, but the prolonged exposure, and subsequent stiffening of the joints, increased the noise significantly. As each unit aged differently, the noises emanated were considerably varied and gave a different 'tone' to each. This

was particularly evident when they were reinstalled as *Pulse (Reiteration)*. Whilst one made a high pitched 'chirping', another emitted a low hum. They combined to create an underlying noise reminiscent of communal wailing, which, in the darkened space, added to the sense of loss and the unnerving experience.

There is a certain material honesty in permitting naturally occurring mechanical noises to be major factors in the work. Allowing the materials their own 'voice' increases the sense of motion and autonomy in the kinetic work.

LIGHTING

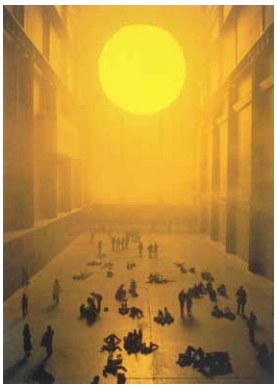
Various experiments and influences throughout the project led to my decision to install the final exhibition in darkened spaces, with the only light coming from the sculptures themselves. The lack of environmental lighting emphasises shadows, sounds and motion, and heightens the potential for intimate experiences with the work.

One of the formative influences towards this concept was my experience of Tinguely's *Dance of Death*, 1986, and *Hannibal II*, 1967, at the Museum Tinguely in Basel in early 2008. *Dance of Death* [fig. 29] explores Tinguely's conceptions of torture and death,[4] whilst *Hannibal II*'s form is associated with monstrous war machines. The installation

29 Jean Tinguely
Dance of Death (detail) 1986

4 Museum Tinguely 2007

of both, however, failed to embrace this darkness; the works were positioned in the main gallery, flooded with natural light. The museum's own explanatory notes describe the central altar-piece of *Dance of Death*, a nodding hippopotamus skull, as "inviting [the spectator] to enter its kingdom of shadows and spirits."[5] The contrast between this light-filled installation and Tinguely's original intent for the body of work is obvious; in collaboration with Paul Sacher and Fritz Gerber, Tinguely designed a 'tomb' to appropriately house *Dance of Death*.[6] Installation in broad daylight fails to respect the inherent nature of the work and the artist's vision for it. It shifts the work from sculptural installation to didactic museum display, significantly diluting its potency.

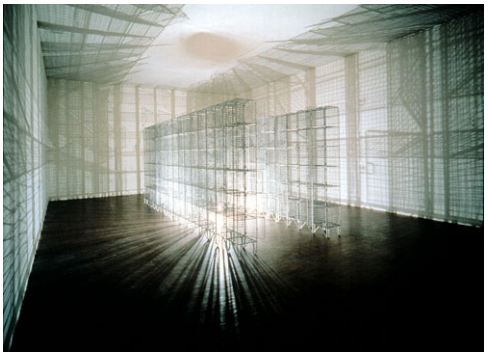


30 Olafur Eliasson
The Weather Project 2003

31 Olafur Eliasson
Your Black Horizon 2005

Olafur Eliasson manipulates lighting to elicit sensory response. In many of his works Eliasson uses 'hot' lighting, as in *The Weather Project*, 2003 [fig. 30]. However, in works such as *Your Black Horizon*, 2005 [fig. 31], darkness frames light to create spatially disorienting installations. Upon entering *Your Black Horizon*, viewers see only darkness; as they move deeper into the space, a thin, horizontal line emerges, finally stretching the entire circumference of the installation. This false 'horizon' gives the illusion of great distance. Eventually, this disorienting effect subsides, replaced by a growing awareness of subtle changes in the work and in one's own perception.[7]

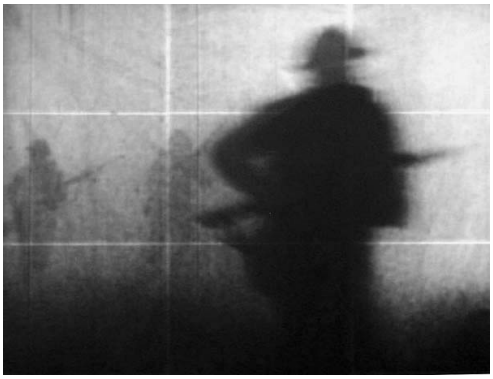
5 Museum Tinguely 2007
6 Museum Tinguely 2007
7 Birnbaum 2007, pp. 132-3



