

Works in sound and pattern synthesis ~ folio of works

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Abstract

An integrated portfolio of writings, music and audio-visual works that responds to aesthetic, technical and critical concerns encounter in the production of the portfolio.

The written component initially considers the relationship between technical tools and creative practices, and then considers how temporality is constructed and treated in computer music softwares. In a series of commentaries, I show how these issues are both derived from and feature within a number of works contained here.

The works are grouped into 3 sections: audio-visual works, microtemporal works, and works responding to house musics; a 4th further section 'three exhibitions' is included in the appendices. The works, produced between 2008 and 2013, explore various vocabularies and materials using sound synthesis and pattern generating procedures. Of particular interest is the relationship between temporality, image, sound and geometry; how works are encountered by the audience; and, the role of works as critical exegesis of the musical and technical histories within which they are embedded. The development and structure of each work is documented, and analysis of each is presented.

In response to the folio a number of theoretical concerns are identified and articulated. A description of creative process based upon a distinction between thought, technology and practice is critiqued and alternatives are drawn from Heidegger's analysis of *Being-in-the-world*, Latour's account of action as constituted in networks of humans and non-humans, and Clark and Chalmers' extended mind hypothesis. Developing from this I offer a reading of the role of music in Husserl's account of temporality and suggest that music has a time-constituting function.

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Introduction

The works contained in this portfolio are placed in one of four groups. This grouping follows a methodology whereby works are considered to be components parts, constitutive of strands of enquiry as opposed to isolated entities. In this sense ideas, techniques and concerns are developed across a number of interrelated works.

Broadly speaking the document comprises two sections. The first section, *themes*, addresses issues that were encountered in the practice-based component of this portfolio. Although this section does not address specific works, it is formulated in response to the making of the works, and thus provides a conceptual framework within which they can be understood.

The first section has two chapters. Chapter one presents and critiques a description of creative practice where a distinction is made between thought, action and technology. I argue this description perpetuates a Cartesian worldview. By contrast I propose alternate descriptions drawn from three sources: (1) Heidegger's reformulation of being as embedded in the world (Heidegger, 1962); (2) Latour's conception of action as formed in networks of humans and non-humans (Latour, 1999); and (3) Clark and Chalmers extended mind hypothesis (Clark and Chalmers, 1998).

Chapter two develops this conceptual framework starting with a critique of Husserl's analysis of temporality (Husserl, 1992). Here I propose a correspondence between software systems (used in the production of music and sound) and modes of time-consciousness. I suggest that our experience and understanding of temporality is culturally specific – grounded in musics and other technologies.

The second section of this document, *commentaries*, contains three chapters each of which corresponds to a group of works. Here the development of works are documented and contextualised.

The three chapters address the following:¹

- Chapter three – a series of audio-visual works that explore highly reduced aesthetic forms; these critically confront materials and discourses surrounding the use of sound and image to engender altered states of consciousness.
- Chapter four – ‘microtemporal works’ that establish rhythmic structures from short and irregular temporal intervals.
- Chapter five – works responding to vocabularies present in house musics, particularly of the North American tradition circa 1992-1994.

An appendix is included that documents and offers a reading of three solo exhibitions.

- Appendix 1 - series of three solo exhibitions staged in 2010 and 2011. Here works construct and explore relationships between movement, scale, sound, image, temporal and spatial geometries.

¹ Folio contents follow the grouping into distinct sections. These can be found on the flash drive submitted with this document in the “folio contents” folder. For further information refer to appendix 1.

Themes

1. Thought, technology, practice

Introduction

In this section I want to consider how creative practice is described and understood. My discussion starts with a description of creative practice where a distinction is established between thought, action and technology. I argue that this description—which I refer to as the metaphysical model—is problematic in a number of ways. Firstly, the hypothetical division and relationships it constructs have inherent conceptual difficulties; secondly, observation of creative practice presents cases where this description is inadequate.

I propose alternatives drawn from three sources: Martin Heidegger's account of absorbed activity presented in *Being and Time* (Heidegger, 1962); Bruno Latour's actor network theory (Latour, 1999); and recent debate in extended cognition following Clark & Chalmers' paper proposing the extended mind (Clark and Chalmers, 1998). These are intended to overcome conceptual difficulties inherent in the metaphysical model, and be applicable to a number of different cases of creative practice.²

The discussion is pertinent for a number of reasons: (1) Critical analysis of creative practice is central to my practice; responding to and informing the development of works contained in this portfolio; it thus provides a more holistic account of my concerns as a practitioner. (2) The discussion can be read as a reflection on my methodology. For me, the metaphysical model does not correlate with my experience of making work; the alternatives that I propose provide a more functionally coherent description of how the works contained here were made. (3) A link is made between the alternative models I propose here and a discussion concerning temporality in section two of this document. (4) In view of thematic correspondences between the discussion here and the

² It should be noted that my aim is not to provide a universal account of the thing we call 'creativity' and how it takes place; but instead is to propose an alternative description that may be more appropriate to some circumstances.

works contained within the portfolio, the discussion facilitates a critically informed reading of the practice-based component.

A metaphysical model of creative practice

Early in the 20th century Edgard Varèse declared, “I dream of instruments obedient to my thought” (Varèse, 1917, p.1). For me Varèse’s wish opens up a number of issues. Firstly I want to ask *why* Varèse dreams of such instruments? I take it to mean that when Varèse makes work, he starts with a mental image (an idea of the work); he then uses instruments (ones that are ideally obedient) to produce a tangible copy. One can deduce therefore that his dream is a response to encounters with technologies that do not always have the obedient character he desires. Here instruments are often active (non-obedient), with their own physiognomies, histories, capacities, limitations, and so on. If we stick with Varèse’s dream metaphor we might call this the ‘nightmare’ of disobedient tools.

Varèse’s dream is a response to an understanding of creative practice where things called ‘ideas’ start in the mind; ideas are then enacted with the aid of a suitable technology under the control of suitably skilled technicians, craftspeople or artists; and finally rendered tangible in a physical form that we can all witness: an act of expression. We can therefore judge the suitability and efficiency of a technology (if we accept the skill of the artist or technician) by comparing the imagined mental idea with the tangible physical form. When there is a close correspondence between the two, the technology is deemed to be suitable and effective; when the two are dissimilar, we can conclude that the technology was either inappropriate or faulty.

This rather ubiquitous understanding of how creative practice takes place is one that I encounter very often when discussing my work: you have an idea and you make it. It involves certain skills, know how, and appropriate and properly functioning technology. If we accept this understanding of how creativity happens, we can see that Varèse’s dream makes perfect sense. However I feel

this understanding does not fit with what I observe in my own practice and in the approach of others.

My suggestion is that this understanding of creative activity is grounded in a particular world view, one that correlates quite closely with a Cartesian description of the self, the world and their interplay. It is a worldview that, I suggest, restricts our understanding of creativity and technology favouring certain types of behaviours and beliefs over others. As such, Varèse's dream does not present the creative practitioner, such as myself, with the ideal template for studio re-design, but simply repeats a Cartesian paradigm.

Next I want to explain when is meant by the Cartesian paradigm and discuss how it shows up in various discourses.

Outline of the Cartesian subject

The Cartesian subject promotes a specific understanding of the self, the world and their interplay³. Descartes' aim is establish that "the mind or soul of man is entirely different from the body"; and he divides the self into two distinct properties: "a being composed of mind and body" (p.161)

The body, according to Descartes, is something to which the "mind is joined" (p.151) or "intermingled with" (p.159); yet the body is considered a subservient vehicle, under the control of the mind: "if a foot, or an arm, or any other part, is separated from my body, it is certain that, on that account, nothing has been taken away from my mind" (p.164).

Thus, for Descartes, "the mind or soul of man is entirely different from the body" (p.164); whilst the body is considered expendable, the mind by contrast is essential. Descartes argues that thought is "an attribute which does belong to

³ There have been many detailed accounts (and critiques) of the Cartesian subject, in recent years a primary example being Dennett (1993). Although I do not aim to improve or compete with these, I refer directly to Descartes' Meditations of First Philosophy (Descartes, 1968) (first published in Latin in 1641). I also want to acknowledge that my sketch is rather brief; its function here is to emphasize the basis upon which Varèse's position (and a number of further positions) are constructed.

me; this alone cannot be detached from me" (p.105); and goes on to say "I am therefore [...] only a thing which thinks, that is to say, a mind, understanding, or reason [...] I am not this assemblage of limbs called the human body" (p.105).

In Meditation VI he sums his position up as follows:

[...] I am only a thinking and unextended thing, and because, on the one hand I have a distinct idea of the body in so far as it is only an extended thing but which does not think, it is certain that I, that is to say my mind, by which I am what I am, is entirely and truly distinct from my body, and may exist without it. (p.156)

Following the division of the self into mind and body, Descartes argues that it is "the function of the mind alone, and not of the composition of mind and body, to know the truth" (p.161). Indeed the senses are not to be trusted, and he argues: "experiences have gradually ruined all the faith I had attached to the senses" (p.154) and, "I found error in judgements based on the external senses". (p.155) The Cartesian methodology is therefore rooted in rationality rather than observation. It divorces the mental from the physical and establishes a hierarchy between the two, what Ryle has called "a polar opposition between mind and matter" (1949, p.15).

According to this opposition, action is the result of prior intention, formed in rational separation from the world. Descartes refers to the bell-pull systems in large houses to summon servants and suggests the body behaves in much the same way as a servant responding to the commands of the master, comparing the body to "a machine, so built and composed of bones, nerves, muscles, veins, blood and skin" (p.163); equating the body with the technical/mechanical.

The Cartesian subject is therefore one derived from conscious awareness and the unadulterated thought. Here knowledge is the product of detached introspective reason rather than sensory experience; the world is ideally engaged with using this insulated rationality and objectivity; a one directional trajectory from thoughts to the world.

How the Cartesian paradigm relates to Varèse's dream and the metaphysical model

In the following I want to argue that there are a number of correspondences between the Cartesian 'mind-matter' division and Varèse's 'thought-instrument' structure.

Firstly, Varèse's distinction between the realm of imagination (thought) and the technical (instrument) follow the Cartesian division between mind and body, the mental and the physical. Secondly, as with the Cartesian paradigm, each half of Varèse's dualism (the thought and the instrument) takes on opposing characteristics:

1. *Dominance / subservience*: If we accept Varèse's claim that instruments are ideally obedient, it follows therefore that imagination (i.e., thought) should be ideally dominant. This clearly corresponds to the Cartesian privileging of mind as domineering master of the ideally subservient body.
2. *Essential / expendable*: Varèse's dream implies, in accordance with Descartes position, that the mind is essential whereas the body can be discarded, substituted and replaced – it is expendable/replaceable. If Varèse's ideal instrument was broken, he could in theory, replace it with another with no noticeable difference.
3. *Source / vehicle*: In this sense the mind and the imagination is the source of thought; it remains constant and unchanged even if the body or the technology is removed or replaced. By contrast the body, the instrument, the technology is a carrier, vehicle or container.
4. *Active / passive*: The mind matter division implies that the mind, as source of its mental contents, should be active; whereas the body, technology or instrument, should be ideally passive. Any content issuing from the body is, in

Cartesian terms, to be distrusted; its contribution to the construction of knowledge is to be avoided.

5. *Genuine / suspect*: This leads to a further dualism between the mental, which is seen as genuine, and the physical, which is seen as suspect. Here the physical is considered as the source of error or inaccuracy... recall for example Descartes comments on the senses as misleading.

6. *Isolated / shared*: Ryle (1949) also shows how the Cartesian paradigm implies that the mind is isolated while the physical is shared. He explains:

Material objects are situated in a common field, known as 'space', and what happens to one body in one part of space is mechanically connected with what happens to other bodies in other parts of space. But mental happenings occur in insulated fields, known as 'minds', and there is, apart maybe from telepathy, no direct causal connection between what happens in one mind and what happens in another. Only through the medium of the public physical world can the mind of one person make a difference to the mind of another. The mind is in its own place [...] (Ryle, 1949, p.15)

The following diagram illustrates the opposition between the mental and physical with reference to Varèse's ideal.

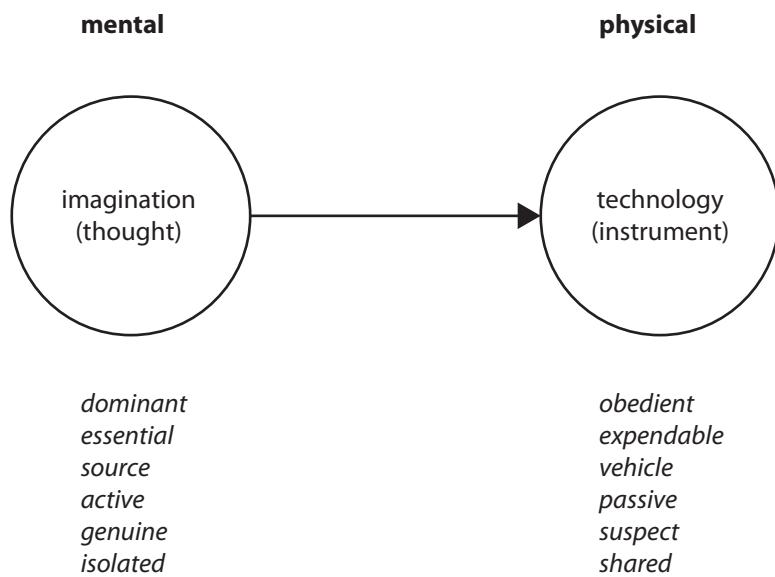


Figure 1, Varèse's ideal instrument as reiterating the Cartesian paradigm.

Further and recent expressions of the Cartesian paradigm: 1. Models of communication

Next I want to show how the Cartesian paradigm shows up in more recent debate. Initially I present an analysis of two models of communication developed in the mid 20th century, showing how their structure is grounded upon and sustains a Cartesian worldview.

The first model I want to address was developed by Shannon and Weaver (Shannon and Weaver, 1962); the second, a revision of this, by Schramm (Schramm, 1965). In Shannon and Weaver's model communication is understood in terms of a distinction between 'messages' that are conveyed along various 'channels'.

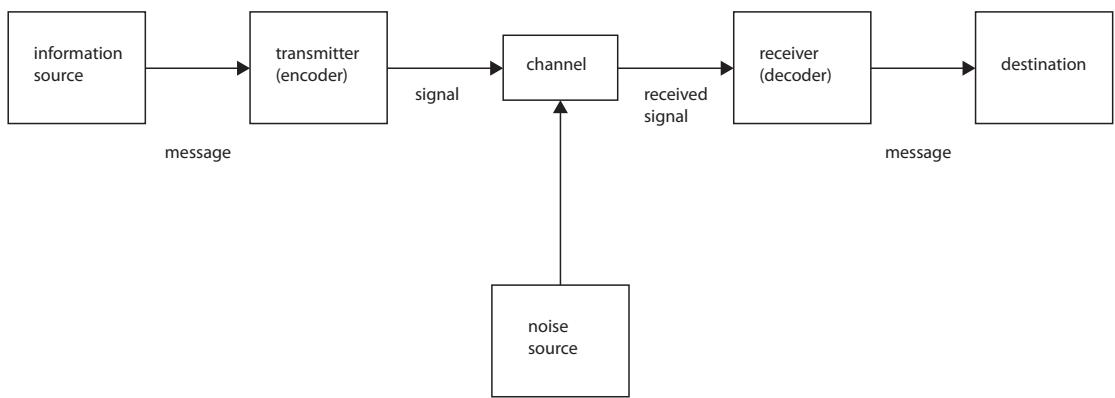


Figure 2, Mathematic model of communication (Shannon and Weaver, 1962).

The channel, in this case, is an ideally passive, subservient and also replaceable vehicle. This parallels the Cartesian distinction between mind as 'essential' and matter as carrier or vehicle (found in Descartes' description of the mind as carried by, but separable from, the body). Furthermore, in a manner that is unmistakably Cartesian, the channel (the physical, technical body) should not be trusted. In Shannon and Weaver's model, communication technologies are indicated only as a potential noise source. Their function therefore ranges from ideally passive to unfavourably disruptive... from silently obedient to vocally deviant. This model does not acknowledge any positively active or constitutive

function of the technical system. Any active function only detracts from transmission of the pre-thought-out message. This clearly follows a Cartesian account of the body as misleading.

Additionally, in its arrangement of communication as a linear path, along which the message travels from sender to receiver, Shannon and Weaver's model mirrors Ryle's analysis of the Cartesian paradigm as isolated minds that interact only by means of a shared physical channel.

Some years later Schramm revised Shannon and Weaver's model adding a notional return path in order to establish a communication loop (Schramm, 1965). In doing so Schramm's model retains and promotes several features of the Cartesian paradigm. In particular it reinforces Ryle's isolated mind hypothesis. Indeed, I would argue that Shramm's revision could be taken as a direct illustration of Ryle's critique of the Cartesian isolated mind.

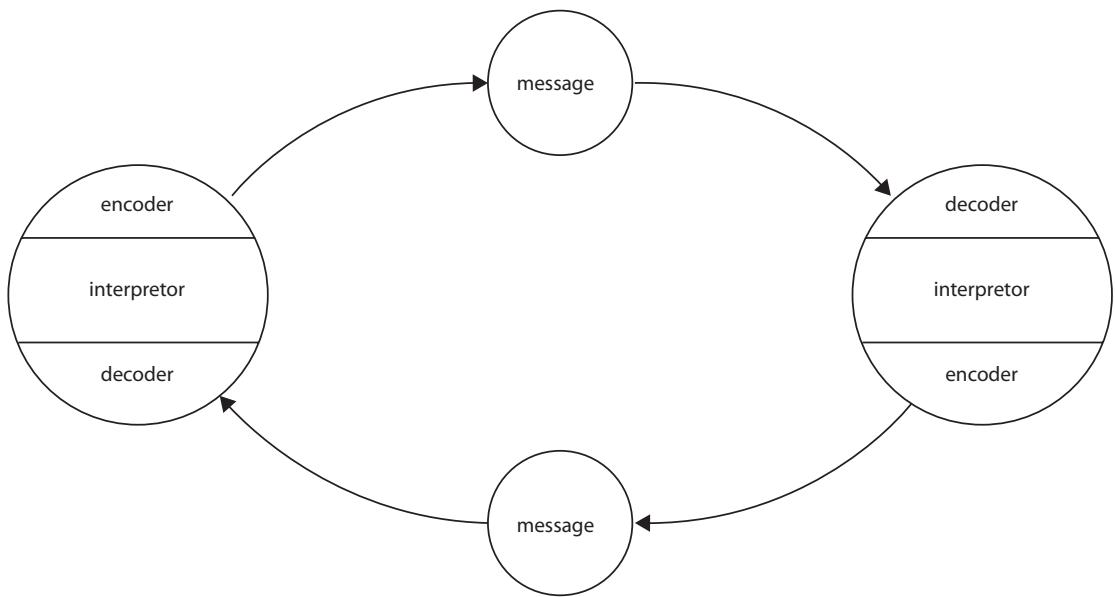


Figure 3, Schramm's model (Schramm, 1965).

Similarly, as with the Cartesian claim of the separability of thought, Schramm goes further than Shannon and Weaver and detaches 'the message' from technologies or physical media by which it is transmitted and received. What is

clearly evident in Schramm's revision is the complete exclusion of technology (or medium) originally present in Shannon and Weaver's earlier model. This implies an idealized telepathic communicative activity, one entirely divorced from its means of transmission and reception.

Schramm's formalization—that communication has an entirely mental, non-material, essence that is conveyed between isolated minds—repeats the Cartesian paradigm. However, this understanding of the mind and inter-mind communication is largely discredited by recent studies in cognitive neuroscience.

[...] a complete understanding of the cognitive processes within a single individual's brain cannot be achieved without examining and understanding the interactions among individuals. (Hasson et al., 2012, p.1)

The authors suggest that “Cognition materializes in an interpersonal space” (Hasson et al., 2012, p.1) and cite a growing body of research that suggests brain to brain ‘coupling’ occurs at a motor, perceptual and cognitive levels (Knoblich et al., 2011). In terms of motor responses they note a tendency for individuals to synchronize various activities, for example the rocking chair (Richardson et al., 2007); and the aptitude of two pianists to achieve synchronized movements that match a single player (Keller, 2008). Studies show that individuals within a group have a tendency to mentally rotate objects in order to adopt the viewpoints of others within the group. (Bockler, A. et al., 2011). Such positions undermine the validity of studying the individual mind in isolation:

Typical experiments isolate humans or animals from their natural environments by placing them in a sealed room where interactions occur solely with a computerized program. [...] we argue here that the dominant focus on single individuals in cognitive neuroscience paradigms obscures the forces that operate. (Hasson et al., 2012, p.1)

This change of viewpoint, from “a single-brain to a multi-brain frame of reference” (Hasson et al., 2012, p.1) challenges the authority of the Schramm's model of distinct agents that encode and exchange messages formed separately from one another. Similarly it questions the accuracy of the Cartesian subject as mentally separable from its body and environment.

Further and recent expressions of the Cartesian paradigm: 2. Cipriani's description of software and its uses

From these two models I want to move to debate concerning music technology. In particular I want to focus on a recent web-based radio broadcast, Störung radio, which in 2010 featured the Italian writer, composer and academic Alessandro Cipriani⁴. In what follows I aim to demonstrate that his discussion rearticulates features of the Cartesian paradigm.

The problem with electronic music is that everybody can use computers to make music, but most of the time people are subjected to the dictatorship of the software. Especially commercial software [it] has a lot of very nice sounds and very nice possibilities, but you end up making music following the way that these softwares are built. [...] it's very important to know what you are doing, not just pushing buttons or using ready made sounds. [...] if you really want to be free you have to have more knowledge about what you are doing. [...] you have to know what you are doing, and this makes you free. Otherwise you are a slave to the software. [...] you know every kind of synthesis, how it works in theory and then you practice it with MaxMSP⁵. ('Störung', 2010)

Cipriani makes a number of points that are grounded within the Cartesian world-view. From the above transcript I extract the following 5 key points:

1. Most of the time people are subjected to the dictatorship of the software
2. You end up making music following the way that these softwares are built.
3. It is very important to know what you are doing, not just pushing buttons
4. If you really want to be free you have to have more knowledge about what you are doing; you have to know what you are doing, and this makes you free. Otherwise you are a slave to the software
5. You know every kind of synthesis, how it works in theory and then you practice it with MaxMSP.

Cipriani's monologue unmistakeably reiterates the hypothetical power struggle between the human and technology. He warns of a problematic relationship

⁴ Störung radio, broadcast 2010. ('Störung', 2010)

⁵ MaxMSP is a visual programming environment for digital signal processing, available from Cycling '74 San Francisco.

where the human becomes subject to the *dictatorship* of the software, where practice follows the structure of software, turning the user into its slave. Knowledge, Cipriani suggests, is the means by which the human is able to reassert dominance... ‘knowing’ enables the user to be really free. According to Cipriani “Just pushing buttons” leads to slavery; theoretical understanding of technical objects and processes avoids slavery and establishes human control. Thus, according to his position, it is imperative that theory is established before practice is undertaken.

As well as reiterating the Varèsian power struggle (between mind and body, thought and instrument), Cipriani also emphasizes the superiority of detached rational knowledge. Here knowledge is not derived in response to what is encountered via the senses, but in terms of prior “hands-off” evaluation. This again parallels Descartes’ position that knowledge should be the product of detached logical analysis as opposed to empirical observation. Perhaps Cipriani might disagree with my point and suggest experimentation is valid. Nonetheless in the context of this quote he clearly argues that one should engage in theory, then practice, and in this sense (even if unwittingly) reaffirms the Cartesian dynamic⁶.

To sum up... from this short extract of Cipriani’s monologue we identify the following features: (1) the idea is something that can be separated from the technical; (2) the active function of technology is contrary to the freedom of the human agent; (3) the technical can impair the formation and transmission of ideas; (4) detached theoretical knowledge should occur before engaged practice; (5) detached theoretical knowledge before practice prevents or curtails the adverse impact of technology on the formation of ideas.

Further and recent expressions of the Cartesian paradigm: 3. Lyon’s discussion concerning experimental and popular music softwares.

⁶ The assertion that theory is separable from practice (that it is both superior and prior to it) is one that I shall return to shortly as it forms part of the Heideggerian critique of the Cartesian paradigm.

Following my analysis of Cipriani's monologue I now want to show how—in the following introductory statement at a panel discussion by Eric Lyon (Lyon et al., 2002)—the Cartesian paradigm is used to establish two distinct types of music software; two distinct uses of those softwares; and two distinct forms of music (that are produced by those distinct types and uses). Lyon suggests:

The distinction between experimental music and what might be termed 'normative music'—that is, music based on accepted stylistic norms—is mirrored in our software. On the normative side of software are utility programs such as mixers, sequencers, and reverberators. On the experimental side are the programs that we discuss today. This software is open, extensible, and invariably used in ways unanticipated by its creators. While such software does not command a market on the scale of normative utility programs, it is arguably much more influential in the long run, as it facilitates the creation of the music which today exists only in our collective imagination. And the experiments of today will lead inevitably to the norms of tomorrow. (Lyon et al., 2002, p.13)

Lyon's statement defines two forms of software which he refers to as (1) utility programmes and (2) open or extensible programmes. The second category 'the open' echoes both the Cartesian and Varèsian desire for passive, obedient technologies (or bodies). Open softwares, according to Lyon's assertion, do not imprint their own character (in the form of stylistic norms) onto the process of making music; and do not adversely impact the structure or content of the music. Lyon suggests his open and extensible programmes achieve this state and therefore enable experimentation. Experimental music therefore is the result of activity within an open, passive environment. It is an expression of the dominance of the human user over the technical environment. Implicit therefore in Lyon's text is the belief that what makes the experimental 'experimental' is a relationship based on the dominance of the human over the machine, of the machine as ultimately and ideally passive and obedient. It demonstrates the triumph of the mind over the machine, facilitating the creation of music that "exists only in our collective imagination" (Lyon et al., 2002, p.13)

By contrast utility programmes do not offer this relationship; they have fixed and limited uses (mixer, sequencers, reverberators) sufficient for normative (read popular) musics. According to Lyon, normative softwares reiterate and

perpetuate stylistic norms. The normative in this context therefore implies a technically driven directive, one that mechanically determines the musical form. Normative music results from the use of technologies that repeat norms; norms that are imposed on music making process. Normative music is therefore primarily determined by technology; as opposed to experimental music which is primarily determined by the imagination.

Lyon goes on to establish a relationship between the experimental and the normative, arguing that the normative is expanded or sustained by an appropriation of the experimental. Here the experimental music of today feeds into the normative music of tomorrow. Lyon's general scheme therefore is of a division between the experimental and normative where the experimental enjoys a special type of relationship to a special type of technology, that in turn enables a special type of music. Distinct from the experimental is the normative, any new features of which are present by virtue of the experimental. Normative (popular) music is therefore understood to be derivative of experimental music.

Lyon's text suggests therefore that human culture has a distinct 'experimental' zone. Its essential epicentre is based on a dominance-obedience relationship between human imagination and fully passive (open) technologies. Surrounding this zone is the normative... a dystopian area where users mechanically recapitulate the stylistic norms embedded within the technologies they encounter. In asserting this dynamic, Lyon's general account of culture is thoroughly Cartesian in character.