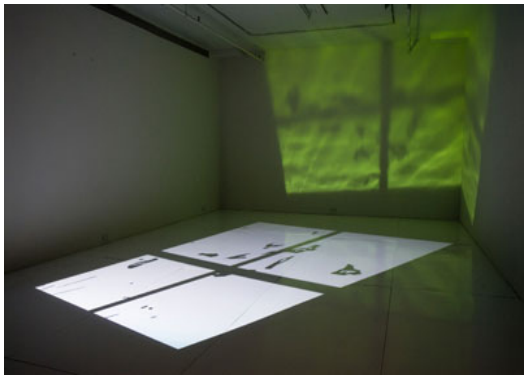
32 Mona Hatoum
Light Sentence 1992

The potential of shadows in sculptural work is clearly displayed in Mona Hatoum's artwork. *Light Sentence,* 1992 [fig. 32], is a stunning example of shadows as a crucial element in an artwork. The shadows shift the work from sculpture to installation, simply by their exposure onto the walls. The layering of shadows from light passing through various elements imbues the space with depth, both visually and conceptually. Centralised lighting, as I have used, immerses viewers in the artwork. As their shadows become part of the installation, boundaries between viewer and artwork blur.

The mixture of kinetics and shadow within my work functions as a primitive projector. Tonal variations upon the walls and the varying scales of kinetic components have a similar effect to that of a monotonal film. This resonates with the artwork of South African artist William Kentridge, in the monotonal forms, dark subject matter and motion-based installations [fig. 33]. It also references American artist Paul Chan's work. Chan's monotonal video installations display numerous objects gently falling through space. He carefully projects the videos across multiple planes, such as on both the wall and floor, to allow immersive experiences [fig. 34].



33 William Kentridge
Zeno Writing 2002



34 Paul Chan
6th Light 2007

35 *Dark City* (film still) 1998

36 *The Matrix* (film still) 1999

Twilight, the verge between light and dark, the in-between, is relevant in the use of light within my work and within the concept of the machine's duality. The transition from dark to light that occurs during twilight is never marked, just as the transition from the inanimate into the animate is not sharply defined but smooth.[8] Twilight and semi-darkness as an experiential and anamorphic state has been used in many science-fiction films. The citizens of *Dark City*[9] [fig. 35] can't quite remember when they last saw daylight. The almost-darkness that they experience constantly allows for powerful beings – the 'Strangers' – to manipulate their human counterparts, never having to step from the shadows. The 'real' world in *The Matrix*[10] [fig. 36], is one of dark devastation. The metaphorical implication of being 'left in the dark' – that is, being unknowingly controlled by an outside force – is apparent in both films. Using 'twilight' for this sense of being 'left in the dark' is highly relevant to the project's final

8 Rötzer 1999, p. 271
9 Proyas (dir.) 1998
10 Wachowski (dir.) 1999

installation, heightening the ambiguities within the work. Twilight is a dream-like time, when edges, definitions and realities blur. It is both clarifying and disorienting. This transitional space can allow a heightened experience for the viewer:

> Points of transition are also points of disjunction, shifts between different domains of experience, between different states of consciousness, moments when our perceptions are heightened and we are most likely to experience fresh insight and to see things with new clarity... The more ambiguous this transition space... the potentially richer the experience.[11]

This ambiguity is emphasised in the placement of light in each sculpture, which disperses an array of shadows across the space. As viewers move around the artwork, their shadows mingle and merge with those of the machines. This immersion of viewer acts in a similar way to the use of sensors, in encouraging an intimate, physical experience with the work and in implicating the viewer in the work's conceptual framework.

LOCATION

A conceptual conflict became apparent whilst I prepared *Pulse* for installation at McClelland Sculpture Park. Whilst sensors positioned the work as interactive art, the presentation of the work at McClelland effectively placed it within the sphere of public art.

11 McGillick 2006, p. 14

There are similar theoretical bases that resonate between interactive art and public art. Contemporary understandings of the cornerstones of each involve: an attempt to engage with and be relevant to an audience; broadened accessibility; and the enrichment of an experience within a particular space.[12] These similarities suggest that a singular artwork could fulfil the descriptions of both interactive and public art. The areas in which interactive and public art tend to differ are the defining of an audience, the positioning of viewers, and their level of intimacy with the artwork. Due to the intention behind *Pulse*, it was these points of difference which created a conceptual difficulty.

In its reflection of bodily responses to human interaction, *Pulse* was intended as a proposition for an 'emotional prosthesis'. With these emotional implications, intimacy was intended to play a large part in the intended outcome. Although McClelland Gallery and Sculpture Park is an artistic institution, the grounds function primarily as public space. The idea of placing a work intended for intimacy within a public, open space proved, in this context, to be flawed. Whilst the work functioned successfully as a publicly-placed, site-specific installation, its original intent as a point of intimacy between viewer and prosthesis was severely limited by the public context.

The smaller and more controllable space offered by a gallery proved more suitable for the provision of intimacy between viewer and artwork. Manipulation of factors such as lighting significantly impacts on the atmospheric qualities of the installation and therefore enables opportunities to facilitate intimate encounters with the work. This became definitively apparent in *Pulse (Reiteration)*. Through the experience of installing *Pulse* in both contexts, it was apparent that a controllable gallery was more suitable than an outdoor space for the final presentation of this body of work.

6 See texts such as Miles 1997, p. 187 and Lacy 1995, p. 19

CULMINATION

Alongside the concepts of 'multi-motive' and the machine, materials, process, sound, lighting and location are crucial factors in the work. Through careful consideration, rigorous experimentation and the occasional useful accident, these elements combine to create a space in which the work's various ambiguities and the viewer's experience come together, blurred and indistinguishable.

IN CONCLUSION

Research and experimentation undertaken throughout this project have led to a significant development and maturation in the body of work. My initial idealistic views regarding interactive art were shifted through experimentation with various forms of interaction. Through this experimentation the body of work developed – from initial attempts to diminish the artist and artwork's autonomy in order to shift agency to the viewer, to a point where I chose to re-imbue the work with some autonomy. Preconceptions of interactive art were challenged, and I eventually came to an awareness of the always-present role of the artist, whether the work is interactive or not. Interactivity is not necessarily an ideal, holistic basis for a work of art. It can, however, be a strong element when suitably applied, and particularly when accompanied by some autonomy within the artwork – thus displaying 'multi-motive' qualities.

The project also emphasised the role that artistic considerations, such as the application of lighting and sound elements, can play as an atmospheric framework. These elements directly influence the conceptual bases of the work, although this influence may not be recognisable until the work has been installed, as discussed with the concept of 'twilight' that arose in the decision to use a darkened space.

This project has exposed many exploratory areas for future artworks. These include pushing the boundaries of machine-based art to exploit the potential ambiguities

of the machine's symbolism, as a lens through which to explore human nature. The concept of the exoskeleton provides a fertile basis for future work, as does the concept of twilight as an indefinable, in-between state. The combination of this concept within the framework of the ever-more ambiguous use of kinetic, mechanistic sculpture holds exciting potential for future work. Finally, further experimentation, development and articulation of the concept of 'multi-motive' art presented within the first chapter provides a strong focal point for the future.

Whilst discussions of interactive art and the machine remain reasonably separate throughout this paper, there is an interconnection and overlapping on many levels between these two integral aspects of the project. The linking theme throughout the entire project has been the concept of humankind and the machine as both good and bad. This ambiguity has carried through all aspects of the project – in the obvious representation of it through direct use of machines, the exploration of interactive art which inherently involves the animation of non-living matter, and the twilight qualities of the darkened installation which furthered the ambiguities present within the work. In its carriage of ambiguity, the work does not simply "tread the line between function and aesthetic, artificial and organic, hope and failure, reliance and anxiety"[1] as presumed at the beginning of the project. Instead, it questions the existence of any distinctive divisive line, collapsing the polarities upon themselves. The human being and technology converge, "not either-or, but this-and-that"[2], roles switching, boundaries ruptured, bodies blurred, both each and the other. Humankind and the machine are simultaneously good and bad.

1 Woodward 2007, p. 49
2 Postman 1992, pp. 4-5

IMAGE DETAILS

1 Jean Tinguely
Méta-Matic 1959
Iron tripod, wooden wheels, sculpted metal plates, rubber band, metal sticks, stamp, electric motor, completely painted black
212cm x 142cm x 100cm
Image from **Dhom, K. & Stahlhut, H. 2007.** *Kunstmaschinen Maschinenkunst [Art Machines: Machine Art]* (exhibition catalogue). Kehrer Verlag: Heidleberg.