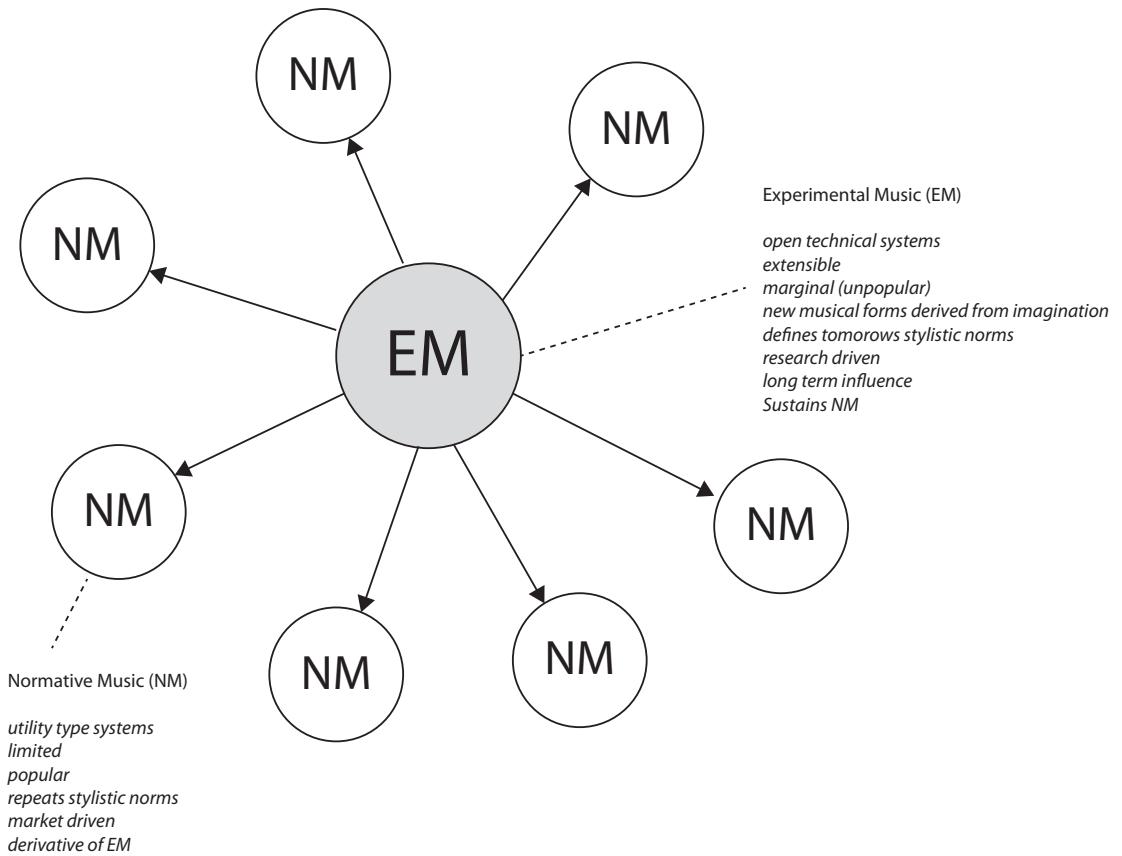


Figure 4, Illustration of Lyon's distinction between experimental and normative musics, and the experimental as sustaining normative musical forms.

Problem

I have a number of problems with these accounts—from Shannon and Weaver (1962), Schramm (1965), Cipriani ('Störung', 2010) to Lyon (2002)—and the relationships they construct between thoughts, actions and technologies. As I pointed out at the start of this discussion, when I reflect on my own practice and that of my peers, I feel that these accounts do not accurately represent how work is made. Furthermore I have a problem with the way Lyon extends this position into a distinction between the experimental and the normative, where popular practices are seen as non-innovative mechanical recapitulations of stylistic norms and experimental practices are seen as of a higher order of informed minds in open technical environments. Indeed my own practice aims to demonstrate the aesthetic growth (of genres within which I am active) does not occur in the form of regular injections of originality from an otherwise

separate musical enterprise (the experimental), but by responding to the vocabularies, stylistic norms and practices inherent within the genre itself.

In response to the above, I want to discuss the making of *Acid Tracks* by Phuture (Trax Records, 1987). This piece is considered to be the first acid house record (Rietveld, 2003) featuring what is now typically referred to as a ‘squidgy’ synthetic sound produced by the Roland TB303⁷. Here the TB303’s filter produces a particularly pronounced resonance, while its cutoff frequency is manually modulated to produce a characteristic sound. In tandem with this sound is a characteristic musical pattern. The unit’s onboard sequencer featured a rather convoluted entry method allowing for variable note length, accent and ‘slide’ settings. This was explained in the manual’s three courses: basic, intermediate and advanced (The Roland Corporation, 1982). The basic course in pattern construction alone takes up twenty-four A4 pages, making a rather challenging unit to learn.

I want to argue that Phuture’s use of the TB303 (and the resultant genre defining recording) demonstrates an enlargement of stylistic and musical forms that cannot be understood in terms of mentally isolated idea-formation followed by transparent implementation within passive or ‘open’ technical systems. Additionally I want to show that this case does not conform to Lyon’s view that utility-type technologies produce stylistic norms and that normative music grows in terms of appropriation of the experimental. I want to suggest therefore that it establishes a number of objections to the Cartesian paradigm.

I am particularly interested in how Nathaniel Pierre Jones (one of the records co-creators which also included Earl Smith) recounts the recording of *Acid tracks*. In a television interview⁸ Jones recalls:

He [referring to Smith] said “but I can’t figure out how to work this thing”. He’s still doing this weird, like, sound. He said, “I don’t know how to programme it, maybe

⁷ The Roland TB303 was produced by The Roland Corporation, Japan in 1982. It featured monophonic analogue sound synthesis, and sequencer, and was intended to produce bass accompaniment.

⁸ Pump Up the Volume, broadcast Channel 4 UK, (Hindmarch, 2001).

you can figure out how to programme it", because it didn't come with a book. So [...] instead of trying to programme it I just started turning knobs. He's [referring to Smith] like "what you doing?" I don't know I'm turning these knobs. He's saying, "keep doing that". I'm turning the knobs and we're just sitting there for like 30 to 40 minutes. I'm just turning knobs, and yeah I like that. Nathaniel Pierre Jones
Interviewed in (Hindmarch, 2001)

From Jones' description we should note the following features:

1. The typical acid house bass sound was not first formed as a prior imagined intention in the minds of Smith and Jones. Contrary to Varèse's ideal.
2. Neither Smith nor Jones had a theoretical understanding of the Roland TB303, in fact they found it confusing. This is directly contrary to Cipriani's claim that one should first have a theoretical knowledge of the tools and processes one is using.
3. Jones methodology was to "just turn knobs". Again this is contrary to Cipriani's claim that theory should proceed practice
4. According to Lyon's classification, the equipment used here (the Roland TB303) was of a "utility" type based on the reproduction of pre-existing stylistic norms. Yet new stylistic norms were established.

Jones' account of his encounter with the TB303 is clearly contrary to Varèse's ideal, Cipriani's methodology, and Lyon's distinction between the experimental and utilitarian in the following ways:

1. The lack of theoretical knowledge
2. The absence of a specific sonic intention
3. The utility-value technology as formulating new stylistic norms
4. The incidence of involved practice before detached theory

Contrary to Cipriani and Lyon I want to suggest that the above four features actively encourage, not hinder, creative progress. It is clear for example that if Jones and Smith had (a) a fully resolved sonic intention; (b) a detailed theoretical knowledge of the TB303's operation; (c) not just turned knobs; and (d) rejected the TB303 on the grounds of its utility and stylistic norm repeating

function... the dynamic of that recording session would have been entirely different. Furthermore this would not have established the stylistic framework present in acid house.

According to my reading of Jones' description of the recording session, it is precisely the lack of clearly defined sonic intention, the hands on experimentation without prior theoretical knowledge, and the specific physiognomy (i.e. non-openness and utility-value) of the TB303, that forms the complex equation giving rise to the breakthrough that became the first acid house record. How then are we to account for this? Surely there must therefore be something quite exceptional, obscure or unusual going on in this case?

Prior (2008b) thinks so, he suggests the Roland TB303 was "misprogrammed to beget acid house" (2008b, p.314), aligning it with a long history of music production that "bulges with cases that point to the unpredictable, productive and unstable" (2008b, p.314). He argues in favour of "unforeseen uses that these technologies end up affording through breakdown, error and misuse" (2008b, p.314), and describes the "slippage between the prescriptions encoded in the manufacture of artifacts" (2008b, p.314) that facilitate these kinds of radical advances in music.

Prior therefore frames this as a rather extraordinary and technically disruptive activity; one that suggests a new relationship is somehow established between the tools, the users and their intentions. Here, in a radical moment of technical and cultural repositioning, older practices are destabilized and new vocabularies are constituted.

Although I agree with Prior that the history of music production includes several cases of unpredictable and unforeseen musical outcomes, there are parts of his analysis that I find problematic.

Prior frames Phuture's use of the TB303 with language that presents it as radical and extraordinary. For example he refers to the TB303 as a bassline

generator, whereas in fact it is a bassline synthesizer and sequencer. Here the term ‘generator’, attributed to the machine, is an attempt to promote the sense in which the machine is active and therefore beyond the absolute control of the human agent... implying what he calls the “attenuation” (Prior, 2008a) of the human agent. This active-passive dynamic recalls the Cartesian paradigm and underlies his analysis of Phuture’s encounter with the TB303. By contrast Jones’ description of their encounter with the TB303 is much less loaded with the Cartesian worldview.

My principal concern therefore is how Prior, when confronted with an example that clearly undermines a Cartesian approach, chooses to describe it using terms that foster a specifically Cartesian reading... steering our interpretation of the encounter back into a reassertion of the hypothetical power struggle between man and machine. Prior’s reading however misrepresents the encounter in the following ways:

1. breakdown and misuse: Why does Prior consider this to be a case of “breakdown or misuse”? The machine was not malfunctioning or broken, and Jones and Smith did not damage, alter or attempt to repurpose the machine.

2. the unstable: What is it about this activity that Prior considers unstable? Following Jones’ account I do not recognize anything that might be called ‘unstable’. Clearly the activity was not driven by clearly defined sonic goal; perhaps progress may have involved several pauses, reconsiderations, redirections, and so on... but how are these unstable? What is it that constitutes instability here? If for example one wanders around the woods, is there something unstable about one’s trajectory? I would suggest not. One could equally, perhaps more accurately, refer to this activity wandering.

3. misprogramming: I would also like to challenge the claim that Jones and Smith somehow misprogrammed the TB303. In my view, if Jones and Smith had attempted to programme a specific musical sequence and failed, then this might arguably constitute misprogramming. However this was not the case. Both were

simply trying to make sense of the programming structure, and perhaps to learn how to operate it. In my view this could be more accurately described as discovery.

4. slippage (between the prescriptions encoded in the manufacture of artefacts): Here Prior asserts that the artefact, the TB303, contains prescriptions that determine its use. I take these to include things like: the synthesis model implemented in the unit; which parameters are available to the user and which are not; the range of values available for given parameters; the structure of the sequencer; and so on. It is not possible, for example, to turn a dial further than it can physically go; it is impossible to record sound on the TB303, or indeed to make the unit produce more than one note. The machine therefore could be said to have a number of brute facts. Slippage in this context could mean a number of things – perhaps a drift from a solid foundation, a subsidence or loosening. If we take prescriptions to mean the brute facts of the machine, what might a slippage between these look or feel like? I take Prior to mean ‘slippage’, in some general sense, as an undermining or acting contrary to the machines brute facts. But it is clear from Jones’ account of Phuture’s encounter with the TB303 that the two did nothing of the sort. They did not open or modify the machine, they didn’t find a series of combinations that resulted in its breakdown, and they did not turn dials further than they were supposed to go. Indeed everything that Jones and Smith did was precisely in accordance to the machines brute facts.

My reading of Prior’s description suggests that it relies upon an imagined power struggle between man and machine. His claim concerning “prescriptions encoded in machines” corresponds to Cipriani’s warning that one may “end up making music following the way that these softwares are built”. Similarly it mirrors Lyon’s prejudice concerning the distinction between ‘open’ and ‘utility’ technologies. In my view Prior makes the same assumption as Lyon – for ‘experimental’ activity to be achieved (in the context of utility systems that repeat stylistic norms) the utility value of the machine must be overcome. Here the machine should be misprogrammed, its prescriptions undermined, its structural logic placed in a mode of breakdown, and the role it constitutes for

the human should be destabilized and in error. Prior's description of Phuture's encounter with the TB303 is grounded in, and reasserts, a thoroughly Cartesian logic.

Alternatives

To sum up our discussion so far: on the one hand we have a number of statements asking for obedient or open technical systems; ones that place an emphasis on the prior formation of ideas; ones that draw a distinction between experimental and normative musics that result from encounters with different types of technical systems. According to such views the role of technology ranges from ideally passive, to disruptively active. Towards the disruptive end of the scale human control and transparent encoding of previously formed musical ideas are undermined. Such views therefore promote a power struggle between the human agent and the technical systems they encounter.

On the other hand is it clear from examples including Phuture's encounter with the TB303, that practical encounters with utility type technical systems (those that merely reiterate stylistic norms) can result in new musical techniques, vocabularies and stylistic forms. This is the case even when the user is puzzled by what is encountered and has a distinct lack of theoretical knowledge or understanding.

How are we to resolve this difference and thus provide an account of creative activity that overcomes the discrepancies of the Cartesian model? Simondon (1958) suggests:

The opposition established between the cultural and the technical and between man and machine is wrong and has no foundation. What underlies it is mere ignorance or resentment. (Simondon, 1958, p.1)

In the following I present three alternatives to the Cartesian paradigm, each of which circumvents the prejudicial opposition between man and machine. The first of the three, a discussion of Martin Heidegger's critique of the Cartesian subject, primarily focuses on being (1962); the second is an account of action

formulated by Bruno Latour (1999); the third is an analysis of thinking proposed by Clark and Chalmers (1998) paper concerning extended cognition. Each of these areas—being, action and thinking—is shown to be indissoluble from the environment.⁹ I want to suggest that the three models provide an account of creativity activity in relation to technical systems that is more functionally relevant within the contemporary technical environment.

Alternatives: 1. Heidegger's, being in the world

In the above we have seen how the Cartesian paradigm promotes specific values, particularly the privileging of mind over body, and theoretical analysis over practical engagement with the world.

For Heidegger this distinction is problematic¹⁰; he argues in *Being and Time*¹¹, the "...distinction between subject and object pervades all the problems of modern philosophy" (Heidegger, 1988, pp.124–125). In place of the Cartesian subject, and the rupture between the self and the world, Heidegger proposes 'being-in-the-world' or 'Dasein'.

Self and world belong together in the single entity, Dasein. Self and world are not two entities, like subject and object ... but self and world are the basic determination of Dasein itself in the unity of the structure of being-in-the-world. (Heidegger, 1988, p.297)

Because the usual separation between a subject with its immanent sphere and an object with its transcendent sphere – because, in general, the distinction between an inner and an outer is constructive and continually gives occasion for further constructions, we shall in the future no longer speak of a subject, of a subjective sphere, but shall understand the being to whom intentional comportments belong as Dasein. (Heidegger, 1988, p.297)

⁹ Although each the authors, and the models they propose, would claim that the very distinction between being, action and thought is itself problematic, it is nonetheless the case that each critiques the Cartesian worldview in reference to a focal area: being (Heidegger, 1962), action (Latour, 1999) and thought (Clark and Chalmers, 1998). My argument simply follows those particular critiques. Commonalities will be evident, but my primarily aim is not to reappraise the distinction between being, action and thinking.

¹⁰ My aim here is not to condense Heidegger's life's work into a few sides of A4, but to provide an account that is sufficient to challenge Cipriani, Lyon and Prior. Due to the incredible density and scale of Heidegger's writings, my reading is greatly aided by Dreyfus' many writings, particularly his commentary on *Being and Time* (Dreyfus, 1991) and his lectures on Heidegger (Dreyfus, 2007).

¹¹ Heidegger's major work, *Being and Time*, was originally published in 1927, I refer to the 1962 translation by Macquarrie and Macquarrie (Heidegger, 1962) used by Dreyfus in his lectures (Dreyfus, 2007).

Dasein is neither a combination of comportments nor a composite of body, soul and spirit, so it is futile to search for the sense of the being of this unity of the composite. It is also not a subject or consciousness, which only incidentally provides itself with a world. Nor is it a center from which all acts spring... (Heidegger, 1992, p.305)

Heidegger's critical assertion is that Dasein (or being) has no singular or fixed approach to the world. Instead it adopts a number of distinct context-dependent modes of being in response to what it encounters. Heidegger therefore provides a reformulation of being that is able to accommodate both the Cartesian variety of determinate theory led analysis, as well as a number of other modes. He calls these: Availability, Unavailability, Occurrence, and Pure Occurrence. Of particular interest here are Availability and Occurrence. In the mode of availability Dasein adopts absorbed coping, it is constituted in practical activity and engagement with tools. Here there is no reflexive awareness or thematic consideration of the self and the situation, one is simply absorbed in the present situation. If for some reason this mode is terminated, Dasein can enter a state of Occurrence. Here practical encountering of the environment and tools is stopped and theoretical analysis of the situation begins... constructing a self-reflexive awareness of the self and the situation as separable entities..

Heidegger argues that Western culture's proclivity for the detached objective mind-world distinction (as found in the Cartesian paradigm) is a peculiar quirk of Dasein: as soon as one asks questions such as "what is being like, what am I like", Dasein necessarily adopts a mode of being that emphasizes detached reason. It steps back from the world and is placed in an ostensibly separated rational relation to it. He calls this mode of detached theoretical reflection 'occurrence' and argues that the separation of the self from the world is consequence of this mode. For Heidegger, the mind and the self only appear as distinct entities when this mode of being is adopted.

By contrast Heidegger argues that most of the time we are simply absorbed in the world; that the self-reflexive mind as a distinct entity is not constituted and thus we are not aware of ourselves at all. Heidegger considers that the primarily

absorbed nature of being is Western philosophy's blind spot: as soon as one asks about it, it disappears. This blind spot he argues pervades Western society and culture.

Thus, because Dasein is ontico-ontologically prior, its own specific state of Being (if we understand this in the sense of Dasein's 'categorical structure') remains concealed from it. Dasein is ontically 'closest' to itself and ontologically farthest; but pre-ontologically it is surely not a stranger. (Heidegger, 1988, p.37)

For Heidegger the mode of absorbed activity, absorbed intentionality, is not facilitated by prior theoretical reflection but is instead the most basic and fundamental mode of being – it comes before (prior) to all the others. Heidegger argues that we don't encounter the world by first learning a detached theory of it that is then enacted. Rather, we are first and foremost encompassed, immersed, and absorbed into the world.

Dreyfus (2007), in his reading of Heidegger, suggests we should "stop thinking that mind is what characterizes us most basically" (H. L. Dreyfus, 2007, p.15). Here the mind is not constituted within or in its relation to the world, but is simply not present. Contrary the Cartesian dynamic 'being' in this sense does not exclusively and primarily mean 'thinking', it is therefore not at the core of what it is to be human. In place of the detached mental agent is a mode of non-thematic selfless awareness, where we are most fundamentally absorbed and skillful copers (H. L. Dreyfus, 2007).

[...] understanding of embedded embodied coping, therefore, is not that the mind is sometimes extended into the world but rather that, in our most basic way of being—that is, as skillful copers—we are not minds at all but one with the world. (H. L. Dreyfus, 2007, p.14)

When you stop thinking that mind is what characterizes us most basically but, rather, that most basically we are absorbed copers, the inner/outer distinction becomes problematic. (H. L. Dreyfus, 2007, p.15)

Heidegger's analysis of being goes on to suggest that what is revealed in this mode, the embodied understanding it offers, is more fundamental than detached theoretical reflection. Thus he promotes a non-theoretical, hands-on, mode as the primary means of exploring and understanding the world.

[...] the less we just stare at the hammer-Thing, and the more we seize hold of it and use it, the more primordial does our relationship to it become, and the more unveiledly is it encountered as that which it is [...] (Heidegger, 1962, p.98)

Heidegger's being in the world, discussion in relation to Phuture

How could we describe Phuture's encounter with the TB303 in the context of Heidegger's thought? First of all we can clearly see that it follows Heidegger's preference for non-theory driven exploration and understanding, as a case of "Availableness". Jones' description of "just turning knobs" directly resembles the Heideggarian mode of absorbed intentionality, absorbed coping and what Dreyfus calls "optimal body-environment gestalt" (H. L. Dreyfus, 2007, p.16). Similarly, the fact that the two (Jones and Smith) did not have recourse to consult the machine's manual—and abandoned the attempt to form a theoretical understanding of the machine—equates to this mode of being.

Thus we can understand Phuture's encounter with the TB303 not as a strange exception to the theory-driven creative practice proposed by Cipriani, or a case of Prior's technical instability-slippage hypothesis, where the Varèsean ideal of the mind expressed via obedient instruments is prevented, but as an everyday case of absorbed intentionality.

Furthermore, if we accept Heidegger's claim that *Dasein* is thoroughly embedded within the world, then the inner-outer distinction and the human-world opposition becomes irrelevant: it is not constituted within the structure of absorbed coping. It follows therefore, that the imagination-instrument, man-machine, power struggle implied by Varèse, Prior and Lyon, and explicitly stated by Cipriani is similarly inappropriate. In the case of Phuture's encounter with the TB303, for sure there is some confusion at play, but this confusion is not resolved by entering into a Cartesian power struggle with the machine; it is resolved by an absorbed embodied exploration of how the machine behaves under certain conditions, contexts and uses. Dreyfus clarifies this point:

When we solve problems, we do sometimes make use of representational equipment outside our bodies, but Heidegger's crucial insight is that being-in-the-

world is more basic than thinking and solving problems; it is not representational at all. That is, when we are coping at our best, we are drawn in by affordances and respond directly to them, so that the distinction between us and our equipment—between inner and outer—vanishes. (H. L. Dreyfus, 2007, p.14)

This responding to affordances—responding to what the equipment presents, and the character of equipment—is visible in Phuture's encounter with the TB303. It provides an account of that specific recording session which, I feel, is far more functionally relevant than Prior's technical instability-slippage narrative.

Heidegger's position shows therefore (contrary to Cipriani) that 'knowing the theory of' does not necessarily precede practical activity... Phuture's absorbed coping was not facilitated by detached, theoretical understanding. In fact, if we are to follow Heidegger's hammer analogy, absorbed activity of this type establishes a more primordial relation to the TB303 than theoretical analysis ever could.

In line with Heidegger's framework, if Phuture's absorbed hands-on coping with the situation had run into problems—if for example they had not hit upon aesthetically appealing results—then it is possible to expect Dasein to shift from absorbed coping to detached theoretical analysis.

In summing up my reading of the Heideggarian approach, I want to address a potential misunderstanding concerning the use of the term 'primordial'. For me this could be taken to imply a context-free relation to the tool or environment – a stepping outside of culture or the specific features of a given situation to some universal, transcendental or ahistorical encounter. But Heidegger does not suggest this. He would not, for example, suggest that in their dealings with the TB303 Jones and Smith somehow stepped out of their personalities when they became absorbed copers. Quite the contrary: absorbed coping, as embedded within the world, is systematically *context-dependent*. Its mode of being is thoroughly opposed to the hypothetical objective, 'outside of time and universe' detached rational stance emphasised in the Cartesian paradigm.

How is this context dependent embeddedness evident in Phuture's (primordial-absorbed) encounter with the TB303? One clear example is how aesthetic judgements were used. For example, earlier I suggested that absorbed coping continued because aesthetically appealing materials were produced. This clearly implies personal judgements – ones formed in relation to wider musical, social and cultural contexts and imperatives. This is not at odds with Heidegger's account of absorbed coping. Being-in-the-world implies aesthetic judgements are formed in relation to wider musical, social and cultural contexts. A point Dreyfus is keen to make in his lecture series on Heidegger's Being and Time:

[...] using equipment gives itself an interpretation of what it is to be a human being in general and in culture [...] we give ourselves an identity by taking up practices. (Dreyfus, 2007)

[...] the role of culture gives us a nature - but that nature is not universal. To say that culture is our nature is to say we have no universal nature [...] (Dreyfus, 2007)

If we are to rephrase this position and propose a response to Varèse's opening statement we could say the following: musical forms are not merely expressed via the technical environment (according to Varèse's dominant thought-obedient instrument ideal), or even shaped in relation to it (according to Prior's technical instability-slippage hypothesis. As there is no inner-outer, human-machine distinction in this model, there can be no 'relation' between them). Instead (in accordance with the Heideggerian model of absorbed intentionality) we could say that musical forms are fundamentally constructed within the technical environment. This offers a meaningful description of Phuture's encounter with the TB303. According to this position, it would make no sense to follow Cipriani and suggest that Jones and Smith are therefore slaves because technology has played an active role in the construction of musical form. Indeed, placing a hypothetical wall of knowledge between the human and the machine (in order to assert dominance over the machine) seems both paranoid and naïve in the context of Heidegger's position.

For me Phuture's encounter with the TB303 has a personal resonance. Not only is the resultant music part of my own musical history (refer to Appendix 2, an autobiographical account of the development of my musical interests), I see many parallels between that specific recording session and how I work.

Although the process of producing work involves a great deal of detached theoretical analysis, at its core I feel my work is derived from very direct hands on explorations of the tools that I encounter. Typically for example I build systems within MaxMSP that I then interact with to promote non-predetermined results.

Although I might sit in isolation from the tools and imagine how I might use them in the context of a given project, what I imagine cannot be divorced from previous encounters with and understanding of tools. My imagination (even though I might think of this as an entirely mental activity) is actually constructed in terms of prior encounters with tools.

For example when I first began to use analogue synthesis I connected a monophonic synthesizer that had an onboard sequencer to a drum machine. I created a sequence of 4 notes and triggered this from the drum machine which had 5 notes per bar. The interplay of values produced a number of interesting results. Consequently it became part of the fabric of how I think about music and music making, indeed it is a technique I am still exploring today (in my microtemporal works series for example, discussed in chapter 4 of this document). This did not come about as a result of prior theoretical analysis, but as a consequence to absorbed activity. In this sense the technology does not so much function as a means of expressing the contents of one's imagination, but a means of constructing one's imagination. When removed from the technology, I am able to think in those terms due to prior encounters with the technology. In this sense, in line with Heidegger's analysis, practical engagement was prior to theoretical development. Furthermore, this practical engagement did not happen in a context free environment; there was not some kind of transcendental connection between the machine and myself that facilitated some kind of free floating isolated intuition. My exploration of the interplay

between two values happened within a context that included, for example, an interest in the then burgeoning acid house scene, my previous interest in electronic musics, as well as other concerns including alienating my guitar-playing friends, and so on. What I want to show here is that, contrary to Varèse, one's imagination does not happen in a vacuum to be then materialized by technology. Imagination, goal formation, is necessarily is embedded within the environment.

Unlike Varèse I do not dream of tools obedient to my thought, I dream of tools with specific functions and properties within which thought and practice are galvanized in response to wider social and cultural contexts. This leads me to:

Alternatives: 2. Latour and actor network theory

In his essay *A Collective of Humans and Nonhumans; Following Daedalus's Labyrinth* (1999) Latour argues that action, rather than being a feature of the human, is formed in 'collectives' of human and non-human agents.

Like Heidegger Latour rejects the human/world, man/machine distinction... he rephrases the familiar Cartesian inner-outer, mind-world opposition as a "polemical tug of war between objects and subjects." (Latour, 1999, p.193). Unlike Heidegger however he does not distinguish between modes of being – between detached thinking and absorbed coping.

Latour's primary concern is to provide an account of goal formation in the context of active environments. Here the environment (the 'collective' to use Latour's term) is a network of agents—both human and non-human—that exert influence on one another. In his critique of *Homo Faber* (man the creator) Latour argues that, "action is a property of associated entities" that "action is simply not a property of humans but of an association of actants". (Latour, 1999, p.182) The collective of agents is anything but passive: each one impacting the behaviour of others. In this sense Latour is in agreement with Cipriani and Lyon, that—contrary to the Varèsian ideal of an entirely obedient instrument—

technology is far from passive. Instead the tool is fundamentally active; it exerts an influence on its users.

The myth of the Neutral Tool under the complete human control and the myth of the Autonomous destiny that no human can master are symmetrical. (Latour, 1999, p.187)

Unlike Cipriani and Lyon, Latour does not consider this problematic. In fact he considers the active nature of technology to be utterly necessary and not obstructive. According to Latour, without an active network of agents—within which the human is single element—new goals would never be formed. Here the collective's function is not to solely realize goals, but more fundamentally to form new goals.

[...] if we try to comprehend techniques while assuming the psychological capacity of humans is forever fixed, we will not succeed in understanding how techniques are created nor even how they are used." (Latour, 1999, p.179)

[...] a third possibility can be realized: the creation of a new goal that corresponds to neither agent's program of action. (Latour, 1999, p.187)

Here, controversially, the tool itself (the non-human actant) is considered capable of action. This suggestion runs quite contrary to an understanding of action present throughout the Western philosophy, one that involves intentions, beliefs, desires and so on. But in order to understand, and perhaps accept, Latour's position I want to refer to a definition of the actant he offers in a later work.