2 Pawel Althamer
Extrusion Machine (Bottle Machine) 1992/2007
Steel, polyethylene HDPE, wire, etc.
160cm x 200cm x 80cm
Installation view at Schirn Kunsthalle, Frankfurt, 2007
Image by Laura Woodward

3 Roxy Paine
Scumak No. 2 (Auto Sculpture Maker) 2001
Aluminium, computer, conveyor, electronics, cooling system, teflon, extruder, stainless steel, polyethylene
229cm x 701cm x 185cm
Installation view at Schirn Kunsthalle, Frankfurt, 2007
Image by Laura Woodward

4 Laura Woodward
Breathe 2007
Steel, air tool, bellows, springs, rubber
80cm x 60cm x 200cm
Installation view at COFAspace, Paddington, 2007
Image by Jem Selig Freeman

5 Laura Woodward
Triplets 2007
Steel, bolts, electric motors, motion sensors
120cm x 90cm x 90cm
Image by Jem Selig Freeman

6 Laura Woodward
Pulse 2007
Stainless steel, electric motors, bolts, cables, motion sensors
Installation size variable
Installation view at McClelland Gallery and Sculpture Park, 2007/8
Image by Jem Selig Freeman

7 Laura Woodward
Pulse (Reiteration) 2008
Stainless steel, electric motors, bolts, cables, motion sensors, LEDs
Installation size variable
Image by Jem Selig Freeman

8 Jon Kessler
The Palace at 4 A.M. (detail) 2005-7
Mixed media with monitors, cameras, aluminium, large format inkjet prints
Dimensions variable
Installation view at ZKM, Karlsruhe, Germany, 2007
Image by Laura Woodward

9 Rebecca Horn
Knuggle Dome for James Joyce 2004
Knives, metal construction, engine
60cm x 110cm x 40cm
Image by Gunter Lepkowski, from *Rebecca Horn* (online) n.d. http://www.rebecca-horn.de/pages/index_eng.html (accessed 4 Oct. 2008).

10 Olafur Eliasson
The Endless Study 2005
Wood, metal, mirror, paper, pen, stamp
235cm x 130cm x 130cm
Installation view at Schirn Kunsthalle, Frankfurt, 2007
Image by Laura Woodward

11 Jean Tinguely
Dance of Death (detail) 1986
Mixed media
Installation view at Museum Tinguely, Basel, Switzerland, 2008
Image by Laura Woodward

12 Antoine Zgraggen
Die Zerquetscherin 2005
Metal, hydraulic system
160cm x 95cm x 40cm
Image from Dhom, K. & Stahlhut, H. 2007. *Kunstmaschinen Maschinenkunst [Art Machines: Machine Art]* (exhibition catalogue). Kehrer Verlag: Heidleberg.

13 Antoine Zgraggen
Der Groβe Hammer 2005
Metal, wood, pneumatics
160cm x 95cm x 40cm
Image from Dhom, K. & Stahlhut, H. 2007. *Kunstmaschinen Maschinenkunst [Art Machines: Machine Art]* (exhibition catalogue). Kehrer Verlag: Heidleberg.

14 *robotlab*: Matthias Gommel, Martina Haitz, Jan Zappe
Bios (Bible) 2007
Industrial robot, steel table, paper rolls, pen
Dimensions variable
Image from *robotlab* (online) n.d. http://www.robotlab.de/bios/pics/bios-zkm06.htm (accessed 4 Oct. 2008).

15 Stelarc
The Third Hand 1980-1994
Mixed media
Dimensions variable
Image by Simon Hunter, from Smith, M. (ed.) 2005. *Stelarc: the Monograph*. MIT Press: Cambridge.

16 Stelarc
Exoskeleton 1999
Mixed media
Dimensions variable
Image by Dominik Landwehr, from Smith, M. (ed.) 2005. *Stelarc: the Monograph*. MIT Press: Cambridge.

17 Louise Bourgeois
Passage Dangereux (detail) 1997
Mixed media
264cm x 356cm x 877cm
Image from Morris, F. (ed.) 2007. *Louise Bourgeois*. Tate Publishing: London.

18 Rebecca Horn
Head Extension (film still) 1972
Wood, polystyrene, metal, fabric
Dimensions variable
Image from Zweite, A., Schmidt, K. & von Drathen, D. 2005. *Rebecca Horn: Bodylandscapes, Drawings, Sculptures, Installations 1964-2004.* Haywood Gallery Publishing: London.