Let us suppose now that someone comes to find you with an association of humans and nonhumans, an association whose exact composition is not yet known to anyone, but about which a series of trials makes it possible to say that its members act, that is, quite simply, that they modify other actors through a series of trials that can be listed thanks to some experimental protocol. This is the minimal, secular, nonpolemical definition of an actor. [...] There are indeed actors here, or at least, to rid the word of any trace of anthropomorphism actants, acting agents, interveners. (Latour, 2009, p.75)

Thus action, in reference to the Latourian actant, is not to be understood in terms of agency or intention, but in terms of influence within a network of fellow actants. Latour does not claim the autonomy of the non-human actant,

and indeed asserts, “A forsaken gun is merely a piece of matter” (Latour, 1999, p.192) The non-human actant should therefore be understood as an attempt displace categorical divide (and the polemical tug of war) between the human and non-human.

Purposeful action and intentionality may not be properties of objects, but they are not properties of humans either. They are properties of institutions, of apparatuses [...] (Latour, 1999, p.192)

In Latour’s scheme, the non-human actant is systematically de-anthropomorphised; and, symmetrically, the human actant (*Homo Faber*) is systematically de-prioritised. The resultant multi-modal actant structure is a necessary component of Latour’s non-hierarchal collective of mutually influencing agents. It should be read as Latour’s attempt to propose an alternative descriptive system, one that unequivocally overcomes the pervasive human-machine, culture-technology allegory present throughout the history of Western thought.

The name of the game is not to extend subjectivity to things, to treat humans like objects, to take machines for social actors, but to avoid using the subject-object distinction at all in order to talk about the folding of humans and nonhumans. (Latour, 1999, pp.193–194)

[...] actants are in the process of exchanging competences, offering one another new possibilities, new goals, new functions. (Latour, 1999, p.192)

In addition to goal realisation, the collective of actants enables goal formation and modification (in Latour’s terminology, goal ‘translation’), facilitating new positions.

I used translation to mean displacement, drift, invention, mediation, the creation of a link that did not exist before and that to some degree modifies the original two. (Latour, 1999, p.179)

If we accept Latour’s definition of active non-human actants, we are able to think about the network not in terms of a pyramid structure with the human actant at the central apex, but as a ‘collective’ ecosystem of actants that constitute a productive network. Rather than passively enacting premeditated agendas according to a Varèsian ideal, the Latourian collective actively

constructs new programmes and positions determined by the complex interplay of its component parts.

Latour's actor network theory, discussion

Latour's account of action as constituted within collectives of humans and non-humans provides, I think, a very informative account of Phuture's encounter with the TB303. It provides, I think, a meaningful explanation of goal formation and execution as a consequence of new linkages, invention, mediation, goal translation between equipment, techniques, aesthetic preferences and so on.

Smith (interviewed in (Hindmarch, 2001)) recalls that Phuture initially wanted to use the TB303 to make basslines. Indeed the TB303 was originally designed and marketed as a replacement for the human bass player, the bass guitar and the process of bass playing; an advert at the time of its release suggested the TB303 functioned like an “individual member of the band”(The Roland Corporation, n.d.). But here the goal to emulate human bass player, the bass guitar and the process of bass playing was translated to form something quite different. This shows that—even though the TB303 was designed to offer a convenient copy another musical instrument, player and style—it was in fact not only a copy. And, within the context of the collective, linkages were produced... invention, mediation and goal translation occurred¹².

This mediation, translation and collective process, although necessarily active, is quite different from the master-slave dynamic asserted by Cipriani. Here the active nature of tools in the context of a collective facilitates growth, invention, and discovery; it is simply not the case that activity is determined in the totalitarian manner suggested by Cipriani.

Additionally the tension-filled collective of actants with their specific agendas, influences, imperatives and so on is clearly in contrast with Lyon's ideally open

¹² Perhaps it should be noted that the TB303's manual, itself a potential actant in this context, was absent.

technical environment. On Latourian grounds one should argue that—even if we accept that there could be such a thing as an open technical environment—no action would ultimately form and occur within Lyon’s paradigm because it lacks the necessary *collection* of active components. Activity is constituted within a collective of active components.

[...] the prime mover of an action becomes a new, distributed, and nested series of practices whose sum may be possible to add up but only if we respect the mediating role of all the actants mobilized in series. (Latour, 1999, p.181)

If we accept Latour’s account of action as collective, and the claim that it simply would not happen in Lyon’s open technical environment, the mere fact that Lyon is able to produce anything within his allegedly ‘open’ environment necessarily implies that it is in fact not ‘open’ at all¹³.

Similarly Latour’s conception of a collective of active agents offers a pertinent reading of my practice; and it is a model to which my practice intentionally responds. In the microtemporal works documented here, processes are established, that, along with my input as a human agent, determine musical outcomes. For example, in one case (*Multistability*) I recorded my real time changes to a given parameter; the recorded data was then disconnected from the original parameter remapped to other parameters. My real time input in this sense continues to be present, but is subsumed within a network of other active agents. In another case (*Periodic Orbits*) temporal patterns formed by an optical drive attempting to mount a DVD were used as the basis for musical patterns.

My claim here is not that these examples present a new relation between the human and the non-human agent, since, if we follow Latour’s description of action as a consequence of the network, we should accept that this applies to all cases. My point is that my approach responds to this understanding and attempts to foreground it as a characteristic of the work.

¹³ Recent studies, including those undertaken at the Creativity and Cognition Research Studios led by Ernest Edmonds and Linda Candy, support this view. Candy suggests that constraints facilitate rather than prevent creative activity (Candy, 2007)

Alternatives: 3. Extended cognition

The fundamental mode of interaction with the environment is not to represent it, or even to exchange inputs and outputs with it; rather, the relation is better understood via the technical notion of coupling. (Van Gelder, 1997, p.16)

To conclude this section I want to refer to recent studies which suggest that the mind itself is extended into the environment. This claim is relevant here for a number of reasons. Firstly, it offers a further critique of the detached Cartesian stance outlined earlier; secondly it promotes consideration of how computer systems extend cognitive functions in the process of music composition.

My discussion here largely follows Clark and Chambers' paper "The Extended Mind" (1998), where, prompted by "the general tendency of human reasoners to lean heavily on environmental supports" the authors ask:

Where does the mind stop and the rest of the world begin? The question invites two standard replies. Some accept the demarcations of skin and skull, and say that what is outside the body is outside the mind. [...] We advocate a very different sort of externalism: an active externalism, based on the active role of the environment in driving cognitive processes. (Clark and Chalmers, 1998, p.7)

Here, the suggestion is not that thought is merely aided by objects within the environment (i.e. the embodied or embedded mind hypothesis), but more fundamentally that the mind itself is extended into the world and the objects it contains. Thus the external apparatus is to be considered a fully integrated part of the cognitive system.

Citing (Kirsh, 1995) Clark and Chambers point out how letter tiles are rearranged by Scrabble players to construct possible letter combinations.

One can explain my choice of words in Scrabble, for example, as the outcome of an extended cognitive process involving the rearrangement of tiles on my tray. Of course, one could always try to explain my action in terms of internal processes and a long series of "inputs" and "actions", but this explanation would be needlessly complex. If an isomorphic process were going on in the head, we would feel no urge to characterize it in this cumbersome way. In a very real sense, the rearrangement of tiles on the tray is not part of action; it is part of thought. (Clark and Chalmers, 1998, p.10)

Clark and Chalmers refer to studies of Tetris players (Kirsh and Maglio, 1994) that suggest ‘hands-on’ rotation of shapes (to ascertain potential ‘landing’ positions) is faster than mental rotation. Thus physical rotation is not just used to move a shape into a predefined location, but to evaluate the correspondence between location and shape. They argue therefore that “the relevant parts of the world are in the loop, not dangling at the other end of a long causal chain” (Clark and Chalmers, 1998, p.9).

The external features in a coupled system play an ineliminable role - if we retain internal structure but change the external features, behavior may change completely. The external features here are just as causally relevant as typical internal features of the brain. (Clark and Chalmers, 1998, p.9)

In developing their argument Clark and Chambers present an analysis of two museum-goers, Otto and Inga (Clark and Chalmers, 1998, p.10). Here Otto is an Alzheimer’s sufferer who relies on a notebook to record memories whereas Inga uses “central” neuronal processes to record memories. Clark and Chambers argue that there is in fact no difference between the functioning of these two systems.

The moral is that when it comes to belief, there is nothing sacred about skull and skin. What makes some information count as a belief is the role it plays, and there is no reason why the relevant role can be played only from inside the body. (Clark and Chalmers, 1998, p.14)

[...] beliefs can be constituted partly by features of the environment, when those features play the right sort of role in driving cognitive processes. If so, the mind extends into the world. (Clark and Chalmers, 1998, p.12)

They assert:

[...] creating a coupled system that can be seen as a cognitive system in its own right. All the components in the system play an active causal role, and they jointly govern behavior in the same sort of way that cognition usually does. If we remove the external component the system’s behavioral competence will drop, just as it would if we removed part of its brain. Our thesis is that this sort of coupled process counts equally well as a cognitive process, whether or not it is wholly in the head. (Clark and Chalmers, 1998, pp.8–9)

In defence of their position Clark and Chambers point out that ‘the mind’ and ‘cognition’ should not be confused with consciousness: “not every cognitive

process, at least on standard usage, is a conscious process” (Clark and Chalmers, 1998, p.10).

Their claim has been met with considerable resistance particularly Rupert (2004) who offers a number of criticisms concluding that Clark and Chambers’ extended cognition hypothesis is of “marginal interest as part of a philosophical foundation for cognitive science”.

By contrast Wheeler (2010) argues that critics of Clark and Chambers often refer to the parity or disparity between mental and non-mental apparatuses in order to undermine the case for extended cognition. He suggests this is little more than a chauvinism: if the inner-outer distinction is eroded, why should neuronal processes occupy a more authentic status than external processes, why should the cognitive status of a note pad be assessed in terms of its parity with a particular neurological function?

As to whether or not cognition is aided by external apparatus (i.e. embedded, embodied) or properly considered to be a function of that apparatus (i.e. extended) is beyond the concern of this discussion. Nonetheless, cognition as non-exclusively neuronal—either with the aid of external apparatus, or as a part of external apparatus—undermines the legitimacy of the isolated mind hypothesis central to the Cartesian paradigm.

The significance of this view (cognition as extended into the technical environment) in the context of creative practice is clear. At a recent conference the computer artist Manfred Morr described his working method as a dialogue between himself and the technology¹⁴. Although Morr’s position acknowledges the non-instrumental, active-constructive nature of the technical apparatus (in line with the Latourian model), if we are to accept the extended cognition hypothesis, this alleged “isomorphic” relation (i.e. dialogue) between mental

¹⁴ “Computer Art Pioneers on Making Art by Writing Code” took place on Saturday the 17th of November 2012 at Sheffield Hallam University. It was chaired by Leila Johnston, speakers included Ernest Edmonds, Manfred Mohr, Frieder Nake Roman Verostko, Laura Sillars (Site Gallery), Douglas Dodds (V&A), Francesca Franco (researcher), Richard Sides (artist), and Alex May (artist). The event was supported by De Montfort University and the Computer Art Society.

states and external states connected by a series of inputs and outputs involving thought and action, should be rejected in favour of a fundamentally indivisible and fused cognitive structure composed of neuronal and technical constituents.

I suggest this position is pertinent to Phuture's encounter with the TB303 and my own practice. On these grounds the TB303 is not an apparatus for aiding, articulating or enacting thought, but in itself is a fundamental component of the cognitive process. In relation to my own practice, we can see that systems including MaxMSP are environments where cognitive processes are constructed rather than enacted.

Summary

My aim in this section has been to thoroughly refute the Cartesian-Metaphysical model of creative practice: where a detached thing called "imagination" drives ideally passive tools. Here, Heidegger's description of being as embedded within the world prioritising absorbed engagement over theoretical detachment; Latour's analysis of action as constituted in collectives of human and non-human actants; and the extended cognition hypothesis of the fused neuronal-technical cognitive mechanism, offer credible and mutually compatible alternatives. Here being, action and thinking are not considered to be distinct from technical environments but, by contrast, are fundamentally constituted within them.

Note concerning other research in creative process in technologically engaged artistic practice

Before moving to the next section I would like to reference a number of relevant activities concerning the role of technology in creative practice, and place my discussion within a wider critical context.

With the emergence of digital technologies the role of the technical within creative practice has increased in prominence, evidenced in a number of recent

publications¹⁵. Pre-empting this trend, in 1967 Billy Klüver established *Experiments in Art and Technology* (E.A.T.) a North American initiative with the aim of bringing artists and scientists together. Despite this aim, Klüver maintained that creative and technical roles are methodically distinct (Stiles and Selz, 1996). Since E.A.T. several platforms have emerged that address the notional division, intersection or relation between the two: The International Symposium on Electronic Art (founded in 1988, Netherlands) is one of a growing number of conferences and exhibitions dealing with this topic; Liverpool (UK) based Foundation for Art and Creative Technology (FACT) places a particular emphasis on this area; and the Wellcome Trust now offers grants to arts to facilitate collaboration between artists and scientists.

Perhaps of most interest—beyond publications and platforms that address the *relation* between art and technology—are a growing number of artist-programmers and artist-theorists that cross the notional divide between aesthetic and technical concern, and between theoretical analysis and practice based research. Of these, three are of direct relevance here: British Algorist Ernest Edmonds, Japanese Fluxus artist Yasunao Tone, and Viennese Structuralist filmmaker Peter Kubelka.

Firstly, Edmonds, in an early and influential paper, acknowledges the potential of technologies to impact and transform creative practice (Cornock and Edmonds, 1973) and in 1968-1969 his mixed media work *Nineteen* used a computer programme to solve a logical problem and thus determine the position of the works component parts, suggesting that technology is an “agent for concept development” (Edmonds, 2002). Clearly such processes sit rather uncomfortably within Cartesian flavoured descriptions of creative practice

¹⁵ Francastel's *Art and Technology in The Nineteenth and Twentieth Centuries* (Francastel, 2000) questions the distinction between cultural and technical activity yet preserves the notion of “imaginative forms materialized through mechanized technology” (p322), adhering to a linear path conception of artistic production as a journey from mental to material, from mind to world. By contrast Rutsky's *High Technē: Art and Technology from the Machine Aesthetic to the Posthuman* (Rutsky, 1999) questions the instrumentality of technology suggesting that contemporary practice redefines the technical in aesthetic terms, “... the aestheticization of technology and the technologization of art” (P73). However Rutsky does not offer an account of creative practice that reappraises the instrumental model of technology. And Wilson's *Information Arts: Intersections of Art, Science, and Technology* (Wilson, 2002) provides an overview of current debate and artistic practice.

where technologies simply reify previously resolved ideas. By contrast the descriptions I offer fit closely with this practice.

Similarly the Fluxus art movement sought to question the view of the artist as Cartesian-like controller of the work, undermining as Latour has done the myth of *Homo Faber* (man the creator). A particularly notable example drawn from this tradition is the work of Yasunao Tone who's piece *Solo For Wounded CD* (1985) engages the error correction system of a specific compact disk player. Here the artist carefully prepares manipulated compact discs in order prevent linear playback. This action could perhaps be read as anti-technical, as a way of disrupting the correct functioning of the machine, potentially reasserting the subject-object power struggle identified by Latour (Latour, 1999). However, this is not the case. Marulanda states:

[...] the adoption of equipment failure should not be interpreted as a reaction against technology: Tone regards his causing CD players to fail as an addition to their capabilities [...] (Marulanda, 2007, p.79)

And in email correspondence with the artist¹⁶ Tone makes it clear that this anti-technical reading is not desirable:

People are tendentious to think technology is against nature, which they think inhuman but, on the contrary nature is inhuman and technology is humane because technology is manmade.

Tone's 'live' presentation of *Solo for Wounded CD* is therefore not a demonstration of what Latour might call a notional tug-of-war between man and machine, but rather of the Latourian 'collective' in action.

Finally, a further notable approach to the technical is found in the work of seminal structuralist filmmaker Peter Kubelka who, since the mid 1950s has rejected the belief that film is a carrier of separable meanings and messages (Mazanec, 2008) expressed in Shannon and Weavers model (1962). In accordance with this belief Kubelka refuses to endorse electronic copies of his

¹⁶ Dated 18th May 2010

work arguing that the work itself cannot be transferred from one platform to another – it does not contain a metaphysical essence that can be divorced from the material qualities of the work; the work is fundamentally in and of a specific cinematic technology. Kubelka’s creative methodology places an emphasis on the “hard-core” character of the technology itself (the brute facts as I referred to them earlier); his aim in making work is to foreground this character, exemplified in *Arnulf Rainer* (1960). Kubelka’s position rejects the linear-chain scheme (again articulated in Shannon and Weaver (1962)) where messages travel from the mind of the creator to the mind of the receiver via any suitable technology. The analysis he offers of his practice is non-Cartesian, in that it parallels the rejection of Descartes mind-world distinction. Similarly it can be understood using models derived from Heidegger, Latour and Clark and Chalmers.

Like me, the above artists —Edmonds, Tone and Kubelka—engage not only with what might be called ‘new’ technologies, but also place particular emphasis on critical analyses of their engagement with those technologies. These analyses (in various ways and with different points of emphasis) like my own, reject instrumental and metaphysical conceptions of technology. In this sense such activities necessitate, prompt and promote different understandings of the role of the technical in creative practice.

2. Temporality

A key concern of the works collected within this portfolio is temporality: from practical concerns about how long a piece of work should be; to how time is treated within different technological environments (consider the difference between the time-line paradigm and various spatial programming environments¹⁷); to questions about how time is experienced in the works collected here; and theoretical issues that bring together ideas about music and time at a critical level.

Initially I want to provide an overview of how temporality has been treated by fellow composers and theorists; following this I present a critical analysis of relationship between time and music in reference to Husserl; and finally I discuss this in relation to a number of the technologies used in the production of this portfolio, and works contained within it.

Temporality, work by fellow composers and theorists

Clearly my concern with temporality is not peculiar to my work. A number of composers have written about temporality and placed its treatment in the foreground of their practice. Curtis Roads for example identifies different levels of temporal structure—from the infinite to the smallest possible temporal division... the sampling rate of the universe (Roads, 2004)—with musically significant divisions such as *Macro*, *Meso*, *Sound Object* and *Micro*. Here the *Macro* is the overall musical piece or form typically lasting from minutes to hours; the *Meso* is said to represent groupings of sound objects that form distinct sections within the overall composition; the *Sound Object* is referred to as a “basic unit of musical structure” (Roads, 2004, p.3) (typically an individual note); finally at the *Micro* level are the sound “particles” (Roads, 2004, p.4) that constitute the note itself.

¹⁷ Here I refer to programme such as Apple's Logic which uses a linear timeline to represent and organise musical data; and by contrast MaxMSP produced by San Francisco based Cycling 74 which offers a spatially organised programming environment.

Having discussed the subject of temporality with Roads at some length¹⁸ I get a sense that his primary concern are the boundaries between those divisions (the “zones of ambiguity” as he calls them (Roads, 2004, p.6)) and specifically how computer technologies enable to composer to transgress or redefine these.

According to Roads, using the techniques he has developed, an individual microsonic particle can form a note or phrase or indeed be extended to form an entire score. Roads’ concern therefore is to get beyond of the conceptual abstraction of music as notes and arrangements of notes, and enter a malleable realm beyond these structural hierarchies. Yet in his diagrammatic depiction of timescales, temporality is consistently shown as a linear phenomenon, with a determinate now point and timescales extending into the past (Roads, 2004, p.5) which ultimately reinforces those hierachal divisions.

In what follows I will question the ubiquity of this linear temporal representation. Unlike Roads I do have no aversion to the boundaries that he identifies exist between *Macro*, *Meso*, *Sound Object* and *Micro* scales. In fact, such structural divisions are a primary focus of a number of my works, for example in my microtemporal works I retain the distinction between sound object and *Micro* level as this is a structural feature of the MIDI protocol (See chapter 4). Similarly the works responding to house music (See chapter 5) deliberately engage these distinctions as fundamental to the vocabulary with which I am dealing: for example *Meso* levels and their function within electronic dance musics.

In opposition to Roads’ analysis of temporality as the interplay of linear scales of distinct lengths moving from the future, through the now point and into the past, other composers and musicologists have rejected this scheme entirely. La Monte Young for example, in reference to the prolonged sustained tones present in his works, states:

¹⁸ In 2011 I took part in a discussion group chaired by Tony Myatt at Supersimetria - New Languages in Computer Music, Barcelona. This included myself, Curtis Roads and Roc Jiménez de Cisneros. Since then I corresponded with Roads during the developing of Composing with Process a radio series commission by Radio Web MACBA for an episode addressing treatments of time in generative musics.

[...] we determined at a certain point that our medium was time [...] I think that this kind of sense of time has to do with getting away from the earthly sense of direction which goes from birth to death, in other words, like developmental form, and has to do with static form. (Nagoski, n.d.)

La Monte Young's interest in directionless temporality and static form challenges Roads' hierachal division of music into distinct temporal zones, particularly his belief that these travel in a linear direction at a constant rate. Kramer calls this absence of linear process "Vertical time" (Kramer, 1988) and suggests that the listener:

[...] give up expectation and enter the vertical time of the work—where linear expectation, implication, cause, effect, antecedents, and consequents do not exist. (Kramer, 1988, p.56)

Kramer, referring to Meyer's term "nonteleological music" (Meyer, 2010, p.53) compares encounters with such temporality to "looking at a piece of sculpture" (Kramer, 1988, p.57). Here music does not move purposefully towards a predetermined resolution, it is not a narrative that takes the listener along some emotionally planned journey. Kramer's *looking-at* time as a mode of encountering musical temporality can perhaps be likened to Tudor's comment on Cage's *Music of Changes* – that it seemed more like *watching* time as opposed to feeling it (Tudor, 1972)¹⁹.

So far I have mentioned two distinct analyses of temporality – the hierachal linear temporality of Roads and the directionless, nonteleological, vertical time of La Monte Young and Kramer. However a number of theorists and composers have attempted to overcome these two poles and define different types (not merely different gradations) of temporal structure within music. Xenakis for example distinguishes between two distinct temporal kinds: the inside-time,

¹⁹ The absence of linear process as 'vertical time', and a spatial encountering of musical temporality, will be recalled later in my discussion.

which is the ordering of events; and the outside-time, which refers to other non-temporal relationships between elements of the music (Xenakis, 1994). Adorno identifies two dissimilar temporal forms in music: dynamic temporality (his example is singing) and repetitive temporality (for example drumming) that ‘divides’ time into equal measures (Adorno, 2003). A similar division of time into ‘types’ is found in Boulez who suggests that his formal time system is based upon a distinction between smooth and striated time structures that interact by a process of osmosis... comparing musical time to a conveyor-belt on which events are organised and subsequently happen (Boulez, 1990): not only temporal organization, but a scheme according to which time itself is understood.

As an artist dealing with the construction of music, I relate very strongly to these attempts to classify and understand the temporal forms present in musical structures: time seems to be at the very core of music. In making music, and considering the fascination with temporality demonstrated by fellow composers and theorists, it seems that time and music are somehow interwoven at a very fundamental level. In the following discussion I want to consider this asserted connectedness of time and music.

Introducing Husserl and temporality

In the above I have used the terms ‘time’ and ‘temporality’ interchangeably. It is necessary at this point to make a distinction between the two: here the term ‘temporality’ refers to time as it is experienced or encountered, time as it feels to us, its phenomenological character. ‘Temporality’ should therefore not be confused with a scientific or mathematical account of ‘time’ as it might be in the universe.

The distinction between time and temporality—and the analysis of temporality within philosophical discourse—is initially made by Husserl (Couzens Hoy, 2012). His primary work in this area “On the Phenomenology of the

Consciousness of Internal Time (1893-1917)²⁰ specifically addresses the temporal (or “time-consciousness” as it is known in Husserl’s vocabulary). Time-consciousness, like the temporal, is the character of time as it appears to us.

An extremely basic account of Husserl’s position is as follows: When we observe the movement of a skipping rope²¹, it does not appear as a series of detached positions, or as several skipping ropes one after the other in rapid succession. Instead it appears to have a continuous and unbroken momentum. Husserl wants to understand how this happens, and he attempts to describe it from a phenomenological point of view.

Every temporal being “appears” in some running-off mode that changes continuously, and in this change the “object in its running off” is always and ever a different object. And yet we continue to say that the object and each point of its time and this time itself are one and the same. (p.20)

Husserl suggests therefore, that in order to have the impression of unbroken momentum, one must in some way hold onto an impression of an objects previous state and also anticipate of its following state. He suggests that this experience (of that which is “happening”) occurs because consciousness retains a trace of what has just happened; similarly, it calculates a phase of what is about to happen. He calls these ‘temporal modes of appearance’. Husserl makes it clear that these modes are not like ‘memories’ and ‘predictions’ as they are components of the phenomenological “now” – within the temporal fringe of the present. Therefore, according to Husserl, the ‘present’ has a threefold structure that includes both ‘retention’ and ‘protention’. ‘Retention’ refers to that which has immediately happened, and how we hold onto it; ‘protention’ refers to that which is about to happen, and how we anticipate it.

In order to explain this process, Husserl makes references to how we encounter music. Following his teacher Brentano (1988), he compares the structure of temporality to the structure of a melody. He argues that as we listen to the

²⁰ (Husserl, 1992)

²¹ My example

music note by note, we hold onto the larger musical structure—the melody—of which each note is a constitutive part.

When a melody sounds, for example, the individual tone does not utterly disappear with the cessation of the stimulus or of the neural movement it excites. When the new tone is sounding, the preceding tone has not disappeared without a trace. If it had, we would be quite incapable of noticing the relations among the successive tones; in each moment we would have a tone, or perhaps an empty pause in the interval between the sounding of two tones, but never the representation of a melody. On the other hand, the abiding of tone-representation in consciousness does not settle the matter. If they were to remain unmodified, then instead of a melody we would have a chord of simultaneous tones, or rather a disharmonious tangle of sound. (p.11)

He goes on to explain how temporality is produced.

If the stimulus disappears, the sensation also disappears. But then the sensation itself becomes productive: it produces for itself a phantasy representation the same or almost the same in content and enriched by the temporal character. This representation in turn awakens a new one, which is joined to it in a continuous fashion, and so on. (p.13)

This productive representation of original sensation is the basis for what Husserl calls “time constituting consciousness”. Temporality therefore emerges as a product of the interplay between retentions and protentions: the temporal appearance of an object, and temporality, are actively constituted, by the observer.

[...] what we are able to find and describe here as the phenomena of time constituting consciousness, of the consciousness in which temporal objects with their temporal determinations become constituted. (p.28)

Husserl's ambiguous references to music

Here I want to focus on Husserl's comparison between the two seemingly unconnected domains – experience of time on the one hand, and experience of music on the other. Is it a coincidence that the time-consciousness described here so closely resembles the musical paradigm alluded to by Husserl? And, if it is not a coincidence, what then is the relationship between the two? I want to suggest that Husserl's description of temporality, and his invention of

protention and retention, are actually based upon his generalised ideas about musical structures.

In confronting this issue it should be made clear that Husserl is remarkably vague about the kinds of music he asks us to imagine in this context. His references are ambiguous – he talks of melodies, tones and notes in an abstract sense without precise examples. In fact nowhere in *The Phenomenology of Internal Time Consciousness* does he refer to a specific tradition, genre, work, score, instrument, tempo, time signature or note. Gallager even asks “One almost begins to wonder whether Husserl ever listened to music” (1998, p.97).

As a consequence of this ambiguity, Husserl’s discussion plays upon assumptions about what music is – what constitutes a musical sound, the tempo of the piece, the relative complexity of melodic patterns, and so on. Similarly he assumes that the general structure of ‘melody’ is of a sequence of ordered events happening in the same order and with more or less the same dynamic emphasis each time it is played or heard. His ambiguity implies that the reader should share these assumptions as if they were obviously the case. And in this sense Husserl asks the reader to compare the *idea* of melody to the *idea* of time.

Initial suggestion concerning the relationship between time-constituting consciousness and melody in Husserl’s discussion

Ostensibly, Husserl aims to clarify his definition of the temporal by making reference to this general sense of ‘melody’. But equally, one could suggest a very different description of what is happening in Husserl’s analysis; one where temporality is actually modelled on, and in response to, his idea of what melody is. According to this alternative description, the melody itself has conditioned or promoted a specific sort understanding of temporality.

I want to suggest therefore that the two items—Husserl’s idea of melody and Husserl’s idea of time—already share some common conceptual features; and

that, within his argument, ideas about music and ideas about time are in some way cognitively combined.

Indeed Husserl's description of temporal events and their "running off" (p.20), the way an event "sinks into the past" (p.238), could equally apply to the note's volume envelope (specifically decay phase of a piano note as its energy vibrates within the body of the instrument and dissipates into the space that contains it). Similarly, his diagrams, used to illustrate his argument, could be easily mistaken for variations on a musical score that adheres to a linear timeline principle. "[...] in all these diagrams inner time is displayed as a line, a continuum of points flowing horizontally" (Larrabee, 1993, p.183)

I want to suggest that, in Husserl's discussion, musical structures provide a model according to which temporality is understood or interpreted, and vice versa. According to this view, music and time-constituting consciousness are functionally linked; and therefore music can be considered to be a fundamental component of time-constituting consciousness.

Husserl's analogy with visual perspective

If we assume that music and time-constituting consciousness share a functional connection (that they are somehow part of the same cognitive process) we should also assume that Husserl's use of "melody" to illustrate temporality is problematic – rather like endorsing a conception of space by making reference to an Italian renaissance painting (and the particular methods it uses in order to represent the three-dimensional universe within a two-dimensional canvas).

My suggestion is that Husserl's idea of melody relates to time in much the same way that linear first-person perspective relates to space. Husserl's idea of melody demonstrates the temporal, much like perspective demonstrates the spatial. Indeed Husserl also draws this analogy between spatial and temporal perspective.

[...] the process “contracts” as it sinks back into the past – a sort of temporal perspective (within the original temporal appearance) as an analogue of the spatial perspective. In receding into the past, the temporal object contracts and in the process also becomes obscure. (Husserl, 1992, p.28)

Linear perspective and its relation to the Western worldview

In order to evaluate Husserl’s suggestion that time-consciousness is a temporal analogue of spatial perspective, I want to question the assumption that linear first-person perspective is an impartial system that represents the three-dimensional space of the world within the two-dimensional space of the canvas.

Numerous studies (I cite these below) suggest that this is not the case. Rather than presenting a value-free copy of the world beyond the canvas, linear perspective in the visual arts is embedded within culturally specific notions of space, the self, and the world. Russell (1981) argues:

By taking as its first premise a single point of vision, perspective had stabilized visual experience. It had bestowed order on chaos; it allowed elaborate and systematized cross-referencing, and quite soon it had become a touchstone of coherence and even-mindedness. To “lose all sense of perspective” is to this day a synonym for mental collapse. (Russell, 1981, p.31)

Similarly Kuhn (1990) suggests that Renaissance art provides an “a priori pictorial space” that emphasises an “extraordinarily thorough conformity to the frontal format” (Kuhn, 1990, p.129); that “The prestige of the frontal format surely had to do instead with its aura of architectural determinacy; we are in designed space, not found space.” (Kuhn, 1990, p.130)

And, tracing the development of linear perspective, Wright (1983) describes explorations of a number of grid based systems, dividing space into units of equal and repeatable volume; placing an emphasis therefore on the geometricizing of space.

From the above one can argue that linear perspective maintains the following principles: a singular viewpoint, rule-governed, ordered, coherent, controllable, rational (even-mindedness), goal directed in terms of designed (as opposed to

found) space, the notion of a spatially fixed subject (conforming to frontality). In doing so it reinforces the sense of separation between ourselves and the world (a world view that I challenged in the previous chapter). First person perspective does not merely suggest: 'this is where you stand as an observer in relation to this space, the objects it contains, and the events depicted', it actively demonstrates this position with the participation of the viewer.

We can see therefore the values implicit within this system, closely resonate with the metaphysical worldview (ordered, coherent, designed), and the Cartesian subject (the subject as fixed and remote, rational viewer of the world, engaging with it in a goal-driven manner, central and singular).

Such arguments propose that linear perspective is value-laden system; it constructs a particular depiction of space, one that is bound into a particular world-view. Furthermore, it necessarily also constructs a spatially identifiable position outside the canvas from which the viewer encounters the painting's contents. Linear perspective therefore not only structures our understanding of the space shown, but also our wider experience and understanding of ourselves as distinct points in relation to the extending space around us. The mathematician Lahr calls this imposed reality:

An imposed reality is something we take for granted in the world, a model for some part of our experience that is not necessarily true or false but helps us to think about the world in an ordered fashion. (Lahr, 1997)

In a statement that substantiates Lahr, the anthropologist Elkin writes:

For persons of European descent, space and time are our space and our time, that is concepts developed in "western" thought. But we are apt to assume that they are essential features of the cosmos rather than categories of thought which enable us to interpret the world as a system in accord with our experiences and purposes. [...] Other peoples with different cultural heritages, with different experiences and purposes, may conceive of space and time differently from ourselves. They do, as can be illustrated from, amongst others, the American Indians and the Australian Aborigines. (Elkin, 1969, p.85)

Relating this to Husserl's references to melody in relation to time-constituting consciousness.

Following the discussion of perspective, and how it is both ‘in and of’ a particular world-view, I want to show how the melodic structure to which Husserl refers is similarly implicated in the same world-view.

The musics to which Husserl alludes (recall he never actually describes specific notes or sounds) presumably include the ordering of distinct notes over a given time frame; these are planned in advance and stepped through one event at a time; and perhaps played in response to a written score or some sort of internalised pattern. In this sense Husserl’s melody is ordered in a temporal domain, in much the same way that spatial objects are ordered in a spatial domain according to the techniques used in linear perspective. Musical events emanate from the future (everything to the right hand side of the now-note as written on a score); through the present (the note that is actually happening); and into the past (everything to the left hand side of the now-note).

Clearly this ordering is already associated with a conception of time as a linear, one-dimensional, one-direction ‘flow’ between past and future. It promotes the view that time is something that passes—the passage of time—as opposed to temporality as being something inherently present. Within this particular framework emphasis is placed on an infinitely narrow, but overwhelmingly important, ‘now’ point – the point where one is currently ‘located’ within the overall musical or temporal landscape as it unfolds. This listener as a distinct entity is ‘here’.

As such this framework constitutes the listener in a particular relation to the narrative or sequence of events, placing the listener in an identifiable and stable moment within a temporal ‘flow’. This establishes a temporally fixed ‘first-person-perspective’ in relation to an ordered, coherent, planned, and typically predictable temporal landscape. In doing so it presents an inherently teleological framework that—much like spatially linear perspective—simultaneously demonstrates the authority and authenticity of the Cartesian subject.

Just as perspective is a description of space, the relation of spatially ordered objects within it, and our position as observer; so too Husserl's use of melody offers a particular, culturally specific description of time-consciousness, the world and the self. This depiction of time is similar (as Husserl suggests) to linear spatial perspective – linear temporality that extends outwards in two directions (the past and the future) from the subject's now point. Shortly we will see how this "Ordinary-Linear Time-Consciousness" contrasts with "Patterned-cyclical time-consciousness" (TenHouten, 1999)

Summing up Husserl's use of melody

Earlier in this discussion I said that I wanted to provide a description of the relationship between music and time, and promote the view that the two are in some way cognitively linked. According to this description, music itself is a component of time-constituting consciousness. One could argue that the development of Husserl's argument is not at odds with the description I promote. Indeed his analysis could be read as one not simply explained by reference to music, but fundamentally formed in reference to music. On my reading, what *On the Phenomenology of the Consciousness of Internal Time* asserts more than anything else, is the complex mesh of relationships between music and time at play in Husserl's thought, and his attempts to unravel and account for these. Yet Husserl never makes the (small but significant) step from (a) "we can use music to illustrate time" to (b) "we use music to articulate time".

To argue that music in itself is a way of thinking about time is not such a radical position. Recall for example Clark & Chalmers discussion of extended cognition (1998) in the previous chapter, according to which we could suggest neuronal and musical structures combine to facilitate cognitive activity. In my view therefore, Husserl's mistake is to compare temporality to a system that in itself already serves as a framework within which our experience and understanding of temporality is constructed. He asks us to think about time by comparing time to something that is already a way of thinking about time.

Other musics and temporalities

[...] members of a society share a common temporal consciousness; time is a social category of thought, a product of society [...] Collective-time is the sum of the temporal procedures which interlock to form the cultural rhythm of a given society. (Hassard, 1990, p.2)

However, as most contemporary musicians know, musical structures are not universally built from sequences of notes, played in a predetermined manner and in a particular order²², anymore than our experience of time is always of a series of events happening around an infinitely narrow now-point wedged at the centre of a vast continuum between past and future.

Irish folk musics that consist of rapidly repeating phrases with increasing speed – a chaotic sonic vortex; Tibetan music with indefinitely sustained tones; and in the world of contemporary music Ligeti's *Continuum* (1968) presents a series of notes the speed of which hovers on the border of the performers ability to play and the audiences ability to temporally distinguish. Do these constitute different temporal modes, different experiences of temporality?

For Heidegger the temporal is not a reducible thing that exists independently of our experiences of it. Throughout his major work (Heidegger, 1962) and in a colossal amount of supplementary writings Heidegger promotes the view that the temporal shows up differently, and in various forms, throughout our encounters with the world and the objects it contains.

Time is not something that happens outside of us, a kind of receptacle of being; we ourselves are time. The processes of the world are encountered in time.
(Heidegger, 2002, p.172)

Our conscious experience of temporality, then, exists on the level of ideas, as symbolic formulations consisting of words together with images, with sense-perceptions, and with our habitual response models of the world. (TenHouten, 1997, p.275)

²² Even if music can be transcribed in a linear fashion, it does not follow that it is constructed, encoded, learned or inherited within that paradigm.

Drawing from this position I want to argue that different musics—forms, styles, traditions, sounds and so on—construct distinct temporal modalities. A particularly interesting example is found in Australian Aboriginal musics and its relation to Aboriginal cosmogony. A principal point of agreement in much writing on Australian Aboriginal culture is the suggestion that Aboriginal thought places a priority on space instead of time. Swain (1993) contends that Aboriginal ontology is one where being is understood primarily in terms of “place and space” as opposed to time.

Rather than prejudicing the issue with the word 'time', I suggest it is best to state that the Aborigines operate from an understanding of rhythmed events. The semantic clarity is important in order to avoid giving time an unfounded ontological autonomy in Aboriginal life. [...] In the popular Western view, time still, so to speak, ticks on even if nothing occurs; its emancipation from events is ensured by its own subjugation of an ongoing numbered measure. But in Aboriginal thought there is nothing beyond events themselves. This is entirely apparent in their cosmologies, which lack any reference to ultimate pre-event origins. For Aborigines, there is nothing more fundamental than the statement: events occur. (Swain, 1993, p.19)

There is no first cause, original world-stuff, moment of origin or co-ordinated emergence. [...] Rather than a world creation, Aboriginal narratives affirm a multitude of independent place-shaping Events. [...] Aboriginal ontology rests upon the maxim that a place-being emerged, moved and established an abode. (Swain, 1993, p.32)

[...] the Aboriginal spatial order has in fact left no room for the emergence of temporality as a principle of being. Rather [it] must derive from the 'affirmation of place'. (Swain, 1993, p.38)

This assertion is validated by clinical studies, Davidson and Klich (1980, p.569) report, “a preference for spatial over temporal order in free-recall tasks” of Aboriginal ‘desert’ children aged between 9 and 16 years. Similarly, TenHouten (TenHouten, 1999) suggests that Australian Aboriginal thinking patterns do not feature “linear” information processing, and suggests “visuospatial” rather than “temporal” orientation. Drawing from this he develops the idea of “Patterned-cyclical time-consciousness” which is contrasted with “Ordinary-Linear Time-Consciousness” typically associated with a Western worldview. He defines and compares seven features of each mode of time-consciousness as follows.

<u>7 Features of Ordinary-Linear Time-Consciousness</u>	<u>7 Aspects of Pattern-Cyclical Time-Consciousness</u>
L1. Linear, time as a single dimension	P1. Dualistic, split into two levels of reality
L2. Separation of past, present, and future realities	P2. Fusion of past, present, and future present, and future realities
L3. Regularity, continuity, and homogeneity	P3. Irregular, discontinuity, and heterogeneity
L4. Clock-orientation and calendar-orientation	P4. Event-orientation and nature-based orientation
L5. Diachronic ordering of events: priority, simultaneity, posteriority	P5. Synchronic ordering of events: cyclical, patterned, oscillatory
L6. Quantitative: numerical measurement; an invariant anchor or zero point	P6. Qualitative: non-numerical measurement; now the anchor point
L7. The experience of time as a series of fleeting moments	P7. The experience of long duration

Table 1, Conceptual Models of Ordinary-Linear and Patterned-Cyclical Forms of Time-Consciousness, TenHouten (1999).

A particularly relevant feature of “Pattern-Cyclical Time-Consciousness” is the difference in how one experiences time. In “Ordinary-Linear Time-Consciousness” time shows up as “a series of fleeting moments” where time-passes... the passage of time. Whereas, in “Pattern-Cyclical Time-Consciousness”, it shows up as an experience of “long duration”... the temporal as that which is indefinitely present within the phenomenological now.

Elkin (1969) suggests the Aboriginal concept of The Dreaming is central to this extended temporality. It is simultaneously “here and now” (Elkin, 1969, p.93) providing the “grounding or conditions of existence” (Elkin, 1969, p.93).

However “The concept is not of a ‘horizontal’ line extending back chronologically through a series of ‘pasts’, but rather of a ‘vertical’ line in which the past underlies and is within the present, the “eternal now” (Elkin, 1969, p.93).

Elkin’s description of the *eternal now* corresponds to both TenHouten’s (1999) emphasis on temporality as *extended duration* (as characteristic of Pattern-Cyclical Time-Consciousness) and perhaps also to Kramer’s description of *vertical time* in music (Kramer, 1988) as the absence of linear process. The eternal now is in stark contrast to the infinitely narrow now (the boundary between the past and future) present in Ordinary-Linear Time-Consciousness: the indefinitely-compressed phenomenological now of linear time consciousness, as opposed to the indefinitely-expanded phenomenological now of pattern cyclical time consciousness.

How does this worldview correspond to Aboriginal musics? In one (albeit rather simplistic) sense, the notion of “eternal now” is clearly embodied in the extended tonal music of the didgeridoo, made possible thought circular breathing techniques. Although the sound is subject to temporal modulation, it is a continuous extended tone of extremely long duration, and thus shares some of the features associated with Pattern-Cyclical Time-Consciousness. One might agree with Rose (2000) who suggests that temporality, being present in the indefinite now, in this context literally “pours thought the person” (Rose, 2000, p.287).

Sound example 1 - *Didjeridu Solo*, (Laade, 1993)²³

Given that this music is a single tone, it could not in fact be accommodated by Husserl’s model of individual notes forming a large whole.

²³ Sound examples can be found on the flash drive submitted with this document in the “sound examples” folder. For more information refer to appendix 2.

In another sense, the timings present in *Antjali Song - Mimic Entertainment Dance* appear (to my Western ears at any rate) rather detached and extemporaneous. These events do not follow a strict temporal grid of equally spaced events of related duration, nor are they placed along side the hypothetical clock of western temporality that “ticks on even if nothing occurs” (Swain, 1993, p.19). The flow and variability of this temporality seems to imply what Swain has called the fundamental statement that “events occur” (Swain, 1993, p.19). These events merely happen, they don’t march in a military style from the future to the past, announcing their arrival like the considered, meticulous or grandiose musical structures of the Western tradition... they simply occur.

Sound example 2 - *Antjali Song - (Mimic Entertainment Dance)* (Laade, 1993)

Rose (2000) attempts to show how the Aboriginal priority of place over time, and the notion of an ‘infinite now’ are encoded within cultural practices including dance and music. In the context of what she describes as a move from “geometric” time to “embodied” and “geographic” time she writes:

The poetics of time, its patterns, waves, and interlocking rhythms work with the politics of correct performances, to transform cosmogonic potential into living action. (Rose, 2000, p.294)

Time, rather than being rendered static or absent, becomes experientially and overwhelmingly focussed, present and shared. The person flips from being an actor in time to becoming a heartbeat of time. (Rose, 2000, p.295)

This brief description of Aboriginal cosmogony and art aims to demonstrate the non-universality of (a) the musical framework alluded to by Husserl, and (b) the character of temporality that he has aligned with it.

Clarke’s critique of Husserl’s account of musical temporality.

Clarke (2011) has shown that Husserl grossly simplifies the temporal structure of Western musics. He points out for example that Husserl’s description of music assumes that one event stops before the other starts, whereas this is not

universally true of musical structures. Similarly he offers examples that demonstrate how musical phrases are not only “bonded” (p12) in terms of “temporal congruity” (p12), but also through “similarity and equivalence” (p12). He suggests that in this sense retention and recollection “interact” (p20) in a process that “radically expands the temporal depth of field” (p17). This re-presentation is “imbued with the cumulative, on-going presence of all the elapsed piece behind it” (p17). Accordingly Clarke suggests that Husserl’s analysis of temporality in music as distinct note-following-note is inaccurate.

Although Clarke is effective in showing how Husserl’s references to music miss out the multi-layered temporal structures fundamental to the organisation of Western musics, we should not forget that Husserl is not primarily concerned with a description of temporality in music, but temporality as it appears to us. In this sense Clarke’s analysis does not necessarily unpick Husserl’s argument. On reading Clarke’s critique we should remember that Husserl is not concerned with the structure of music, any more than the person who points out that an unbelted rear-seat passenger in a car (on impact with another car) is propelled forward with the force of a charging elephant, is not primarily concerned with the weight and speed of elephants in general.

However if we consider—as both Clarke and I do—that music *articulates* time (in my terms “music is a technology for constructing an experience of time” (2010b)) then the circularity in Husserl’s discussion becomes evident; it shows how his culturally specific encounter with, and analysis of, temporality is incorrectly declared as somehow acultural or transcendent. Although both Clarke and I critique Husserl from different angles, with different objectives and motivations, Clarke’s critique of Husserl’s description of musical temporality, and my critique of the function of music within Husserl’s analysis of our encounters with temporality are not incompatible. For example Clarke’s analytic work on specific musical structures substantiates my critique of the function of musical examples within Husserl’s discussion of time-consciousness. For example, identification of a “teleological impetus” (p. 14) present in the

temporality of western musics reveals corresponds to my reading of Husserl's temporality as derived from those structures.

Reference and relevance to works contained here

How does the above discussion relate to the work contained in this portfolio?

I want to stress that the works contained here are not intended to be an expression, exploration or demonstration of the themes and ideas I have just discussed. Instead these theoretical interests developed in parallel with the works themselves, often in response to issues encountered as a result of making works.

For example I initially began to consider the relationship between music and temporality during the production of the audio-visual collection *Attack on Silence*. Typically this collection features very long tonal sections where change, although constant, is often barely identifiable. While making the works, my feeling was that something quite unusual was taking place in terms of change, time and attention. In particular the use of sound in this context, which explored different amounts of tonal change and stasis, produced unusual temporal artefacts²⁴.

Similarly, during the development of the installation *Factoid #3*²⁵ I began to consider the notion of continuous movement of a balloon and how this implied a continuous flow of time and the continuity of the self. The use of stroboscope and synchronised sound utterly disrupts this sense of flow and continuity. If we remember the initial example of a skipping rope appearing to have a continuous motion, in this case the motion is reduced to a series of unrelated and unpredictable now points.

²⁴ See chapter three of this document concerning audio visual works

²⁵ See chapter six of this document concerning exhibitions including the piece Factoid#3

In other cases the notion of time and how it is present within musics was a concern from the very beginning. In the development of both the microtemporal works and the works responding to house musics²⁶, the technologies involved occupied two very distinct temporal and technical paradigms. On the one hand timeline-based methods of composition, implemented in Digital Performer²⁷ closely resembles “Ordinary-Linear Time-Consciousness” described by TenHouten (1999), whereas the visual-spatial programming metaphor offered by MaxMSP could be said to more closely resemble the features of “Pattern-Cyclical Time-Consciousness”.

The following table derived from TenHouten’s “Conceptual Models of Ordinary-Linear and Patterned-Cyclical Forms of Time-Consciousness” is intended to illustrate this correspondence. It is intended to show how some features of the two modes of time-consciousness relate to the two compositional technologies used in production of this portfolio.

Technology Digital performer	Technology MaxMSP
Paradigm Timeline	Paradigm Spatial programming environment ²⁸
Mode of Time-Consciousness Ordinary-Linear	Mode of Time-Consciousness Pattern-Cyclical
L1. Linear time as single dimension	P1. Space as two dimensional
L2. Separation of past, present, and future	P2. Past, present, and future not represented
L3. Regularity continuity	P3. Irregularity, discontinuity
L4. Clock orientation	P4. Event orientation
L5. Diachronic ordering of events: priority, simultaneity, posteriority	P5. Synchronic ordering of events: cyclical, patterned, oscillatory

²⁶ See chapters four and five of this document

²⁷ Digital Performer is an audio and MIDI editing environment produced by Mark Of The Unicorn (MOTU) based in Cambridge, Massachusetts.

²⁸ Although MaxMSP is often referred to as a visual programming environment I suggest it is more accurate to consider this as a spatial environment as its interface clearly employs a spatial metaphor.

L6. Metrical measurement, time divided into equal and related segments; an invariant anchor or zero point	P6. Variable measurement; now as the anchor point
L7. Time as a series of ordered moments	P7. The infinite now, events just occur

Table 2, Comparison between modes of time consciousness and music softwares.

The table illustrates how the timeline method found in much music composition software²⁹ is both derived from and sustains the features present in “Ordinary-Linear Time Consciousness”. Here time is divided into past, present and future; time flows at a constant rate, in one direction; it has a determinate now point – the first person division between the past and the future; events are predetermined, regular, and repeatable; time is divided into equal and related parts.

Compare this to features of the spatial programming environment. Here processes assume a spatial character; time (and its division into past, present and future) is not a necessary feature of this environment as it is with the timeline paradigm; here events merely occur (Swain, 1993).

At P6 I propose the idea of “variable measurement” a feature that I explore throughout a series of microtemporal works³⁰. Here the division of time into regular and related temporal units is rejected in favour of divisions of indeterminate duration. Although this feature is possible within timeline environments (as explored by my “works relating to club musics”), these are certainly not conducive to works exploring this characteristic.

²⁹ For example Logic (Apple), Cubase (Steinberg) and Digital Performer (Mark Of The Unicorn).

³⁰ Discussed in the chapter four concerning “Microtemporal Works”.

Finally, characteristic P7 suggests that—unlike L7 which divides time into a series of moments moving between past and future—the now point is simply immanent not transcendent; not flowing from either the past or future; here the present is all that is the case.

To sum up, my view is that a musical structure is a temporal structure. Hence I would suggest that different musical structures—different treatments of time—necessarily promote different temporalities: structures that might or might not foster beliefs about time and ourselves in relation to it.

Summing up

It would be extremely naïve of me to assume that works contained in this portfolio radically undermine a common temporal consciousness shared by members of our society (Hassard, 1990). But, nonetheless, one aim is to offer unfamiliar treatments of the temporal field within music. This treatment should not only be considered as an exploration of musical structure, but also as an exploration of how we encounter and understand the temporal, and its function as a component of social experience. This is primarily visible in both the “microtemporal works” and “works relating to club musics”, where temporality is radically repurposed – deployed as a means of critically confronting assumptions about rhythmic structures in relation to social activities.

Finally I want to recall Husserl’s description of how melody might sound without the present of protention and retention:

[...] we would be quite incapable of noticing the relations among the successive tones; in each moment we would have a tone, or perhaps an empty pause in the interval between the sounding of two tones, but never the representation of a melody. On the other hand [...] a melody we would have a chord of simultaneous tones, or rather a disharmonious tangle of sound. (Husserl, 1992, p.18)

Ironically these features clearly apply to much of the work contained in this portfolio. *Multistability* (one of a series of microtemporal works), with its emphasis on the space between notes as a compositional strategy, undermines

the sense of temporal flow by breaking tonal landscape into a series of disconnected occurrences. *Attack on Silence* (an audio visual piece) with its temporally extended tonal transformations where change is often imperceptible yet constant. The former breaks up time into a series of temporally isolated musical nows of indeterminate duration, the latter grossly expands the now, removing any formal reference of what might come before or after.

Commentaries

3. Audio-visual works

The following aims to document and contextualise a series of audio-visual works made between 2008 and 2011. In these works both sonic and visual materials are computer generated, and are characterised by highly formal arrangements of tone, colour and shape with minor amounts of change. The document describes the evolution of the project, offers a technical account of how works were developed, and gives a critical analysis of the themes with which the series deals.

This series began when I was invited to screen work at an event in Hong Kong.³¹ The programme note included at the event referred to this piece as follows:³²

The series draws upon ideas from sacred geometry, the role of sound and colour to engender meditative states and the technology of psycho-physiological control. Whilst experiencing the works, the audience member is unclear of the nature of their response: are they engaged in some kind of spiritual release or intrusive technological intervention? (Fell, 2008)

The work consisted of a square image made up of 8x8 cells projected in the centre of the screen on a black background. The piece lasted for 11 minutes 25 seconds. Throughout this time 14 different sets of 8x8 cells were displayed each with synthetic sound. Here, the sound and image are not bound together in any kind of mathematical relationship; they are simply presented along side one another.

³¹ POV curated By Sunshine Wong and Matthew Steel.

³² Sadly the website on which this programme note was documented is no longer online so I include the entire programme note here.

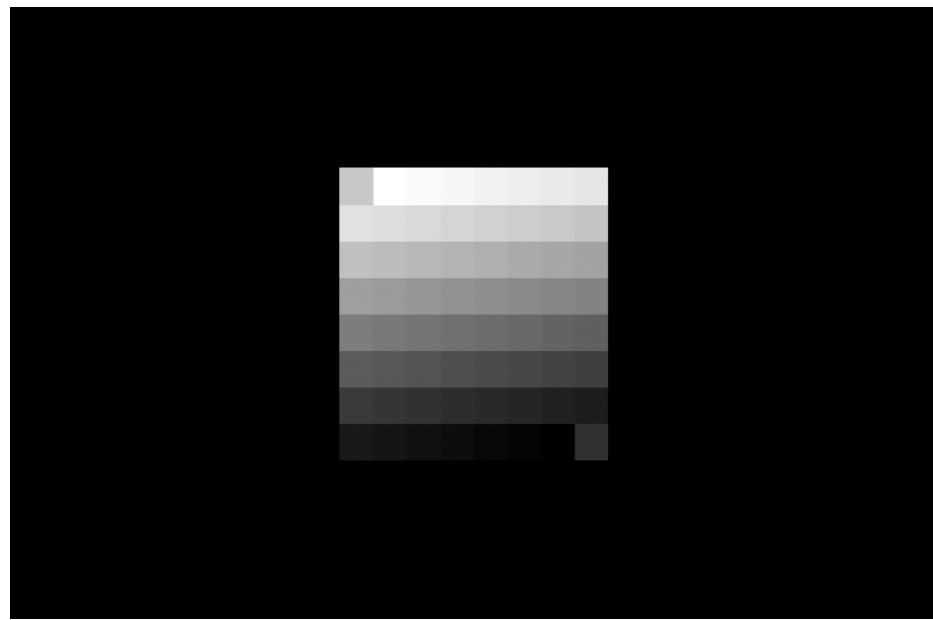


Figure 5, Still from Attack on Silence POV edit, 2008.

My intention was to create a work that presented the audience with static audio-visual formations, lasting for several minutes without change. Here the format of the image presented a number of possible options that were deliberately not acted upon; presenting a work that established a self-consciously ‘dormant’ system. Here cellular change is resisted; instead simple cuts, from one image to the next, take place. My intention therefore was not only to present static combinations of both sonic and visual, tone and colour combinations, but to do so in a way that would foreground the lack of dynamic change, to place the lack of dynamic change centre stage as it were.

I considered this to be a critical response to the prevailing trend among my contemporaries. A notable example of this trend were the audio-visual pieces by artists associated with the German record label Raster Noton³³ – including works by Carsten Nicolai, Olaf Bender and Frank Bretschneider. Such works typically include fast moving, highly dynamic graphic images that are closely synchronised to electronic rhythms. Here computer generated images (typically geometric forms) are rendered in response to sound and music. Such works to promote a highly dynamic experience, whereby the audience is swept along

³³ Based in Chemnitz Germany, founded 1996

with the flow of the work. The live performance of *Robotron* by Signal 2007³⁴ (a collaborative project that includes Carsten Nicolai, Olaf Bender and Frank Bretschneider) is a primary example of this approach, with fast moving rectangles pulsing in time to the tempo of the music.