19 Richard Goodwin
Exoskeleton Performance Sequence 1995
Mixed media
Dimensions variable
Image from Goodwin, R. (ed.) 2006. *Richard Goodwin: Performance to Porosity*. Thames & Hudson: Fishermans Bend.

20 *The Matrix Reloaded* (film still) 2003
Image from DVD Wachowski, A. & Wachowski, L. (dir.) 2003. *The Matrix Reloaded* (film). Warner Bros: Sydney.

21 Louise Bourgeois
Maman 1999
Bronze, stainless steel, marble
1023cm x 927cm x 891cm
Installation view in Roppongi Hills, Tokyo, 2008
Image by Laura Woodward

22 Richard Goodwin
Untitled Doll 1976 (destroyed 1976)
Clothing
60cm x 90cm x 100cm
Image from Allen, C. (ed.) 1992. *Richard Goodwin*. Oliver Freeman Editions: Redfern.

23 Rebecca Horn
Arm Extensions 1968
Fabric
Dimensions variable
Image from Celant, G., Spector, N., Bruno, G. & Schmidt, K. 1994. *Rebecca Horn*. Guggenheim Museum Publications: New York.

24 Stelarc
Extra Ear 1/4 Scale 2003
Small replica of the artist's ear grown with human cells
Dimensions variable
Image by Ionat Zurr, from Smith, M. (ed.) 2005. *Stelarc: the Monograph*. MIT Press: Cambridge.

25 Fritz Kahn
Der Mensch als Industriepalast (Man as an Industrial Palace) 1926
Chromolithograph
Image from *Street Anatomy: Medicine and Art and Design* (online) 2006-8. http://streetanatomy.com/blog/2007/07/27/man-as-industrial-palace-the-impact-of-fritz-kahn/ (accessed 5 Oct. 2008).

26 Rebecca Horn
Overflowing Blood Machine (film still) 1970
Metal box, plastic hoses, electrical pump, red water
Dimensions variable
Image from Zweite, A., Schmidt, K. & von Drathen, D. 2005. *Rebecca Horn: Bodylandscapes, Drawings, Sculptures, Installations 1964-2004.* Haywood Gallery Publishing: London.

27 *Metropolis* (film still) 1927
Image from DVD Lang, F. (dir.) 1927. *Metropolis* (film). Universum Film: Berlin.

28 Tim Lewis
Auto-Dali Prosthetic (detail) 2000
Table, metal, paper
132cm x 93cm x 52cm
Installation view at Schirn Kunsthalle, Frankfurt, 2007
Image by Laura Woodward

29 Jean Tinguely
Dance of Death (detail) 1986
Mixed media
Installation view at Museum Tinguely, Basel, Switzerland, 2008
Image by Laura Woodward

30 Olafur Eliasson
The Weather Project 2003
Monofrequency lights, projection foil, haze machine, mirror foil, aluminium, scaffolding
Dimensions variable
Image from Grynsztejn, M. (ed.) 2007. *Take Your Time: Olafur Eliasson*. Thames & Hudson: New York.

31 Olafur Eliasson
Your Black Horizon 2005
Mixed media
Dimensions variable
Image from *Olafur Eliasson* (online) 2008. http://www.olafureliasson.net/selected_works/sw_2_2.html (accessed 4 Oct. 2008).

32 Mona Hatoum
Light Sentence 1992
Mixed media
Dimensions variable
Image from *The Tate Britain: The Turner Prize* (online) n.d. http://www.tate.org.uk/britain/turnerprize/images/hatoum_lightsentence.jpg (accessed 4 Oct. 2008).

33 William Kentridge
Zeno Writing (animation still) 2002
Photogravure, drypoint and burnishing on paper
Image from *Artnet* (online) 2004. http://www.artnet.com/Magazine/features/jsaltz/saltz12-30-02.asp (accessed 4 Oct. 2008).

34 Paul Chan
6th Light 2007
Digital projection
Dimensions variable
Image from *The Biennale of Sydney 2008* (online) 2008. http://www.bos2008.com/app/biennale/artist/31 (accessed 5 Oct. 2008).

35 *Dark City* (film still) 1998
Image from DVD Proyas, A. (dir.) 1998. *Dark City* (film). New Line Cinema: Sydney.

36 *The Matrix* (film still) 1999
Image from DVD Wachowski, A. & Wachowski, L. (dir.) 1999. *The Matrix* (film). Warner Bros: Sydney.

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