My aim with these works was to promote an antithesis to this: an object that would embody the absence of any temporal flow or engaging journey: to create a sense of tension rather than excitement. In this respect I feel the audio visual works discussed here have more in common with Structuralist film practices; a move from “Increasing complexity-consciousness” to “a more formal determination of subject and technique” (Curtis, 1971, p.155). In particular I was influenced by the work of Michael Snow, whose film *Wavelength* (1967) principally features a 45-minute zoom into a picture fixed on a wall in front of a static camera. While making the works in this series, I was more concerning with this kind of tension, than the highly dynamic generative works made by my contemporaries.

Development of the works

The image component was developed as follows: In June 2007 the Glade Festival, a dance music event based in Thatcham UK, invited myself and Mat Steel to curate, produce and manage a strand of music as an alternative to the main musical programme which largely consisted of house and techno musics.

In response we erected a large geodesic dome structure within which were suspended 8 Meyer UPM-1p loudspeakers³⁵ and 8 Pixelline³⁶ 1044 LED lighting fixtures. I developed a computer-based system within the MaxMSP programming environment to control the lighting fixtures and generate 8 channels of sound. The lighting control section of this used a matrix of 8 x 18 cells, each controlling the red, green and blue values of a square within the 8

³⁴ Raster Noton 2007

³⁵ Meyer Sound Berkley California.

³⁶ PixelRange Worcester UK.

fixtures. In previous experiments I had specified these values by drawing curves into a MaxMSP interface object. However, on one occasion my drawing was not accurate and I missed the start and end pixels. This resulted in the following image.



Figure 6, The resulting matrix.

I found the appearance of this form aesthetically appealing, and in response I began work developing a system that would generate spreads of colour of 64 cells (8x8). These were specified by hue, saturation and lightness as opposed to red, green and blue, enabling me to create spreads of hues, saturations and lightnesses. This system also changed the settings of the first and last cells (the top left and bottom right); this might include setting saturation to maximum, inverting the hue, or setting the saturation and lightness to the same settings as the background (effectively rendering them invisible). A corresponding process was adopted for the sound, with 16 sine wave oscillators, the frequency of each modulated by a further 16 sine wave oscillators. The frequencies of each oscillator was determined by a spread of values, with the amount of modulation and ratio set manually for each pair of oscillators. I have called this method for image and sound synthesis 'type B'.

Soon after type B I began work on type A. This was more closely related to the original LED lighting works I had developed for the Glade Festival. Here the 144 cells of the matrix used to control the lights were simply displayed onscreen as a bar of colour.



Figure 7, Type A, manually drawn colour curves.

The sound for type A included 16 oscillators with settings for fundamental frequency and the intensity for 16 harmonics for each oscillator. Settings for the oscillators and matrices were stored in a database and interpolated at various rates to create sweeps of sound and colour. I realised however, that in terms of the image, this actually resulted in nothing more than a primitive cross fade. Consequently I began work to develop a way of filling this matrix using mathematical expressions so that interpolations created “morphing” effects. The most successful was a Gaussian curve. Here I specified values for peak, trough and width for red, green and blue channels. Resulting in the following kinds of image:

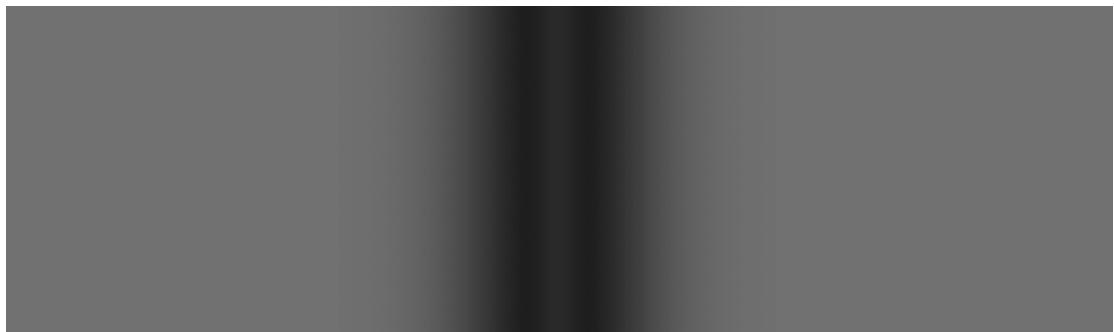


Figure 8, Type C, colour curves generated by a Gaussian function.

I refer to this as ‘type C’. The sound used in type C is exactly the same as type A: 8 channel harmonic synthesis. I found that when Gaussian curves are used to fill a matrix with colour curves, interpolation between values does not result in a cross fade of pixels. Instead curves spread out and disappear; the central band can change from very defined to blurred and almost indistinct.

I also started to experiment with values where the peak was lower than the trough, meaning the central band could be negative and even black (when the

peak value for red, green and blue were all set to -1). At this point I decided to present works on a mid grey background.

At this stage I also noticed other phenomena relating to perception of sound and image within these works. It became apparent that these Gaussian composites were quite confusing to look at; often the image becomes blank and, as one's eyes dart from left to right, perceptual artefacts emerge; a consequence of the interaction between the eye's after image the onscreen image itself. I also noticed that changes in sound were often much more apparent than changes in image. At the end of a long transition lasting ten minutes, one is immediately aware of the stop or end as the frequencies fix their positions in relation to one another. Also, in terms of perception of change, I felt there was 'too much' change in the sonic component of the work. In response to this concern (of too much perceived sonic change in relation to perceived visual change) I did the following: In one case the duration of a transition was five minutes. The visual parameters were left intact. The sound parameters at 2 minutes 15 seconds and 2 minutes 45 seconds were noted and placed at the start and end points of the transition. This method effectively used the central 30 seconds of audio and stretched it out to the entire five minutes.

Towards the end of 2008, after several screenings and performances of these works, I recorded excerpts of type A, B and C and compiled these for a DVD release on Line Imprint³⁷.

During the making of the DVD I became aware of some problems: the pieces that used hand drawn colour curves (Type A) were rather low resolution – having a horizontal resolution of 144 pixels; this was also the case with type C, the Gaussian curves. Here, due to a drawback in MaxMSP environment that limited list length to 256 items, the horizontal resolution of the image was 256. A further problem was the compression format used in video DVDs; this resulted

³⁷ "Attack on Silence", Line 037, 5.1 Surround NTSC, Edition of 1000.

in visible artefacts, especially apparent on smooth gradients – precisely the kind of material I was working with.

To resolve this issue I decided to prepare high definition versions of the works that could be distributed in a format with multichannel high definition sound, and high definition image with a suitable codec. With the assistance of Theo Burt³⁸ I implemented a version of the Gaussian curve method by directly specifying an expression within Jitter³⁹. Here I was able to fill a matrix of much larger size with the three curves (currently I have experimented up to a horizontal resolution of 20,000 cells). Given this development, it became possible not only to perform in a high definition environment (according to the projectors resolution), but also to record and render high definition movie files with multi channel 96kHz 24bit sound.

A further and significant advantage of working at very high definitions is the possibility to work with curves and diagonals. In the low-resolution versions of these works, I was restricted to plotting lines vertically or horizontally. The new high definition implementation enabled me to develop a ‘radial’ version of type C which was first shown at an event I called *Isomorphism and Totality* in Sheffield UK 2010⁴⁰.

³⁸ Burt is a fellow composer and programmer based in York (UK).

³⁹ Jitter is a set of extensions for the MaxMSP programming environment for the generation and processing of visual materials.

⁴⁰ Isomorphism and Totality was the name of an event I curated that took place in Sheffield at the Showroom Cinema Screen 3 on the 26th of April 2010, part of the Sensoria Festival of music and film. The evening was divided into two sessions, in the first session I invited Theo Burt to perform his piece “Colour Projections” and Ernest Edmonds (from the University of Technology Sydney) to give a short talk and perform a collaborative work he and I made entitled “DC Release”. After a short interval I performed a new ‘radial’ version of my work ‘attack on silence’. The works were shown on a high definition Christie Projector with a native resolution of 2048 x 1080; works were rendered in real time at this resolution. An 8.2 channel sound system was installed for the event with 6 x Meyer MM4 (passive) units, 2 x Meyer UPM-1p and 2 x USW-1p Subs. These were arranged around the perimeter of the seating area with the two UPM-1p units at the front left and front right, a USW-1p centre front and a USW-1p centre rear. For my solo piece sound was generated at 96kHz 24bit. The piece lasted approximately 45 minutes.

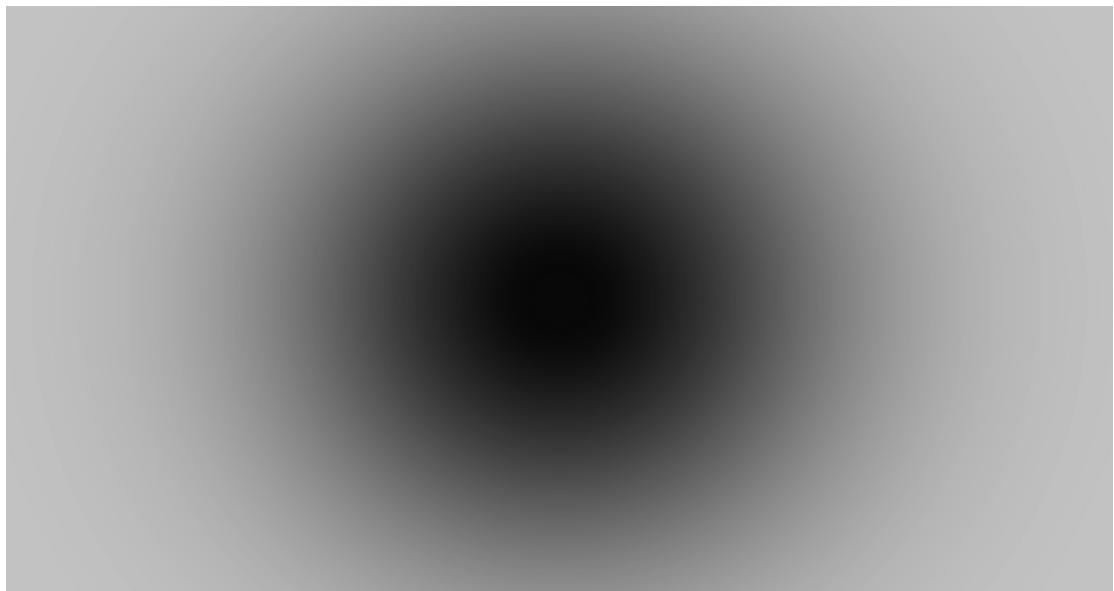


Figure 9, Screenshot of the hi-definition radial system.

A press release for the event included the following text:⁴¹

Three artists working with computational processes present a programme of works exploring exceptionally close correlations between digital sound synthesis, colour, geometry and time. The works performed and presented here demonstrate a preoccupation with the interplay of hypostasis and instability, intentionality and uncertainty, experience and understanding, played out within an extreme temporal field. (Fell, 2010a)

The performance at *Isomorphism and Totality* was a milestone in the development of this series in several respects. It attained a level of production that had previously not been possible (use of high definition image, multichannel sound, extremely high quality digital cinema projection, audience comfort). Within this setting I was able to explore the themes present in series from its beginning and encountered thought-out the project's development. Next I offer an explanation and analysis of these themes.

Thematic development

In the following I want to address how my critical concerns shifted through four distinct phases of the work: from (1) the disjunction between discourses

⁴¹ Again the original document is not available online so I include the entire text here.

surrounding spiritual practices and technological control; to (2) the notion of ‘cueing’ the audience; (3) the interplay between technical and perceptual process; and finally to (4) temporality and boredom.

(1) On the disjunction between narratives of spiritual practices and technological control.

In press releases, curatorial statements and programme notes I have frequently described the series as an exploration of sacred geometries and the use of sound to engender altered states of consciousness. My interest in these themes can be traced by to encounters as a teenager with the writings of Aleister Crowley (1939), *The Tibetan Book of the Dead* (1960), the film *THX1138* (1971) written and directed by George Lucas, and the activities and interests of a group of musicians and artists based in Sheffield (UK) known as The Anti Group. I will briefly describe each of these:

1. *Crowley*: In Eight Lectures on Yoga, Crowley discusses ‘Dharana’ or ‘control of thought’, instructing the reader to “Constrain the mind to concentrate itself upon a single simple object imagined [...] a black oval; a blue disk; a silver crescent; a yellow square; a red triangle” (Crowley, 1939, p.35). Here Crowley refers to the five tattva found in Indian philosophy which represent components of reality⁴².

2. *The Tibetan book of the Dead*: This describes the use of sound and vibration to control and destroy entities, or to promote altered states of being. “Each organism exhibits its own vibratory rate, and so does every inanimate object [...] When this rate of vibration is known, the organism or form can, by occult use of it, be disintegrated” (1960, p.220). At the age of 17, when I first encountered Tibetan music, it appeared to embodied these principles: the singing bowl and the prolonged tonal frequencies of chanting and the thigh bone trumpet offered a sonic diagram of the world quite unlike the one promoted in Western musics;

⁴² The five Tattva originate in Indian philosophy and are considered to represent five underlying aspects of reality.

here (it seemed to me at that time) there was no place for narrative, emotion or the communication of meaning, but sheer physicality and presence of sound.

3. THX1138: In Lucas' science fiction film 'THX1138' the central character is subjected to a 'mind lock', apparent to the viewer as a sustained electronic tone, rendering the subject immobile. Fourier analysis of the Mind Lock reveals principle frequency components at 48hz, 89hz, 124hz, 160hz, 185hz, 210hz, 1927hz, 2039hz, 6180hz, 8677hz and 15881hz. For me as a teenager, this example presented a rather more disturbing, but equally fascinating, picture of technologically enforced trance states.

4. The Anti Group: To a large extent the above themes were of interest to the 'Industrial' music movement of the early 1980's⁴³. The Anti Group (also known as The Anti Group Communications or TAGC) was a Sheffield based group working with music, sound and video, primarily active from 1985 until 1989. Their record *Meontological Research Recording* series (Record 1, Sweatbox 1987) is of particular relevance. Here 'Meontage' is described as the science of non-being and was a play upon the French montage referred to in experimental cinematic practices and theory. Working with materials and themes drawn from The Tibetan Book of the Dead, popular culture, the visual arts, cinema and so on, the group's practice was promoted as an exploration of how new technologies could uncover and extend the use of patterns (primarily in sound but also visually) found in ancient systems to alter and control states of consciousness. In their terms to "directly address the central nervous system" (TAGC, 1990).

In the work described here I have no interest in the use and combination of sounds, shapes and colours to engender altered or radically unusual states of consciousness; and equally I have no expectation that this will or could happen. My concern is to contrast the language and imagery surrounding these practices and create a work that creates a tension between contrasting descriptions of

⁴³ Industrial music was a term, derived from the record label "Industrial Records" and included the work of Throbbing Gristle, Cabaret Voltaire and others.

such phenomena – a spiritual opening of the mind on the one hand, and technological manipulation of the brain on the other.

For example the mandala, which is used in both Hinduism and Buddhism to aid meditation and induce trance states, is considered to promote correspondences between the mind, nature and universe; enabling the user to enter otherwise inaccessible areas of the mind and thus achieve a oneness with the cosmos. The British psychologist David Fontana suggests that the mandala enables the users “to access progressively deeper levels of the unconscious, ultimately assisting the meditator to experience a mystical sense of oneness with the ultimate unity from which the cosmos in all its manifold forms arises.” (Fontana, 2006, p.10)

Ultimate Reality is at once Absolute and Infinite, the source of all being, of all consciousness and life. Itself beyond form, it speaks to mankind through revealed forms which, while externally bound and limited, open up inwardly towards the Boundless. Through revelations of this Word or Logos come into being sacred traditions which although outwardly different are inwardly united into a Centre which transcends all forms. They are, however, the bridge from the periphery to the Centre, from the relative to the Absolute, from the finite to the Infinite, from multiplicity to Union. (Nasr, 1976, p.6)

Contrast the above language to that used in US Patent #5,123,899 titled: *Method And System For Altering Consciousness* (Gall, 1991) which describes “A system for altering the states of human consciousness involves the simultaneous application of multiple stimuli, preferable sounds, having differing frequencies and wave forms” (Gall, 1991, p.1).

The first evokes images of transcendence and spiritual discovery, the second, of technologically enforced mind control. Yet how different are these practices? Each could feasibly be described as technology for manipulating states of mind. The distinction, if any, is primarily found in the division between ancient, pre-electronic, technologies on the one hand, and modern, electronic technologies on the other; the first is said to influence the mind, the second to manipulate the brain or central nervous system.

[...] the distinction between ancient techniques (the poesis of artisans) and modern (broad-scale, inhuman, domineering) technologies. This distinction was never more than a prejudice. (Latour, 1999, p.194)

Highlighting this contradiction is central to the work. The opposition between the two treatments of 'old' and 'new' technology was a key concern for me during the early stages of the *Attack on Silence* series. I refer again to the programme notes for the first public showing of work in this series from POV Wanchai 2008.

The series draws upon ideas from sacred geometry, the role of sound and colour to engender meditative states and the technology of psycho-physiological control. Whilst experiencing the works, the audience member is unclear of the nature of their response: are they engaged in some kind of spiritual release or intrusive technological intervention? (Fell, 2008)

This contradiction is dealt with most clearly in a later part of this series developed for a radio⁴⁴ called *Psycho-neural Geometrization Study #5*. Here the user is instructed to download the following image:



Figure 10, Double radial image to be downloaded by listeners to the radio show.

As the radio station broadcasts a sound (which is the frequency content of a Tibetan singing bowl interpolated over 6 minutes into the frequency content of THX1138's mind lock) the listener is instructed to stare at the image throughout this interpolation and attempt to align the two discs by going cross-eyed. The aim of this is to clearly and critically addresses contradictory descriptions of

⁴⁴ Broadcast on NABA 93.1 FM independent radio station, Monday, June 7th, 22.00-23.00. (GTM+3 time zone) Riga, Latvia. Curated by "Skanu Mezs" festival.

spiritual journey, or technically invasive process, offered by the various discourses I have mentioned above.

This critical element is embedded in my concern with the aesthetic appeal of the sounds, patterns, colours and shapes, and the language itself (found the practices and artefacts I mention above). Throughout this work it is my intention to create objects that aestheticise this format (and therefore offer a critique of the rhetorics surrounding ancient spiritual practices and more recent attempts at mind control) with computer graphics and digital sound synthesis.

(2) 'Cueing' the audience

Some years ago I attended a performance by Chris Watson at a small venue on the outskirts of Sheffield⁴⁵. The event featured a 5.1 surround sound presentation of field recordings and was introduced by Mike Harding (Watson's Label manager) who explained the use of processes to capture and recreate three-dimensional sound. The performance was met with enthusiastic cheers. I overheard several comments from the audience referring to the amazing 'three-dimensional' quality of the sound. For me (although I very much enjoyed the works presented), the sound was not discernably more or less 'three-dimensional' than any other⁴⁶; nothing more than stereo sound played over relatively good speakers; and immersive due to the high quality sound system that the promoters had hired in (following my advice on speaker model and type). It occurred to me at that the added three-dimensionality of the sound could possibly have been constructed by the listener in response to Harding's prior comments; driven by their expectations about what they were about to encounter.

In a similar situation, some years ago my parents visited me while I was listening to music. They found the sound quite irritating and it made conversation a little difficult. However when I mentioned that it had been

⁴⁵ "Chris Watson and TOUCH 25", curated by Robert Lye, Sheffield, 2007,

⁴⁶ In fact the acoustic energy produced by a single speaker radiates in three dimensions.

composed in memoriam to those lost in the holocaust⁴⁷ my mother became quite silent and adopted a very solemn expression. Suddenly the music had become sadder for her; she commented on how emotional the music was, whereas before she had found it mildly annoying. Here my framing of her encounter with the music fundamentally changed that encounter. The music itself had not changed.

In reference to the 'Isomorphism and totality' an audience member reported, "It could possibly be as a result of listening to Ernest's [Ernest Edmonds] talk prior to your piece that I remember reflecting on the relationship between the sound and image and did get a felt sense of morphing - and not simply a visual effect put to music". Here the audience member clearly identifies the impact of Edmonds' prior discussion on the experience of the work.

I have decided to call this technique 'Cueing the audience'. In line with this technique, the use of words like 'Isomorphism' and 'totality' are deliberate attempts to frame how audiences encounter and understand the work. Here the audience is primed to look for profound-deep-hidden-mathematical relationships between sound and image. In fact there are non – only a concurrent temporal positioning of objects. This is not done with the aim of maintaining an illusion or trick at the expense of the viewer, but to draw the audience into a self-reflexive relationship to the work whereby they are prompted to question their encounter with, and understanding of, the work.

In an interview with Mitchell Whitelaw⁴⁸ in response to the question "How do you choose these mappings between sound and light, and what role does sensation - or even pleasure - play? What has drawn you to these tightly constructed relationships?" I describe this concurrence as follows:

[...] the recent works I've been doing - with pure synthesis and colour in the form of light - link the two in the closest possible way, but in a way that is completely arbitrary. There is no mapping. It's just like putting two objects next to each other -

⁴⁷ Górecki's third symphony, *Symfonia Pięciu Smakosnych* (Symphony of Sorrowful Songs).

⁴⁸ Whitelaw is Associate Professor in the Faculty of Arts and Design at the University of Canberra and writes for Teeming Void.

say a football and a block of cheddar cheese, then a tennis ball and some ricotta, just collections of two classes of object. When we talk about correspondences in sound and image, it's just the same as correspondences between spherical objects used in sporting activities and slightly decayed dairy products. The relationship is absolutely tight, but doesn't follow any mathematical or natural law. Given that this relationship is an aesthetic one, sensation and pleasure are considerations. (Fell, 2007)

Imagine for example that a bus driver pulls out from a bus stop at one end of a street. At the same time, a leaf starts to fall from a tree. The driver passes the leaf as he travels half-way down the street, as the leaf is half-way between the tree and the ground. As the leaf reaches the ground the driver pulls into the bus stop at the other end of the street. Are there deep or hidden mathematical relationships orchestrating the interplay of movement between these two objects? The answer is irrelevant, but the special attention we now have about the bus driver's journey between two stops, and its correspondence with the leaf as it falls from the tree to the ground, takes on a new poetic emphasis; perhaps a transcendental logic binds the two events together as if these two discreet things had a predestined need to be together.

This is the case with transitions experienced in *Attack on Silence*: they simply start and end at the same temporal locations, there is no other relationship between them; any other relationship is therefore constructed by the audience.

(3) The interplay between technical and perceptual process

As the series progressed my original interest in a critical interrogation of discourses surrounding these forms and phenomena were overtaken by other concerns. I became interested not only in how audiences encounter these works (which is discussed above), but how the audience encounters itself encountering the works; to establish a self-reflexive relationship to the work.

This position is hinted at in the programme notes for 'Isomorphism and Totality' which mentions "...the interplay of hypostasis and instability, intentionality and uncertainty, experience and understanding, played out within an extreme temporal field." (Fell, 2010a) The term 'isomorphism' itself alludes

to potential correspondence between the neuronal state of the audience member, and the external apparatus involved in the presentation of the work, recalling Clark and Chalmers discussion on the extended mind as a neuronal-external isomorphism (Clark and Chalmers, 1998).

Here I include two statements from audience members reported after 'Isomorphism and Totality'.

I notice my eyes were trying to compensate for the contrasts in colour and when I moved to look at another area my eyes distorted what was there. (Audience member, 2010)

I was never sure where the change was occurring – in my retina or on screen [...] If I stared with my focus on the centre point, everything would disappear into the background field of grey. I found myself playing games with my perception like this during the performance... Also moving my eyes and looking at the edges of the blur... Which would make other intense colours appear. (Audience member, 2010)

Both subjects report interplay between the screen and the 'retina' (which I take to mean perceptual process in a holistic sense).

I want to recall my earlier discussion concerning the Cartesian subject, specifically the division of the self into a mind and body and perception as transference of data from 'external reality' to 'internal minds'. The above responses are demonstrations of this kind of account; viewers report where is the change is taking place: out there [in a hypothetical 'external reality'] or in here [an equally hypothetical 'internal mind'].

My aim is that the work foregrounds the alleged interplay between the two states; it functions as a microscope, focused on the notional dividing line between ourselves and the world, prompting us to re-examine our assumptions about the placement and nature of this division.

Ideally, throughout the experience of the work, one should become aware of the active nature of our perceptual systems, and furthermore our inability to disengage these. Every micro-movement of the eye is amplified; objects dissolve into and emerge from a colourless blur according to the play between projection

and eye movement. This foregrounding of the interplay between technical and perceptual process reveals the active role of our perceptual mechanism and its interconnectedness with the wider environment.

(4) Temporality and boredom

Towards the end of the development of these works I began to understand the works as experiments in time and attention: the material of the work in this sense is the encountering of the work. The dual interest in how audiences encounter the work and how they encounter themselves encountering the work is explored in the use of long durations and minimal change.

In this sense it might be argued that the works are aligned with the aims and principles of sacred geometries and their role in meditative practices. I reject this claim. I am not interested in engendering any particular state, but instead with revealing anomalies of our perceptual mechanisms; how we encounter the relationship between sound and image in the work; the construction of time in music and our relationship to it; and the instability between profound boredom and absorbed attention. These are intended to draw the audience into a self-reflexive relationship with the work and their mode of encountering of it.

The use of reduced change in the temporal structure of works became a central feature. This reduced change, it should be noted, is distinguished from an absence of change. For me, it is important that change is perceptible, on-going and constant, and that this should be experienced as extremely drawn out. This I feel is a feature that distinguishes these works from much tonal work where frequencies and tones are sustained. For example, if one listens to a very short extract of these pieces, they could be compared to La Monte Young's seminal work *Dream House* (1963). However this comparison overlooks fundamental differences present in the larger structure of the works: one where frequencies are more or less constant; the other where frequencies are constantly in flux⁴⁹.

⁴⁹ Although *Dream House* creates interplay between tones in space, the frequency of those tones is static.

For me the effect of slow change in frequency content is more disconcerting than sustained frequency content; thus a reading of the work as invoking blissful timelessness is undermined. Although these works may be considered to be an aestheticisation of the structures present in sacred geometries and their tonal counterparts, the resultant form is intentionally anti-tranquil and ideally disconcerting.

While making these works I was reading Husserl's text on time consciousness (Husserl, 1992) and Heidegger's lectures on boredom (Heidegger, 2001), searching perhaps for some connection between their theories and my works. Although there are salient points that can be made in reference to my earlier discussion of temporality (particularly concerning the organisation of the temporal subject in relation to musical practices, addressed in chapter 2 of this document), I consider Heidegger's discussion of boredom pertinent as (on my reading) this relates to the question of the audience encountering themselves encountering the work.

For Heidegger temporality is understood not as a distinct feature of the world but as constructed in our encounters with the world:

The fundamental character of the being of Dasein is therefore first adequately grasped in the determination, an entity which is in the to-be-it-at-its-time. [...] That is, there is simply no Dasein which would be as Dasein that would not in its very sense be 'at its time,' temporally particular. (Heidegger, 1992, p.155)

Time is not something that happens outside of us, a kind of receptacle of being; we ourselves are time. The processes of the world are encountered in time. [...] Dasein is itself time (Heidegger, 2002, p.172)

Furthermore Heidegger places a special emphasis on the role of boredom. He writes:

[...] each time we attempt to penetrate into the time-structure of boredom, we were forced to recognize the fact that we cannot get by with the ordinary conception of time as a flowing away of now points. (Heidegger, 2001, p.141)

[...] one feels removed from the flow of time. (Heidegger, 2001, p.141)

But for Heidegger it does not follow that, when in a mode of profound boredom we are in some sense outside time, quite the opposite:

However unconcerned we are about time in whatever way—we are just as close to it, and in this 'it is boring for one' we move just as deeply within the essence of time. (Heidegger, 2001, p.144)

For Heidegger the temporal structure of profound boredom enables Dasein to encounter the conditions of its own being. Here "... the unity of one's temporality is grasped" (Couzens Hoy, 2012, p.30); "This withdrawal of everything makes Dasein aware of the whole of its existence" (Couzens Hoy, 2012, p.31). For me, in the context of these works, boredom is not something to be avoided, but something to be constructed and manipulated as it places the audience (Dasein) in a particularly curious state.

For example it is often difficult (both for artist and audience) to identify one's temporal placement within a specific transition – how long it has been taking place, how much longer there is to go, or how fast (in subjective terms) this transition is unfolding. After the performance at 'Isomorphism and Totality' an audience member commented that they felt bored during the show. The person reported becoming bored during the middle section when they thought the work should have ended. I recognised this point, and remember noting during performance that this would be a good end point. This point however was at forty minutes into a forty-five minute performance –the perceived 'middle' was nowhere near the 'actual' middle. Two things are of interest here: the difference between the perceived middle and actual middle; but more importantly that we both identified a certain point as a potential 'end' and, that having carried on at this point, we both felt bored.

I hope that those attending the event become aware of a switch between different states of boredom, attention, expectation and so on. Questions like: have I achieved the right state of mind in order to appreciate this work; how much longer will this last; how long have I been here; am I the only person

missing the point; are the kinds of questions I frequently ask myself in music performances.⁵⁰

I find it desirable that people ask these questions during a performance of *Attack on Silence* and to switch between different modes of attention throughout the work. An exploration of change in this context is therefore an exploration of the limits and characteristics of attention.

There are however other important concerns, and these relate to my position and attention as a performer. Here the performance of the work is an act of resistance – not only to the needs of an audience, and maintaining their attention, but also to the needs of the performer and the desire to be actively engaged in performance of something and as controller of the work. Here minimal interface options are available to the performer – ones that merely start and stop transitions. No other performance parameters are possible. Performance of this work feels like an act of mental training in itself, not in terms of focussing the mind towards an onscreen shape, but in terms of refraining from actively maintaining a level of attention between the audience and performer. It would be technically simple to run the work from a score that would introduce and terminate transitions over the course of the piece. This however would fundamentally change the work. A key part of the work therefore is the tension that is brought about between the artist and audience through the development and exploration of limited change.

List of public performances, installations, screenings and other outcomes of this series.

2008

- Screening of “POV Edit” from Quicktime file, “POV”, Wanchai, Hong Kong.

⁵⁰ For example I never feel “lost in the moment” when listening to live music. Typically I feel quite bored and uncomfortable.

- Performance of Gaussian Curve interpolations at "Starrunning", Manchester UK.
- Screening of "Sonic Recycler Edit" at "Sonic Recycler", London UK.
- Limited edition print for Template Exhibition at Sightsonic York UK
- DVD release "Attack on Silence" Line records, Washington DC USA.
- Performance of Gaussian Curve Interpolations and Hand Drawn Colour Curves at Focus:2 Festival, Poznan, Poland.
- Performance of Gaussian Curve Interpolations at Three Pieces for Unattended, Somewhat Attended and Attended Computer Performance, SND studio, Sheffield UK

2009

- Installation of Hand Drawn Colour Curves, projection onto white cuboid at Starrunning as part of Futuresonic, Manchester UK.
- Screening from DVD at Flatpack Festival Cyrk Birmingham UK.
- Screening of Gaussian Curve Interpolations from computer score at Plateau Festival, Torun & Bydogoszcz Poland.
- Limited edition print for Template Exhibition at ISEA Belfast UK

2010

- Screening from DVD at "There is no solution because there is no problem" Sheffield UK.
- Performance of Radial version at Isomorphism and Totality, Sensoria, Sheffield UK.
- Psycho-neural geometrization study 5 for radio broadcast on NABA 93.1 FM Riga, Latvia, on the 31st may 2010, curated by "Skanu Mezs" festival
- Screening from DVD at Exposición ARTe SONoro at La Casa Encendida, Madrid Spain.
- Performance of Radial version at The Computer Arts Society's Generative Film and Performance, Birkbeck Cinema London.

2011

- Performance of Radial version at Olsen, Leeds UK.
- Installation of Radial version with computer and LCD screen at of Supersymmetry New Languages in Computer Music, Barcelona Spain.
- Installation of Radial version with the title "Tone Pattern Transactuality" at Datafields Artisphere Arlington USA.
- Installation of Radial version with the title "Tone Pattern Transactuality" at Seeing Sound, Bath Spa University UK.

4. Microtemporal works

Introduction

The following section discusses a series of works that I refer to as 'microtemporal'⁵¹. This term is used to emphasise the rhythmic content of the works and its tendency to abandon regular tempo or meter. Here rhythmic patterns are not constructed in a timeline based composition environment (such as Logic or Cubase) where time is divided into regular and related intervals. By contrast patterns are developed using pattern generating processes; these have very short temporal intervals (specified in milliseconds, often as short as 1 millisecond each) and do not repeat over regular periods.

The four works included in this section are:

1. *Multistability* (Raster Noton, 2010) compact disc
2. *UL8* Editions (Mego, 2010) compact disc
3. *Manitutshu* (Editions Mego, 2011) double 12" vinyl
4. *Periodic Orbits Of A Dynamic System Related To A Knot* (Editions Mego, 2011) single 12" vinyl

I document the production and development of each, and where relevant, critical and contextual considerations are discussed.

⁵¹ The term "microtemporal" is also used by Danielsen (2010) who makes a distinction between microrhythm and 'microtiming'. In Danielsen's usage the microtemporal "... examines only the temporal aspects of the larger field of microrhythm" (Danielsen, 2010, p.9). In this sense it has some correspondence with my usage. Danielsen is concerned with what happens to popular dance music based genres (as ones that might be considered my precursors such as house and techno) when machines enter the equation. As such she raises a number of points, some of which are pertinent here, but several of which I will challenge. These are dealt with later in this chapter.

Multistability



Figure 11, Multistability cover.

Multistability – Developing the work and its production

Production work on *Multistability* began in August 2009. Among my principle aims for the project was to make a work that investigated frequency modulation synthesis (Chowning, 1973) with specific reference to its implementation on two hardware units produced by Yamaha in the mid to late 1980s – the TX81Z and the DX100.⁵² Of particular interest were the factory presets distributed with these units, and their use in early techno musics (refer to Appendix 2 which is an autobiographical account of my musical development in reference to this

⁵² The Yamaha Corporation

period). In tandem with these sounds I also used drum samples primarily from the Linn LM1 drum machine⁵³ launched in 1981.

At the beginning of the project I formulated the conditions for the work: this formulation included tools, processes and types of sonic materials that I might use. In 2012, some time after the completion of the project, I listed these as a series of guidelines. It should be pointed out however, that these guidelines are deliberately transgressed at points throughout the CD. The seven guidelines are described and discussed below.

Guideline #1: Do not use the “pencil tool” to enter notes into a grid

This particular point was a response to the apparent ubiquity of time-line based midi editors within the house and techno musics to which my practice refers. When using these, one is presented with a grid: a piano keyboard positioned vertically on the left (i.e. pitch divisions on the vertical axis) and bar, beat and sub divisions running from left to right (i.e. quantised tempo on the horizontal axis). Typically a “pencil” tool is used to draw notes into the grid that is looped to create repeating rhythmic structures - I refer to these as “patterns”. Patterns are then ordered sequentially to create longer musical structures, which I refer to as “tracks”. (Note, “tracks” here does not refer to individual channels of sound within the piece.)

⁵³ Linn Electronics Inc

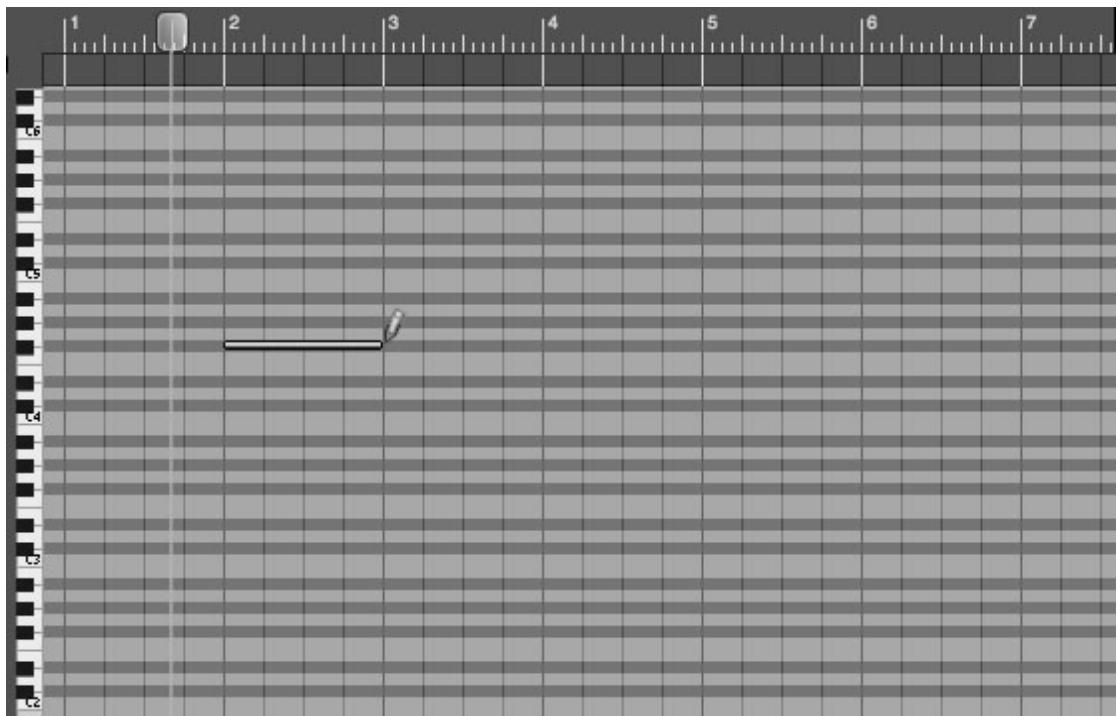


Figure 12, The pencil tool used to draw a note.

Since my initial encounters with this method of making musical structures (around 1987) I have been acutely aware of the difficulties I found in it. My primary dissatisfaction was the necessity to stop, rewind, replay, stop, rewind, redraw, and so on. For me this cycle quickly led to a difficult situation whereby I found decision making highly difficult. When using this method I would spend several hours constructing patterns, but after a break from the process of making, I would return to these to find them completely unsatisfactory. To a large extent this dissatisfaction was directed toward the implementation of musical change within works: for example, the introduction of a new sound, or pause, or change in the structure of a sounded wrong. This ‘wrongness’ was not due to the fact that these features were grotesque or boundary transgressing, but ‘wrong’ in the sense they seemed to follow a kind of tedious logic that ironically rearticulated those boundaries. Therefore, from my early encounters with the time-line method I felt there was an isomorphic relation between the methods used in the construction of music, and the vocabulary present in musical styles that heavily employed those methods.

At the onset of the Multistability project, the rejection of the timeline therefore also implied a rejection of certain well established musical structures, narrative development and so on found in house and techno musics to which I was referring; and, more fundamentally, a rejection of highly quantised, regularly repeating rhythmic structures of specific and predictable durations. Which leads me to guideline #2

Guideline #2: No obvious or fixed tempo or meter

In response to the above I decided to develop a project that had no clearly defined tempo or meter, and to reject the structuring of musical events within a grid of related and relatively constant temporal intervals. In order to achieve this I continued to work in the MaxMSP programming environment and to explore the use of systems to generate unfamiliar temporal structures. I refer to this technique as “pattern synthesis”.

The rejection of the time line methodology and the use of a programming environment facilitated a further feature of this work: the management of change within a given piece was no longer necessarily predetermined but could be manipulated in ‘real-time’.

I began to look at musical practices and structures beyond house and techno musics and to think about how the various parts fitted together and developed over time. It appeared to me, that in many musical practices—for example Indian ragas, Australian aboriginal music—there are a limited number of players, a predetermined combination of musical instruments; performance, rather than following a linear score, involves interchange between different states and behaviours.

I decided therefore to develop and explore different systems that could generate different musical behaviours. In defining different algorithmic structures, and

altering one or more of the parameters involved in these, I could also generate, change and modify musical behaviours⁵⁴.

Guideline #3: Limited set of objects and keep patches 'simple'

It was my intention that, wherever possible, Max patches should be very simple. The following diagram aims to illustrate what constitutes simplicity in this context.

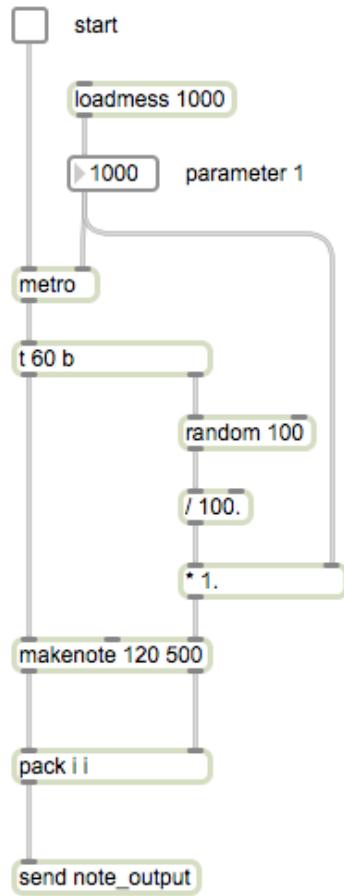


Figure 13, Multistability, track 7, Pattern synthesis implemented in Max.

The above illustration is a screen grab of the Max patch used in the production of the seventh track on the CD. The function of this structure is to produce a series of events at a specified speed; here the number 1000 (labelled parameter

⁵⁴ These techniques are discussed later in this chapter.

1) specifies a speed of 1000 milliseconds. The system triggers a sound at this rate, the “on phase” or duration of which can range from 0 to 99% of the space between events. The user can change parameter 1 in real time to slow down or speed up the flow of events. The user can also start and stop the process.

Please refer to pattern generating example 1, “random duration”.⁵⁵

We could write this down in the following form:

1. Determine the length of time from one sonic event to the next (user specified)
2. Determine the length of the “on phase” of this sound, and the “gap” following it (randomly generated).
3. Trigger the sonic event
4. Repeat the above until the process stops

This produces the following output:

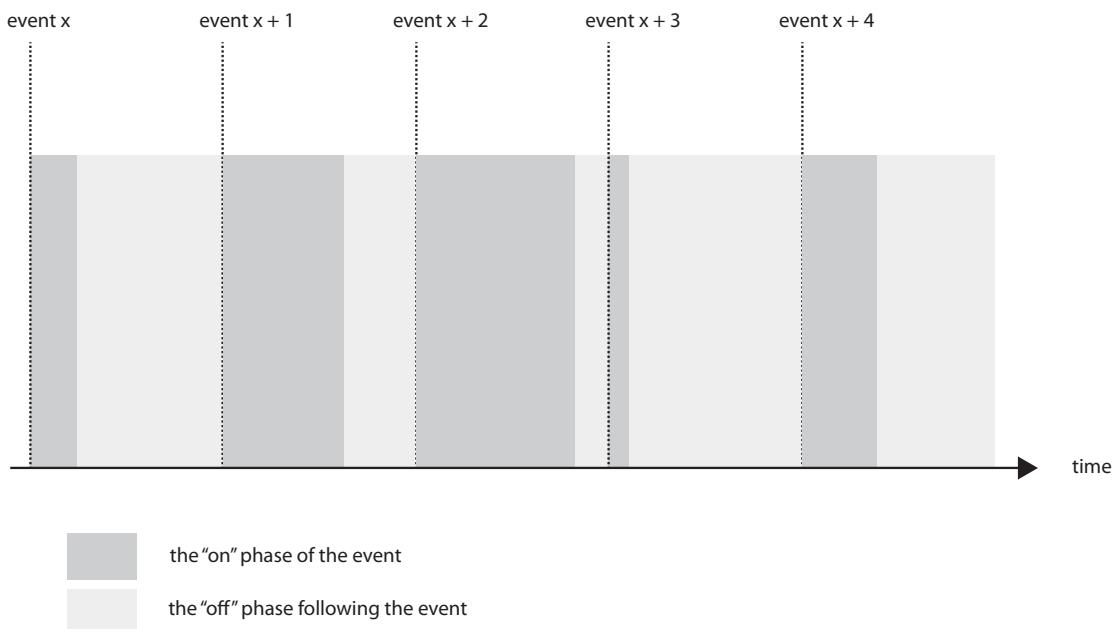


Figure 14, The “on” phases of different ratios of the space between events.

⁵⁵ Included on the memory stick are a number of examples. Refer to the folder “pattern generating examples” which contains this system and a number of other examples.

In this work, low-level parameters of this kind are favoured over high-level procedures that aim to model pre-existing musical vocabularies. Computational structures, user input and musical output are deliberately held in this constrained state⁵⁶.

Guideline #4: Focus on velocity, speed and length of notes as compositional parameters

A further guideline was to explore the use of velocity, speed and duration of sonic events as primary compositional materials. Pitch for example is often constant throughout compositions; timbres remain constant and unmodified; and sounds are not introduced or removed.

This emphasis is a response to the way notes are encoded within the MIDI specification and how musical events are handled in the Max environment. In terms of producing a sound via midi, the first method described by the Max tutorial *02iMIDINoteManagement*⁵⁷ uses the ‘makenote’ object. Here the duration of the sonic event is specified at its beginning and, because it functions via MIDI, no reference is made to the sounds tonal envelope: it is merely an event of a predetermined duration, whose end point is required at its onset. Additionally each noteon message includes a velocity value ranging from 0 to 127. Velocity is typically used to change a sound’s loudness and/or timbre, so that higher velocities produce louder, brighter sounds and lower velocities produce quieter, duller sounds. The makenote object therefore works according to this principle: make this pitch (for example C3) at this velocity (for example 100) for this long (for example 200 milliseconds). I regard this way of dealing with musical data, along with the speed of automated triggering, as key a construct of the Max/MIDI paradigm – a conceptual scheme with which the user

⁵⁶ Recall my discussion of extended cognition from chapter one of this document and research into constraints in art production.

⁵⁷ Distributed with the software.

must implicitly mediate, in order to operate within the environment⁵⁸. I therefore attempted to place this scheme in the foreground of the work⁵⁹.

A clear example of this emphasis on speed, velocity and duration is the first track. Here a list of ten values, ranging from 0.02994 to 1, is stored. The list is then stepped through one item at a time at varying speeds. The output is scaled to determine the velocity (i.e. volume) of a kick drum, and the velocity (volume and brightness) and duration of a chord. I was able to speed up, slow down, start and stop playback, and also to change the values in the list. Typically this would include increasing an additional value in the list to 1.

Refer to pattern generating example 2, length velocity table.

It should also be noted that, in this piece, the value controlling the chord is one position behind the value controlling the percussion, therefore the loudest kick is followed one step later by the loudest, brightest and longest chord. I did not choose to implement this feature – that is, I did not conceptually formulate this feature in advance and then encode it within the patch. Instead it came about as a result of a synchronization issue within the Max patch that I had built.

Although correcting this issue would be a relatively straightforward matter, I found the result of it appealing and so decided leave the feature in place. This is typical of my working method in which I aim to respond to, and incorporate, the physiognomy of materials and process as they occur.

⁵⁸ Recalling my discussion of action as constituted in networks (Latour, 1999, 2009)

⁵⁹ My interest in the duration of notes also stems from the use of keyboard stabs in both techno and New York house musics.

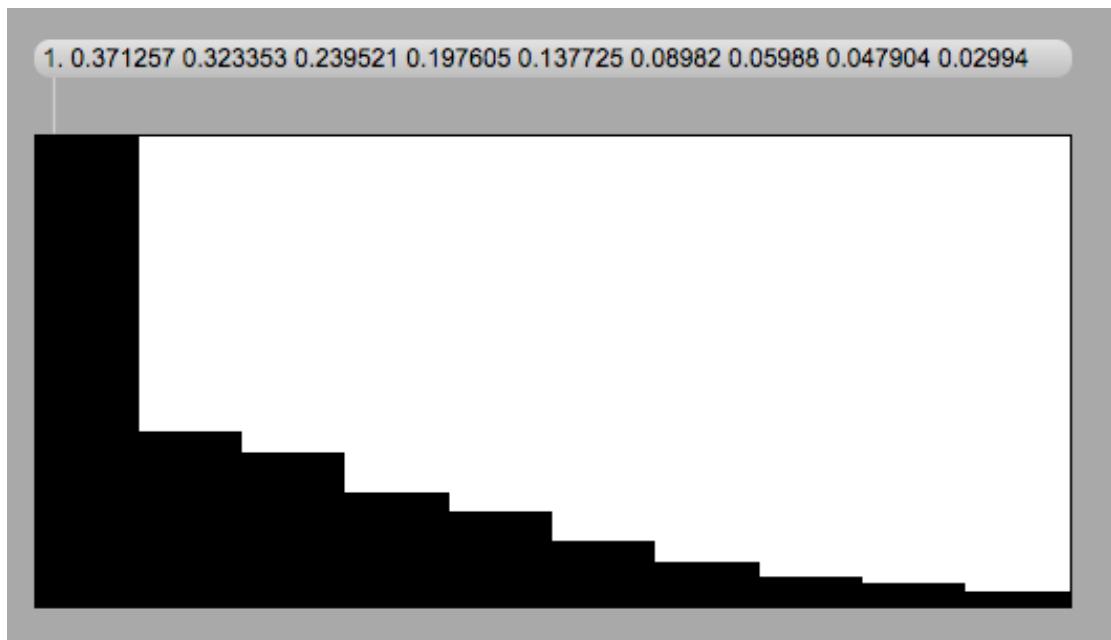


Figure 15, List of values used in track 1.

Guideline #5: Synchronic use of: “percussion” and “chord” layers

For this project I define two categories of sound: (a) percussion sounds typically a kick drum and clap; (b) a chord made up of 5 notes. It is important that both sounds happen at the same time so that there is never percussive sound without a chord and vice-versa.

Guideline #6: Percussion sounds

In terms of percussion sounds these are typically a synthetic clap sound and a kick drum. Both are sampled from various drum machines with synthesis implemented in MaxMSP which is resampled and overdubbed.

A note concerning kick sounds and their reference to early and pre-techno musics

For this project kick drum sounds are typically derived from the Linn LM-1 drum machine having a rather ‘sharp’ kick sound. This sound featured heavily on chart hits of the early 1980’s including The Human League’s *Don’t You Want Me* Virgin Records, 1981). This ‘sharp’ kick paradigm set the sonic agenda for the following years. Followed for example by New Order’s *Blue Monday* (Factory Records, 1983) which conforms to this sharper sonic type. To some extent this type of kick drum was adopted beyond specifically electronic musical practices, for example, Brian Adams’ *Run To You* (A&M Records, 1984).

This sharp kick is contrasted with the archetypal ‘techno’ kick, derived from the Roland TR808 and later TR909⁶⁰, which is rather deeper and denser, often with some added harmonic distortion.

It should be noted however that while many early techno productions featured this deeper kick⁶¹, some incorporated the sharper kick paradigm drawn from earlier electronic musics. A primary example is Armando’s *151* (Warehouse Records, 1988) which used a Roland TR707 kick.

Refer to sound example 3, Linn LM1, TR808, and TR909 kick drums.

In these works I wanted to avoid the denser kick typical of later techno, and make reference instead to the sharpness of the Linn drum. This is a deliberate quotation to early and pre-techno production styles; and specifically references the dialogue concerning the precise sonic form of the kick drum. I feel this switching of dominance (from the sharp to the deep) marks an important shift within electronic musics from one paradigm to another.

Guideline #7: “Pitched” sounds

The second category of sound I refer to as ‘chord’ sounds. These were made using 4-operator frequency modulation synthesis, and typically derived from

⁶⁰ Roland Corporation

⁶¹ For example “Rock To The Beat” by Reese, released by KMS in 1989.

sounds distributed with the DX100 and TX81Z. These were imported into Native Instruments FM8 software instrument⁶² for editing and playback. As with the kick drum sound described above, this sonic palette makes specific reference to early house and techno musics.

One of the first encounters I had with these then nascent emerging genres was the compilation album *Techno! The New Dance Sound Of Detroit* (10 records, 1988). Here the track *Un Deux Trois*⁶³ by the artist Idol Making features the DX100 group 3 preset 24 “HeiferBell”. (See appendix 2)

Notable sounds used in Multistability

1, Lately bass

The DX100 and TX81Z included a bass sound—the DX100 Solidbass (preset group 2 number 1) and the TX81Z LatelyBass (preset bank C number 15)—that has featured on a number of records and occupies a prominent position within the history of club musics⁶⁴.

The two implementations found on the DX100 and TX81Z appear to be identical, however their makeup is slightly different. Although the units' operators are connected to form the same algorithm on both machines, there are minor differences in output levels of the 3 modulating operators. Furthermore the TX81Z's implementation of this sound uses a non-sinusoidal wave as one of its modulating operators – TX Wave 5. (See the following diagram: DX100 Solid Bass, TX81Z Lately Bass, and a modified version from the Multistability project). This illustrates one important difference between the two machines: the TX81Z included non-sinusoidal waveshapes. The evolution of Solid Bass to Lately Bass is an example of how a sound was slightly modified to

⁶² FM8 is a frequency modulation software synthesiser produced by Native Instruments Germany.

⁶³ Mixed my Master Reese, Derrick May and Produced Blake Baxter.

⁶⁴ Examples include *Good Life* by Inner City (10 Records, 1988), *Express Yourself* by Madonna (Sire, 1989), *Chime* by Orbital (FFRR, 1990), *I'm Gonna Get You* by Bizarre Inc (Columbia, 1992) and *Pussycat Meow* by Delite (Eleckra, 1992). Later examples include *Saturday Night* by Whigfield (Systematic UK, 1994) and *Free* by Ultra Naté (Strictly Rhythm, 1997).

make use of this feature. For me therefore this sound not only has a cultural significance or history, but also a conceptual dynamic that refers to the evolution of sonic types – how they move from machine to machine, record to record, through implementation and re-implementation. This is of particular critical and aesthetic relevance to the works here.

The multistability project makes frequent use of the LatelyBass algorithm, modified in various ways, primarily with increased modulator levels and non-sinusoidal modulator waveshapes resulting in a ‘brighter’ sonic character (see the following diagram: DX100 Solid Bass, TX81Z Lately Bass, and a modified version from the Multistability project).

Refer to sound example 4, “Latelybass” which includes the original sound (played with FM8), solidbass, and an example of modification.

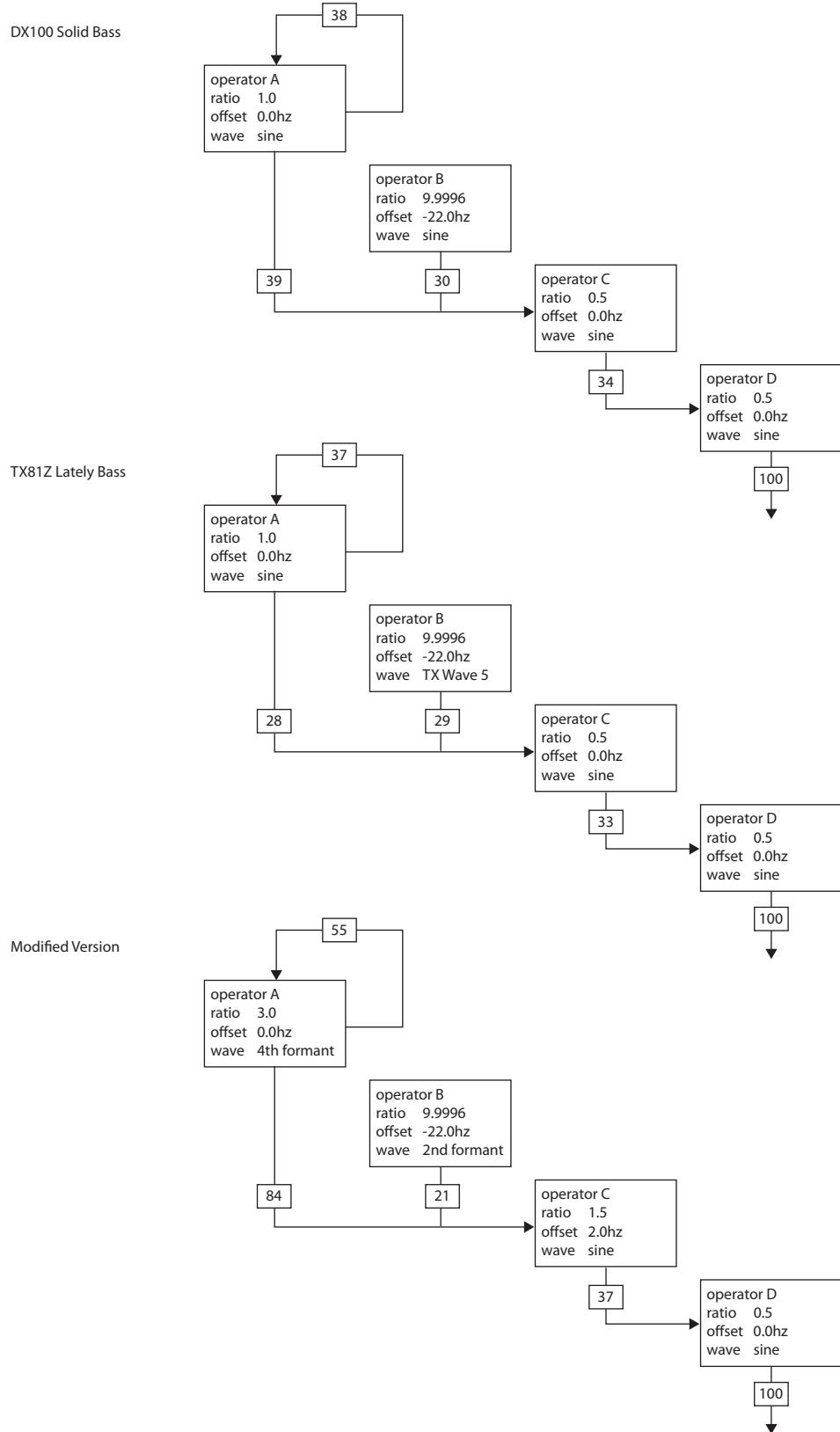


Figure 16, DX100 Solid Bass, TX81Z Lately Bass, and a modified version from the Multistability project.

In terms of how this sound is placed within the wider tonal arrangement of a piece, often a single note of Latelybass is layered with a chordal structure of a different sound. This is particularly evident in track 17 of the Multistability CD.

2, Jazz Organ

A further key sound is the DX100 Jazz Organ preset, voice group 1 number 13, which was not present on the TX81Z. This sound again has an interesting role within the development of house and techno musics and has appeared many notable records.⁶⁵

In the following diagram (Jazz org and modifications) the original DX100 Jazz Organ algorithm is shown, followed by two modifications used in the production of Multistability. The first features on track 4 of the Multistability CD. Here the harmonic content of operators A, B and C has been modified resulting in a sharper sound. The second modification is used on track 5 of the Multistability CD. It also features alterations to operators A, B and C, and two further operators are added as modulators. The volume envelope of these sounds increases at the release phase of the note. Therefore harmonics are introduced during the release phase.

Refer to sound example 5, "Jazzorg" which includes the original sound (played with FM8), and two modifications.

⁶⁵ Including the Marc Kinchen (MK) remix of *Push The Feeling on* by Nightcrawlers (Island Records, 1992), *Show Me Love* by Robin S (Champion, 1990), and *The Vibe (That's Flowing)* by Mount Rushmore (Ore Music, 1993). A similar sound is found on *So Deep* (Joey Negro Fruit Mix) by the Reese Project (Network Records, 1993). Precursors to this sound can be heard on *Back To The Beat* by the Todd Terry project (Fresh Records, 1988) and a much earlier track by Arthur Russell *Arm Around You* from the album *Calling Out Of Context* (recorded 1973-1992, released Rough Trade Records 2004). A later incarnation of this sound is found on *Can't Get You Out of My Head* by Kylie Minogue (Parlephone, 2001).

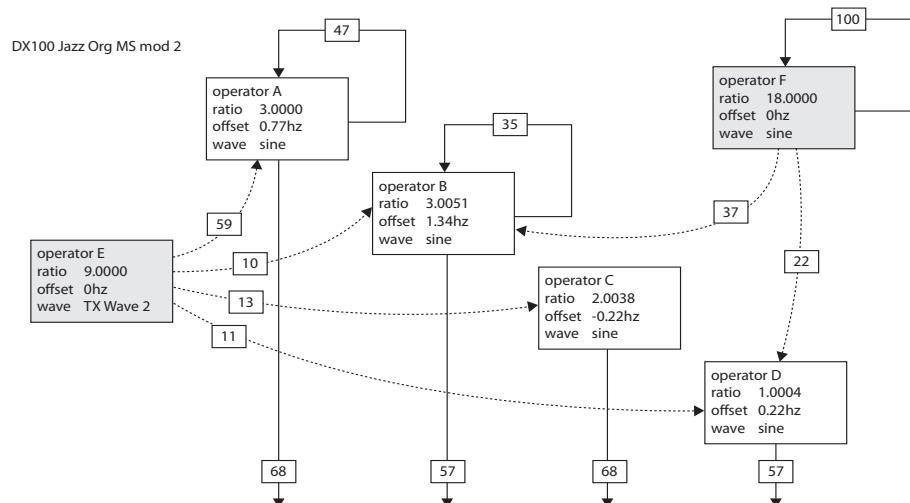
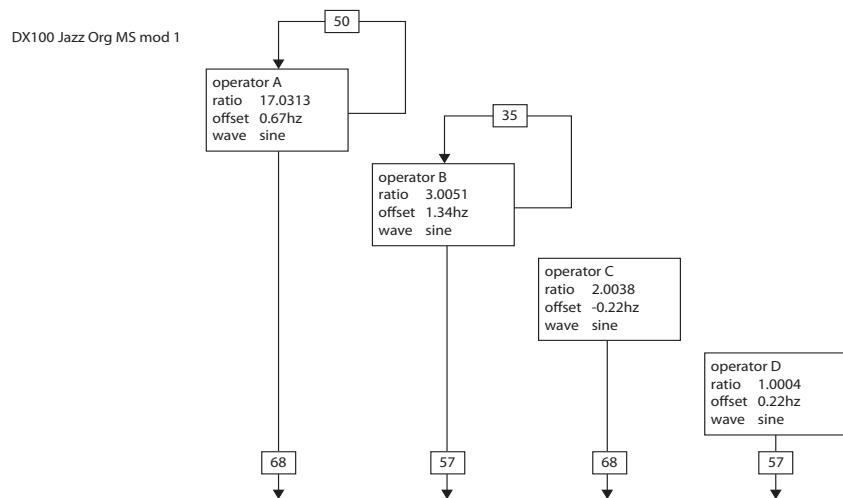
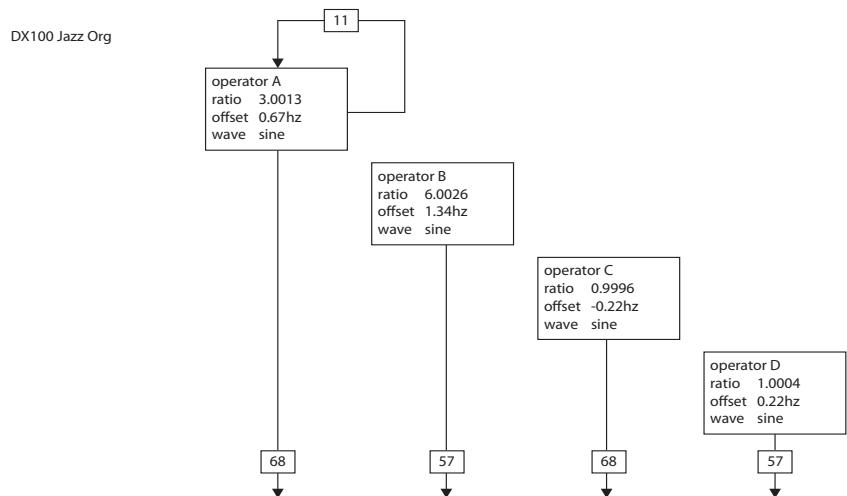


Figure 17, Jazz org and modifications.

Among the two presets listed above are a number of other organ, electronic piano and string sounds. Specific uses of these sounds on released materials are harder to identify.⁶⁶

I am drawn to frequency modulation synthesis as it offers a way of dealing with harmonic structures beyond the scope of subtractive synthesis. But more fundamentally however, I drawn to this method of synthesis, its implementation in the DX100 and TX81Z units, and the sounds that were distributed with them, because of its placement within the development of genres to which my work primarily refers. In this sense the Multistability project could be read as a response to this lineage. It is hoped however that it is not read as merely the latest descendent or incarnation of this line, but instead considered as part of a process of critical re-examination; one focussed upon a specific point in history; and an attempt radically reimagine its consequence; an act of critical exegesis.

Cases where guidelines are transgressed

Track 8, has a constant tempo and could be divided into bars, beats and sub beats. Track 17, features notes drawn into a grid. Tracks 6 and 14, feature pitched chordal sound in isolation of co-temporal percussive sound.

Multistability – further descriptions of pattern synthesis

In this section I will describe pattern synthesis methods used in the production of Multistability. The above section describes two of these: the use of random “on phase” of a sound with manual speed control, the use of a table of values to determine volume, brightness and duration of sounds.

A number of other methods were explored to generate temporal divisions. In an initial experiment a table of values was specified and used to determine the

⁶⁶ For example an organ sound used on the Marc Kinchen and Derrick May remix of *Can You Feel It* (New York Dubby Dub) by Chez Damier (KMS, 1992) is very similar to the DX100 Club Organ preset.

speed of a clock that triggers sonic events. Here each “step” of the clock was specified in milliseconds.

My initial test used tables of various lengths (typically around 5 or 6 items) these were entered with a Multislider⁶⁷ and combinations of these were stored and recalled to switch between different sets of speeds.

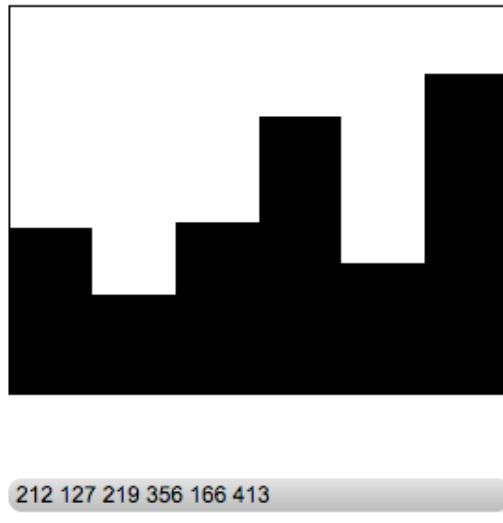


Figure 18, A list of timing steps with a range from 0 to 500 milliseconds..

I found this method appealing for a number of reasons. An interesting feature was that it generated rhythmic structures of variable overall duration. For example if the duration of step 1 is increased, the overall duration of the pattern is increased. This produced recognisable rhythmic structures that could be transformed in a much less familiar manner.

A second version of this method was implemented. Here the range of values was reduced, to between 1 and 10. At these speeds (which equates to between 100 and 1000Hz) events produce tonal rather than rhythmic materials. The list was then multiplied to produce rhythmic structures.

Refer to pattern generating example 3, “time sequence”.

⁶⁷ An interface object used in the MaxMSP environment.

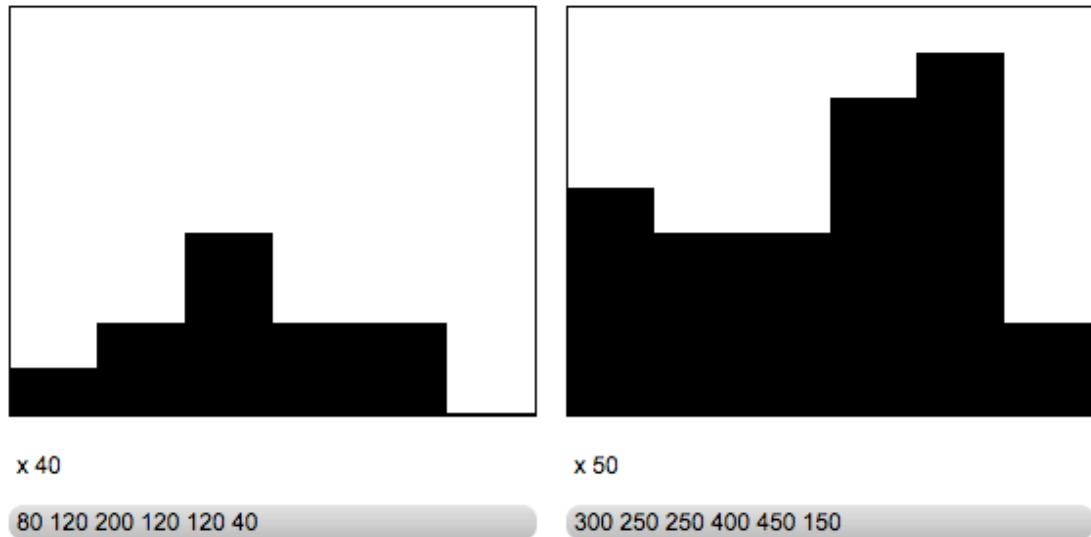


Figure 19, A range of values from 1 to 10 multiplied to produced longer intervals.

The temporal divisions generated by this second version were restricted to multiples of a base value (in the above diagram 40 and 50 milliseconds); and therefore the resultant materials more clearly referred to familiar musical structures. The system retained unfamiliar characteristics such as dynamic pattern duration. The rhythmic structures present in track three on the multistability CD were produced in this manner.

A further development of this system was implemented. Here each timing step could be repeated a number of times.

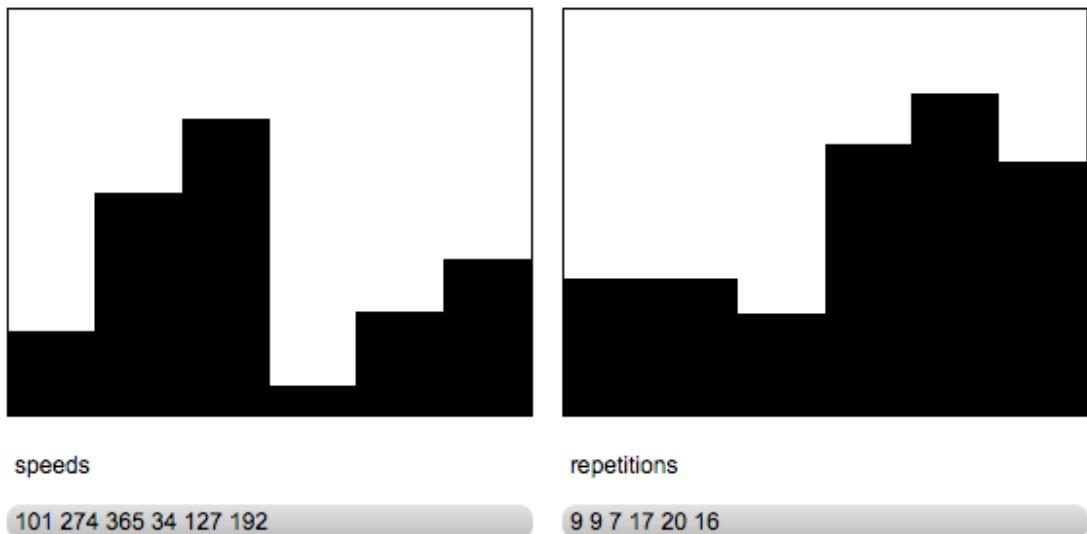


Figure 20, Step speed and repetition.

Here is step could be repeated a number of times. This method was used to produce rhythmic structures with very short intervals present in tracks 5, 13 and 17.⁶⁸

Refer to pattern generating example 4, “duration repetition”.

I experimented with speed and repetition lists of different lengths. For example six specified speeds (lets call these a to f) and five specified repetitions (a to e). As these two lists looped the following result was produced:

Speeds	a	b	c	d	e	f	a	b	c	d	e	f	a	b	c	d	e	f	etc
Repetitions	a	b	c	d	e	a	b	c	d	e	a	b	c	d	e	a	b	c	etc

Table 3, Asynchronous groupings of speeds and repetitions.

⁶⁸ In the above example step 1 has a speed of 101 milliseconds and is repeated 9 times. Step 2 has a value of 274 milliseconds and is also repeated 9 times. The overall duration of this pattern is therefore $(101 \times 9) + (274 \times 9) + (365 \times 17) + (34 \times 17) + (127 \times 20) + (192 \times 16)$ which is 12,120 milliseconds.

This resulted in a level of complexity and indeterminacy that I felt was inappropriate to the project, and therefore I rejected it.

The above methods produce patterns that have the characteristic of dynamic duration; i.e. when the duration of a single event is modified, the duration of the overall pattern is changed. Contrary to this I also developed a system to produce patterns of determinate duration. Here a number of events, typically 5, are triggered at a given speed, the 5 events are retriggered at specified intervals.

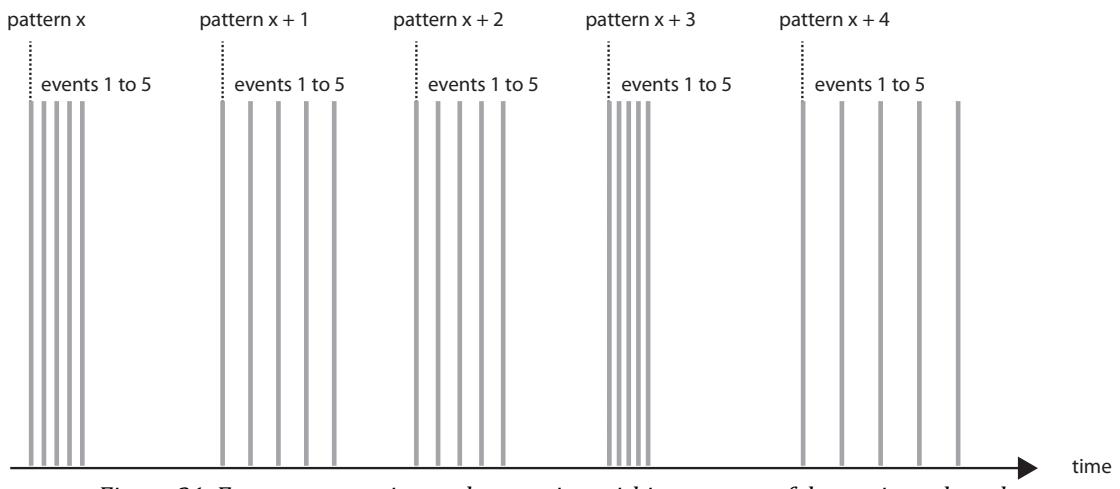


Figure 21, Event compression and expansion within patterns of determinate length.

The rhythmic structures present in tracks 6 and 14 were produced using this method. Here the compression and expansion factor, and the duration between adjacent patterns were controlled in real time.

Refer to pattern generating example 5, "compression expansion".

For this project MaxMSP was used to generate MIDI data which was then recorded in Digital Performer for editing. In the vast majority of cases all editing was done in the MIDI domain as opposed to audio.

Multistability related works and special editions

The release of Multistability was accompanied by a limited edition 7" single. This was only available as a multipack with the CD from the Raster Noton online

shop. The 7" single featured one track on each side. Side 1 played from the edge of the record to the centre; side 2 however played from the centre to the edge. The music, which was recorded as MIDI on a timeline, plays in one direction on side 1, and is reversed on side 2. Therefore, because the MIDI data plays from end to start and the record plays from centre to edge, the notes are approximately in the same place on both sides of the record. This peculiar treatment aims to foreground the interplay of different domains of temporal ordering within the vinyl formal.



Figure 22, Multistability multipack with limited editions 7" single.

Before the release of Multistability I presented a playback version of the work under the title *Studies in Synthesis and Geometry* at Enjoy Artspace, Leeds (July 2010). This was accompanied with a limited edition CDr called *Sonology in Context #1*. This included colour photo print on satin paper, 5000 word critical commentary, CD and 65 stickers in clear plastic sleeve in a limited edition of ten

copies. These were sold out at the event and proceeds went to Enjoy Artspace. It contains different versions of some of the works later released by Raster Noton as well as otherwise unreleased material.



Figure 23, *Sonology in context #1*.

Similarly at my solo show *Coherence and Proximity* at the Woodmill Gallery (see appendix 1), London (December 2010) I made a CDr *Sonology in Context #2* as an edition of 25 copies. This contained an hour long unedited version of a track from Multistability. This track was called *Shamanic Bear Session*. Unfortunately a copy of this was lost in the post to Tokyo. The customer, who I will refer to as “Junji” was very unhappy to have lost this limited edition item and was not

satisfied with a refund. I contacted Junji and asked if he would be happy for me to make a special one off edition *Shamanic Bear Session Junji Version* with a fine art print and certificate of authentication. Junji was keen to accept this offer. Junji's version features reversed note data, so that the MIDI plays from end to beginning.



Figure 24, Junji version.

Another version was made available online as an mp3. This featured additional LatelyBass notes with portamento.

Context and themes, Multistability as Response to label

When I work on a recorded project—a compact disc, cassette or vinyl for example—I find it important to know in advance which label will release it. This is because I consider the label itself as facilitating dialogue between

practitioners, consumers, curators and so on. The work therefore is to some extent a response to, and a comment on, the historical, critical and aesthetic contexts that the label inevitably brings to the project. Thus a primary concern in the development and production of a record is the dialogue that it establishes with those contexts... to critique and propose revisions to the label's aesthetic strategies. In terms of my practice, the same record would not have the same meaning, function or character if placed in the context of a different record label.

Multistability was conceived of, developed and produced for a specific record label: Raster Noton. Before work commenced I discussed the project with the record label, and at the initial stages of production confirmed the release with the label.

Raster Noton is owned and operated by two practicing artists: Carsten Nicolai and Olaf Bender both of whom work in electronic music. It is primarily associated with their work, and others including Ryoji Ikeda and Frank Bretschneider, and is known for a very specific aesthetic style. The sonic component of their aesthetic includes highly quantised synthetic rhythmic structures, and tonal elements derived from sinusoidal waveshapes and noise. Often frequency modulation synthesis is used where the frequency relationships between carrier and modulator result in non-harmonic spectral content.

Of particular relevance here is the album *Dataplex* by Ryoji Ikeda (Raster Noton, 2008) released immediately prior to my initial work on Multistability. I have been an admirer of Ikeda's work since 1995, when the compilation *Mesmer Variations* (Ash International, 1995) was released.

Dataplex, like much of Ikeda's work, employs a characteristic sonic palette, and (also characteristically) its rhythmic structures take the form of tightly quantised temporal divisions and repeating events of constant speed. After listening to this work I began to consider how speed changes might be used in

the context of this aesthetic framework. These considerations informed the development of the Multistability project.

Ironically, in May 2013 one of Raster Noton's younger artists Aoki Takamasa, completed a work called *RV8* (referring perhaps to my *UL8*). In an email to me the artist writes, "I learned so much from your album multistability. I had huge influence from your recent works."⁶⁹ Among other sounds *RV8* makes use of a synthetic bassline that very closely resembles the TX81Z Latelybass preset, perhaps illustrating my claim that the label itself provides a means by which musical positions can be renegotiated across several works and between artists.

If we consider Multistability as a response to the label and its contemporaneous outputs, I hope that it can be read as an attempt to propose a revised aesthetic agenda: one that questions the use of an impervious chronological grid; one that replaces relentless regularity, symmetry and constancy with temporal distortions, bendings, inconsistencies, instabilities, morphologies. This brings me to my next point.

Multistability as system state and perceptual ambiguity

The term 'multistability' has a number of uses. In systems theory multistability is a term used to describe systems that switch between different states and are neither entirely stable nor unstable. My borrowing of the term "multistability" here is intended to imply that the work itself, its production and reception have this characteristic. Its occurrence is implied at several levels: 1) that the music itself is multistable - switching between different states and behaviours; 2) that the tools used to produce the work (specifically the pattern generating systems) are multistable in that they produce differing types of behaviours that in some cases are indeterminate and in other entirely determinate; 3) that the artist's relationship to the tools and materials is multistable and does not follow a linear path from imagination to realization; 4) that the audience is placed in a

⁶⁹ Email correspondence with the artist 18th of May 2013

multistable relationship to the work because the ambiguity of temporal forms circumvents clearly resolved musical structures.

In studies of perception, multistability refers to a feature of objects that are difficult to resolve – a famous example is the Necker cube⁷⁰ which can be seen from different, mutually exclusive, perspectives. Of interest to me here is not merely that a perceived object changes its orientation, but by consequence, that the position of the percipient is subject to an equivalent change; and therefore that the notion of a stable relationship between subjects and objects (of the kind idealised by the Cartesian subject) is undermined.

To reinforce this suggestion the cd itself contains two ‘versions’ of itself. Here pattern-generating systems are generally used to produce two distinct pieces, each of which is included on the cd. The track listing can be divided as follows:

Version A		Version B	
Track#	Track title	Track#	Track Title
1	Multistability 1-A	9	Multistability 1-B
2	Multistability 2-A	10	Multistability 2-B
3	Multistability 3	11	Multistability 4
4	Multistability 5-A	12	Multistability 5-B
5	Multistability 6-A	13	Multistability 6-B
6	Multistability 7-A	14	Multistability 7-B
7	Multistability 2-AA	15	Multistability 9
8	Multistability 10-A	16	Multistability 10-B
		17	Multistability 12

Table 4, Track listing showing version A and B.

⁷⁰ Developed by Swiss crystallographer Louis Albert Necker (1832).

UL8



Figure 25, UL8.

UL8 three sections, and the production of each

The project is divided into three discrete sections—*Part 1: The Occultation of 3C 273*, *Part 2: Vortex Studies*, *Part 3: Acids In The Style of Rian Treanor*—and closes with a short epilogue *Death of Loved One*.

The impetus for this project, like Multistability, was to explore microtemporal pattern generating systems and to temporality position tonal or pitched sounds with percussive sounds. Whereas Multistability used and extended sounds distributed with the TX81Z and DX100 synthesizers, here synthesis models were implemented in directly MaxMSP and do not conform to traditional tuning systems. As with Multistability patterns are not composed in a timeline

environment and are generated using MaxMSP. There is one notable difference between Multistability and UL8 concerning the recording of material: for the recording of Multistability patterns generated in MaxMSP were recorded as MIDI data which was then edited; by contrast while writing UL8 the output of MaxMSP was recorded in an audio format – two channels of audio containing percussive samples, two channels of audio containing synthesis. This was then edited in the audio domain.

UL8 Part 1: The Occultation of 3C 273

Part 1 is subdivided into 5 pieces. The temporal structures present in the piece are generated using a process also used in the production of Multistability. Here a list of values determine temporal intervals. Typically the list is ten items long with values from 1 to 20, these are then multiplied by 40 to give durations in milliseconds.

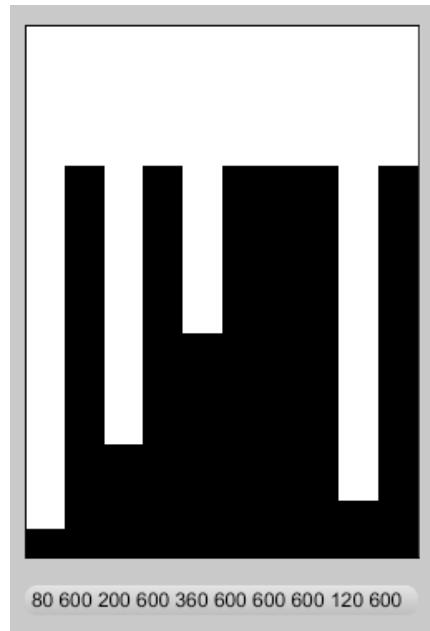


Figure 26, Durations as multiples of 40.

The synthesis for this section uses 32 sinusoidal oscillators configured in pairs; one of which is a carrier and the other a modulator. The carrier frequency of each is set by generating a list of values between user-specified low and high

values. The modulator frequency is a ratio of the carrier frequency. The 16 modulator ratios, as well as 16 modulation amounts (i.e. modulator intensities) are user specified. The synthesis settings are stored in a database, recalled and interpolated to create tonal change thought out the pieces.

I initially implemented this synthesis method for section 1 of the *Attack On Silence* audio-visual works. It was then used for the split cassette release *Thunder Bollocks* (Alku, 2009). Here it is overdubbed with a modified kick drum sample taken from the Roland TR707.

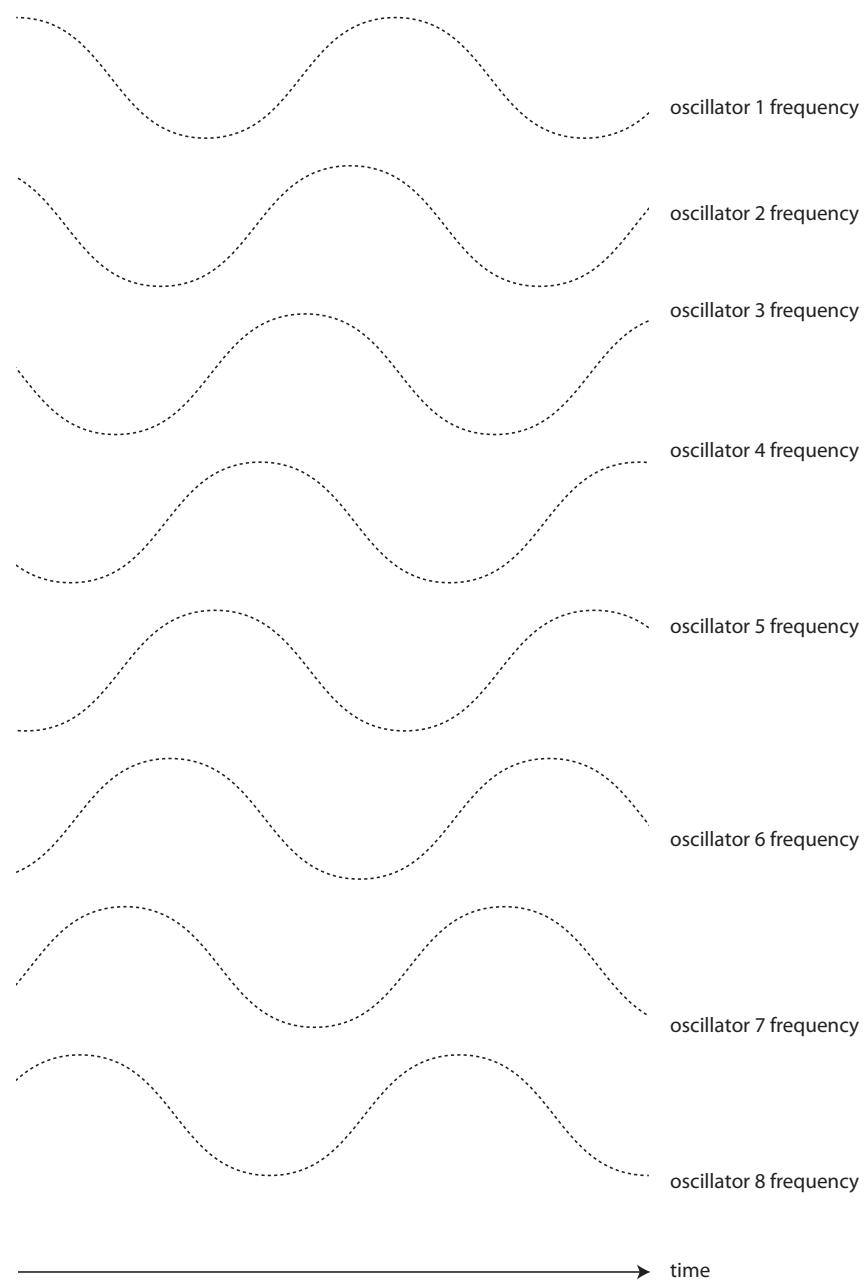
UL8 Part 2: Vortex Studies

Part 2 of this project features a number of oscillators each of which produce a rectangular waveshape with variable duty cycle. The frequency of each oscillator is modulated by an independent sinusoidal oscillator. (Referred to here as Low Frequency Oscillator, LFO). Here the frequency of the LFOs rarely increases beyond 20 cycles per second and is thus perceived as a frequency sweep as apposed to additional harmonic content. Frequency modulation can vary from large sweeps – 10Hz to 1000Hz, or smaller ranges 100hz to 105Hz. The phase of each LFO can be offset so that all can run in sync or be out of phase by a user specified angle. (See figure 27) Additionally, the speed of all LFOs is in turn modulated by a single sinusoidal oscillator, so that pitch sweeps increase and decrease in speed. A kick sample is synchronised to the low point of one or more LFOs to create a percussive element.

In this section 2 channel oscillation is implemented, panned hard left and right. Occasionally two lots of 2 channel oscillation are overdubbed at the editing stage.

8 channel versions of this work have been performed a number of times on 8 channel sound systems. Here each oscillator is relayed over a separate

loudspeaker. This was often accompanied with 8 blue lights the brightness of which is controlled by the 8 LFOs⁷¹.



⁷¹ A notable performance was Centre d'Art Santa Mònica, Barcelona 2008.

Figure 27, Illustration of pitch sweeps when phase offset is changed.

UL8 Part 3: Acids In The Style of Rian Treanor

The name of the final section *Acids In The Style of Rian Treanor* is a reference to Florian Hecker's earlier work *Acid In The Style Of David Tudor* (Editions Mego, 2009). It uses a pattern generation system similar to that used in section one. A key difference is that each temporal division can be repeated a number of times.

In this section all sound is produced using sample playback. In addition to a kick drum, various synthetic percussion sounds are included. These synthetic sounds were made with wavetable oscillators whose frequency was swept from high to low. The pitch, equalisation and loop length of these is modulated in real time. Modulation of these parameters is automated in the following manner.

A trigger is taken from the pattern generation system. The user specifies a number of "steps" (in the diagram below this is set to 5). A counter counts between 0 and 5, the output of which is then scaled from 0. to 1. to generate the following stream of numbers: 0.0, 0.2, 0.4, 0.6, 0.8 and 1.0. This stream then used to control pitch, equalisation and sample loop length parameters

Two of these procedures are used, the first to determine the pitch and equalisation setting, the second to determine the loop length of the sample. Different values are used creating a phasing between pitch-equalization change and sample loop length.

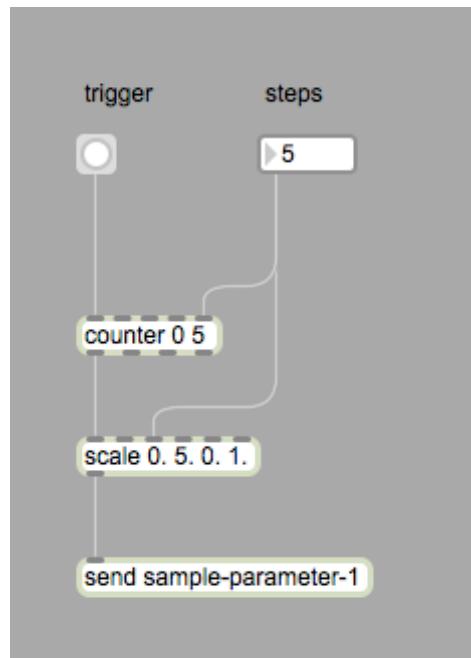


Figure 28, Step division technique.

UL8, discussion concerning the release of UL8 one week after the release of Multistability and its relationship to Multistability

UL8 was developed in tandem with Multistability. While Multistability was written for Raster Noton (henceforth referred to as RN), UL8 was written for the Viennese Editions Mego (EM) (before 2006 known as Mego). For me there are interesting relationships between at play between these two labels. My intention to release two records at the same time on both RN and EM should be understood in this context.

RN and Mego are of a similar age – RN was founded in 1996, Mego released its first record in 1995. In their formative years both primarily released electronic music and electronic sound art, positioning themselves within the canon of electronica traditions including industrial musics, synth pop and post techno musics (generally conforming to the trajectory I propose in appendix 2). Both pioneered the use of the laptop as a compositional and performance device.

If we consider the five year period 1996-2001 each label comprised a roster of artists primarily associated with that label. Russell Haswell, Florian Hecker,

Christian Fennesz, Farmers Manual and Pita were primarily associated with Mego; whereas Carsten Nicolai, Frank Bretschneider, Ivan Pavlov (CoH), Cyclo (Nicolai and Ryoji Ikeda) and (to a lesser extent) CM von Hausswolff were associated with RN.

These activities formed an extended community. Yet within this community RN and Mego were known for rather divergent aesthetic and ideological attitudes. RN for example promoted a highly ordered aesthetic agenda often based upon sustained sinusoidal waveshapes and rhythmic patterns constructed from electronic pulses and short bursts of noise. Bender, a founding member of RN, has said that RN's ambition was to become a distinctly "German" record label following the tradition of the Bauhaus⁷². By implication Bender's statement refers to grid like formalisation, order, functionality, efficiency and so on.

Yet if "order" could be applied to RN's aesthetic format, "disorder" might be applied to Mego. Haswell for example has commented that his performances would continue, "until the computer crashed".⁷³ Similarly Farmers Manual employed a performance paradigm where the performer knows that something will happen but not what will happen⁷⁴. Works typically included extreme noise levels, distortion and manipulation of sonic materials in a digital domain. Peter Rehberg describes Mego's catalogue as "Jagged"⁷⁵, referring to the divergent styles and approaches it contains. In keeping with this aesthetic Mego referred to their collective output as *extreme* computer music. The two labels, although belonging to shared musical communities, represented very different 'poles' within those communities.

⁷² Olaf Bender in discussion with the New Aesthetics in Computer Music research group between 14/04/09 and 26/04/09. The New Aesthetics in Computer Music (NACM) was a research group, of which I was a member, led by Tony Myatt based at the University of York (UK) and was funded by the Arts and Humanities Research Council. It conducted research into independent practices in experimental electronic and computer musics. It conducted a series of 9 artist residencies and conducted interviews with resident artists.

⁷³ Russell Haswell in discussion with the New Aesthetics in Computer Music research group between 11/01/08 and 19/02/09

⁷⁴ From a conversation with Oswald Berthold, Hull 2000.

⁷⁵ Peter Rehberg in discussion with the New Aesthetics in Computer Music research group between 12/07/09 and 25/07/09

Indeed the two labels are often compared; a recent reviewer, in reference to an Editions Mego label music festival⁷⁶ suggested the following:

What most differentiated MEGO from – say – Carsten Nicolai’s contemporaneous Raster-Noton imprint, was that Alva-Noto et al seemed in endless pursuit of a mathematical rigour and sterile reduction (not, for what its worth, a criticism) whereas [...] MEGO’s singular pursuit of sound-qua-sound seemed to be inoculated by a trenchant sense of transgression and wilful perversity that never allowed its distinctive style to become reducible to a signature aesthetic. (Backhous, 2013)

Rehberg reiterates this:⁷⁷

I always wanted to do a label that was loud, not loud in terms of sound, but like 'here we are', rocking the boat a bit. I still have that approach. Lots of labels and groups get into a generic flow of things and always do the same thing. I never was interested in that, so that's why the catalogue is quite jagged, you can't pigeon hole the label.

In the previous section I suggested that the label can be understood as a locus that facilities dialogue among practitioners and with their audiences. Yet dialogue is also established between labels. I find the dynamic between RN and EM, their histories, approaches and their particular roles within the evolution of electronic musics extremely interesting, and though my release schedule I wanted to participate in this. In developing two distinct projects for each of these labels, my aim therefore was to construct an interchange between the two.

Each label reacted differently to my intention to release two records at the same time. When I told RN of my plan to release something at the same time on Mego they considered terminating the release of *Multistability*; Mego on the other hand did not object to the RN project.

UL8, about the name and language used in its presentation

⁷⁶ Editions Mego, De La Warr Pavilion Bexhill On Sea UK 11th May 2013).

⁷⁷ Peter Rehberg in discussion with the New Aesthetics in Computer Music research group between 12/07/09 and 25/07/09

The name UL8 is a reference to the Celestion UL8 speaker. These played a particular role in the development of my interest in electronic music. The press release for UL8 explains this.

This project takes its name from the Celestion UL8 speaker. My older brother bought a pair of these when i was starting comprehensive school, and between his 10cc and Supertramp records i first encountered electronically synthesized sound at high volumes. I soon noticed a pattern emerging in my musical tastes which excluded guitars or drums. Instead i favoured almost exclusively the electronic textures and rhythms of The Human League, Fad Gadget and other synthesiser based music of that period. I was quite curious about this prejudice and would try to work out why Kraftwerk sounded so much better than a rock band of the time. So began my interest in the texture of synthetic sound - there was something much more beautiful (and perhaps more emotionally charged) about a sustained square wave than any guitar solo. I began search out and replay sections of music which dropped to a single sound - these, for some reason, were the best. This interest increased when, a few months later, my parent's next door neighbour (a technician in the electronics department at Sheffield University) let me borrow his analogue synthesiser on semi-permanent loan. And, following that, i managed to convince my dad to buy me a cheap second hand Boss Dr55 drum machine. Many years later Mat Steel and I used the UL8 speakers, now relegated to an attic in a rented house, to work on early abandoned 12" projects (circa 1993). Finally my brother gave in to demand and let me have the speakers which now sit in my front room. Although these are of little use in a studio context, they still provide an adequate and often rewarding listening experience. The tracks here replicate the simple monosynth and drum machine equation; and have, to a large extent, been made with and for the UL8. (Fell, 2010c)

Here the tone of the press release (which is based upon personal recollection, mentions family relationships, early projects and so on) is quite emotive and personal. The tone of this is in stark contrast to the project's sleeve notes an example of which follows:

Part 1: The Occultation of 3C 273. Using 32 operator frequency modulation synthesis configured in 16 pairs of operator and modulator. Frequency, modulation ratio and amount determined by linear interpolation between two spatial extremes, with further interpolation over variable temporal divisions. Panned at equal positions around the circumference of a circle using high order ambisonics. First implemented for the DVD 'Attack on Silence' (Line Records 2008) and developed for the cassette release 'Thunder Bollocks' with Evol (Alku 2009). The compositions here also feature modified Roland TR707 and Linn kick drum samples. (Fell, 2010d)

My intention here, in using different writing styles, is to prompt the listener/reader to consider how the emotional and technical descriptions of the work fit together, and ideally to create an ambiguous tension between the two. This strategy parallels the interplay of discourses surrounding the manipulation

of consciousness in the context of the audio-visual works discussed earlier. Here music is presented as a technical exercise or emotional journey or both. The exaggerated writing style suggests the music as constituted in some convoluted, uncomfortable relationship between the two.

Manitutshu



Figure 29, Manitutshu.

Manitutshu as UL8 with different sounds

This project was initially conceived of as a “remix” of UL8. Although it does not clearly fit that description. It was released as a double 12” vinyl playing at 45 rpm.

My strategy (in approaching this ‘remix’) was to use the pattern generating systems from sections 1 and 3 of UL8 and to connect these to a different synthesis model. In January 2011 I was invited by Erik Wiegand to produce a

collection of sounds for a new software synthesiser he was designing⁷⁸. This offers a number of oscillation types, filtering procedures and spectral manipulation implemented using additive techniques. Manitutshu makes use of the presets I developed for the release of this synthesizer.

Manitutshu also uses some sounds derived from the DX100 and TX81Z factory presets including JazzOrg, LatelyBass and electric piano patches⁷⁹. It features a synthetic “hi hat” sound constructed from two square waves with variable duty cycle and high pass filter with frequency swept by an envelope generator. The vast majority of pieces were recorded as MIDI from MaxMSP into Digital Performer and edited in the MIDI domain.

Manitutshu contains a further sonic element: the voice of the French translation from Google Translate⁸⁰. Here descriptions of pieces are translated from English to French, captured as audio, and placed at relevant points within pieces – for example the introduction of a new sound or algorithmic structure. This is included as reference to *Le Son Musical* (Pierce, 1984) which contains contributions from Jean Claude Risset and Max Mathews. Here short sound excerpts are preceded by a brief spoken introduction in French. In this sense my aim was to align the French electroacoustic tradition with the more vernacular techno tradition. In a sense to parody the hierachal distinction between experimental and normative asserted by Lyon (Lyon et al., 2002).

Manitutshu, notes on pattern generation

Although much of Manitutshu’s rhythmic structures are generated using procedures used in UL8, a number of pieces are generated using a method derived from a process I encountered in *RTC-lib* a real time composition library developed by Karlheinz Essl (1992-2010). In Essl’s implementation a series of possible durations and repetitions can be specified. Pairs of durations and

⁷⁸ Razor for the German software company Native Instruments.

⁷⁹ My motivation for using these sounds is explained earlier in this section in my discussion of the sounds used in Multistability.

⁸⁰ www.translate.google.com

repetitions are randomly selected. For example if one enters the following durations (100, 200, 300) and the following repetitions (1, 4), either 100, 200 or 300 milliseconds could be repeated either 1 or 4 times. My implementation, of Essl's procedure, although completely rewritten, is exactly the same. However I specify durations between 1 and 10 and multiply these by a specific amount (for example 40) to produce possible durations that are multiples of 40.

A further technique that features rather heavily on this recording is similar to the step/division technique used in the production of *Acids in the style of Rian Treanor*, section 3 of UL8. Here a number between 0 and 1 is specified. When the process is "triggered" (by a pattern generating system) that number is added to the current total and output.

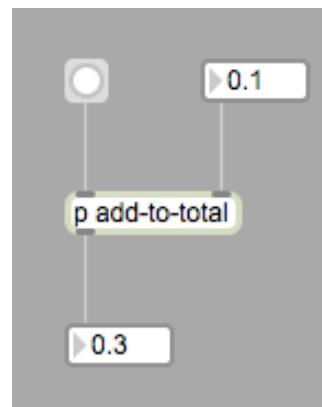


Figure 30, Accumulation.

If a maximum of 1 is reached, the total is reset to 0, and if a minimum of 0 is reached (for example when the user specified a negative number) the total is reset to 1. In the above example the output would be 0.0, 0.1, 0.2 and so on. The output, which is between 0 and 1 is then scaled and typically used to determine the note-on velocity of a midi note. This can be heard on track C1 *Manitutshu... First Algorithm Test* (among others) where it generates note-on velocity that is then used to control filter parameters.

Periodic Orbits of a Dynamic System Related to a Knot

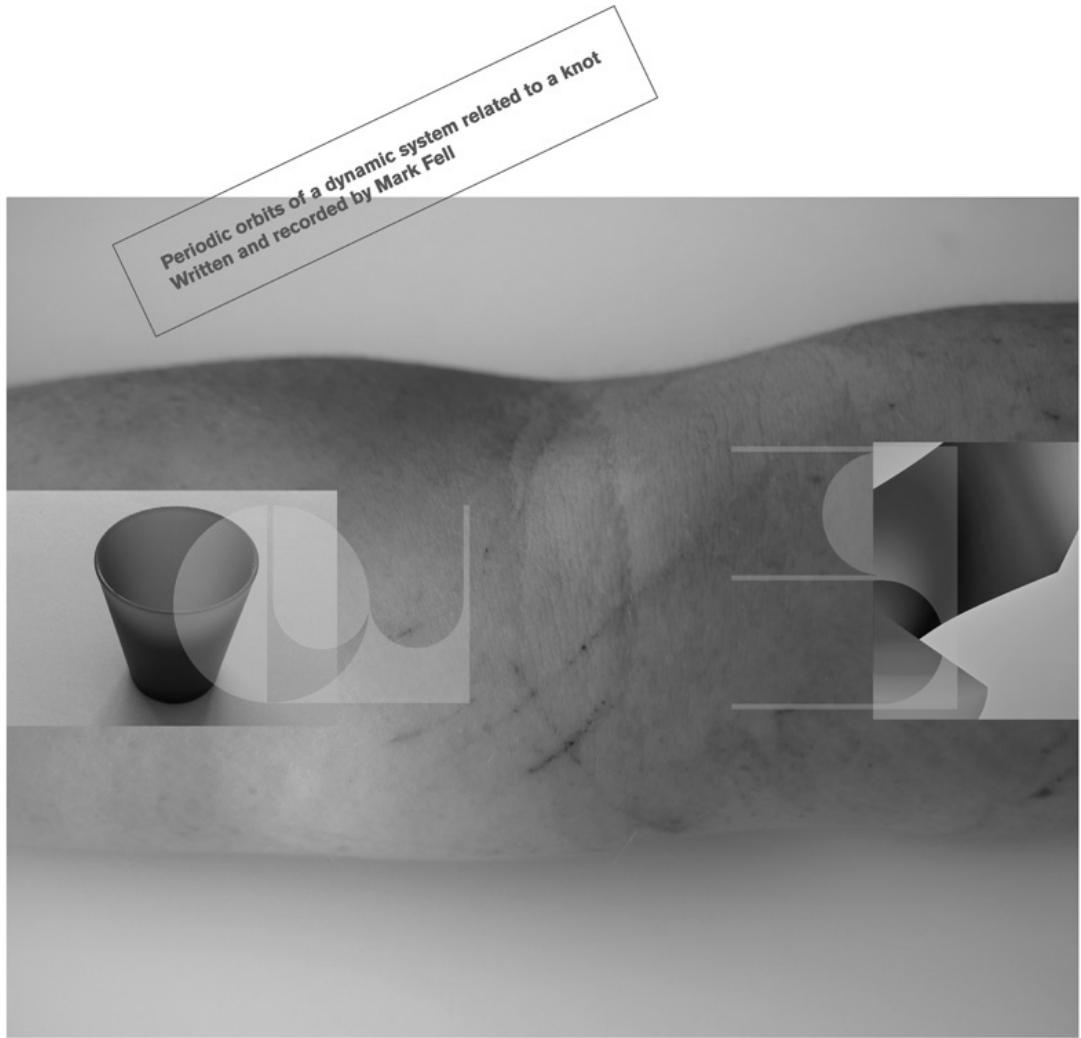


Figure 31, Periodic Orbits of a Dynamic System Related to a Knot.

Periodic orbits of a dynamic system related to a knot (henceforth PO) was released in November 2011 on Editions Mego. It was promoted as a “almost-live-album” (Fell, 2011). It’s two sides “this side” and “that side” are the same length – 23 minutes and 18 seconds. “This side” contains two sections and “That side” contains four sections but these are not indicated on the vinyl or the sleeve. The cover imagery and design refer to my earlier *Multistability* CD – specifically the two logo-like characters from the front of *Multistability* and the cut arm which features on the inner of *Multistability*. Although conceivably a

reference to self-harming, sleeve notes on the back of the record explain how this was a gardening injury incurred by my partner while cutting back bushes.

For this project patterns were generated in MaxMSP (with one exception which I will come to shortly). These were recorded into a MIDI editor where they were edited, copied, overdubbed and transposed.

That side, section 1, 0:00 to 3:19: Features synchronised kick and FM chord, with pattern generation taken implemented in Max using the same algorithm as Part 1 of UL8 *The Occultation of 3C 273*.

That side, section 2, 3:19 to end: This features a piece which was originally performed in Barcelona at *Supersimetria - New Languages in Computer Music curated* by Anna Ramos and Roc Jiménez de Cisneros⁸¹. A short recording of Pi Saw flute played by Jan Hendrickse is overdubbed. This came about after a dialogue between Jan and myself about possible collaboration. He gave me some samples of his work and as a test I placed this over the track I was working on. Jan was happy for me to include this on the piece and the sleeve notes fully credited his involvement.

This side, section 1, 0:00 to 2:44: Features a pattern generating system originally developed for Multistability but not included on that release.

This side, section 2, 2:44 to 9:10: This section starts with a recording of a Mac Mini computer failing to mount a DVD. This was imported into an audio editor. MIDI notes were drawn corresponding to the timing of events present in the sound recording. Therefore temporal patterns originate in the sound recording and are not generated with MaxMSP. The original sound file is overdubbed with kick drum and chord. As the piece progresses the original sound recording is removed leaving kick drum and chord. Further FM synthesis is overdubbed.

⁸¹ Espai Cultural Caja Madrid, Barcelona 2011.

This side, section 3, 9:10 to 18:07: This is a version of the duration and speed grouping system used on Multistability, and the three variations of *Shamanic Bear Session* described earlier in this section. Here patterns are edited, copied and transposed in MIDI with additional instrumentation. It reflects how the piece has changed following its widespread performance. For example the versions included on Multistability were generated while I was relatively unfamiliar with the system and its behaviour. Here, by contrast, I demonstrate my use of the system following a year of live performances with it. It is interesting therefore for the listener to compare this to track 13 on the Multistability CD.

This side, section 4, 18:07 to end: Features the same pattern generative system as "That side, section 1" with an additional overdub executed in MIDI of an alternating electric piano note.

Concerning Danielsen and Musical Rhythm

The Introduction of *Musical Rhythm in the Age of Digital Reproduction* (Danielsen, 2010) poses the question "... what happened to the sound and rhythm of African-American-derived, groove-directed popular music styles when these grooves began to be produced and played by machines" (p.1) suggesting that "... since the 1990s this music has involved ever-increasing experimentation with and manipulation of the microtiming of rhythmic events" (p.1).

If we accept Danielsen's term (i.e. African-American-derived, groove-directed popular music styles) and overlook any potential issues concerning a; notional musical practices before machines (Danielsen does not clarify what machine means in her discussion) and b; the idea of "ever-increasing experimentation", it might seem that Danielsen's analysis is relevant to the works discussed here. I suspect her definition of *groove-based* would cover the traditions I cite (in Appendix 2) as precursors, and the emphasis on the microtiming of rhythmic events corresponds to the works discussed here. Yet Danielsen ignores much of the activities undertaken by myself and my contemporaries – for example Ikeda's +/- (Touch 1996), Mika Vaino's *Metri* (Sähkö 1994), or the seminal *Fsck* by Farmers Manual (Tray 1997). Although positioned at the marginal end of electronic musics, each of these presents a number of interesting and pertinent responses to Danielsen's opening question and can be placed within "groove-directed popular music" traditions.

Given this omission, Danielsen's identification of two distinctive trends is somewhat problematic. The first trend evokes earlier traditions such as "1970s funk" (p.2) and "represents the antithesis of rhythmic clarity and precision that was sought after in the early days of digital music processing in the 1980s" (p.2). The second "electronica-related" category where "rhythmic events are on a metric grid" promotes the "exaggerated virtuosity of the machine". Here Aphex Twin's *Come to Daddy* (Warp Records 1997) and Squarepusher's *Hard Normal Daddy* (Warp Records 1997) are offered as definitive examples of this

type. However Danielsen neglects to mention any of Autechre's contemporaneous works such as *Chiastic Slide* (Warp Records 1997) or their later *Untilted* (Warp Records 2005) both of which are contrary to the metric grid paradigm. Similarly she does not pick up on direct references to 1970s funk present in Squarepusher's *Hard Normal Daddy*.

Danielsen also claims that the character of this second grouping of work "is linked technologically to the fact that digital editing software allows for the adjustment of individual tracks and events on a time axis with millisecond precision" (p. 1) assuming therefore that musics of this category are developed within time line based editing systems. Whereas a number of Aphex Twin's pieces (i. e. those representing paradigm cases of the trend 2 activity she identifies) were made with non-linear systems including MaxMSP and Kyma⁸². Furthermore in focussing on the minutiae of rhythmic events Danielsen does not address the potential impact of such technologies (i.e. both linear and non-linear formats) on larger temporal structures that may or may not be present in musics of this category: for example, she does not ask what happens to a piece's rhythmic structure over its entire duration as a consequence of having a visual representation of the entire duration visible on a computer screen.

Following her two-trend analysis, Danielsen suggests that the kind of "mechanical virtuosity" present in trend 2 travels from avant-garde activities of Aphex Twin to the likes of Destiny's Child (as evidenced in *Survivor* (Columbia 2001). However I question the validity of Danielsen's claim that Aphex Twin actually constitutes avant-garde practice. *Come To Daddy* reached number 36 in the charts and thus enjoyed a very large popular audience. Furthermore, even if we accept the notional split between avant-garde and popular practices, the trajectory from allegedly avant-garde to popular is problematic in this context. For example, many of the artists associated with the German record label Mille Plateaux whose roster included Oval, Akufen (noted in Danielsen's book) as well as the equally influential Thomas Köner, Vladislav Delay and others (fitting

⁸² Kyma is a sound synthesis and processing system developed by symbolic sound offering flow chart like process definition see <http://www.symbolicsound.com>.

Danielsen's 'electronica' categorisation) displayed a preoccupation with a number of commercially successful R and B producers including Timberland, evident Kid606's references to Missy Elliot's *Get Ur Freak On* (Elektra 2001). Similarly Carsten Nicolai and Ryoji Ikeda's *Cyclo* project reworked a number of patterns lifted from Timberland productions⁸³. As Danielsen presents no analysis of the emphasis on stylistic methods travelling from the avant-garde to the commercial, and does not draw attention to anything travelling in the opposite direction, I suggest her argument corresponds with the prejudice I identified in Lyon (2002) in chapter 1 of this document.

Danielsen does however raise a number of interesting points, some of which are relevant to the works addressed in this chapter. Firstly she identifies an undue importance on the attack phase of the musical event in much analysis of musical temporality:

"[...] most scholars privilege the attack-point rhythm and ignore the potential impact of sound or any other non-timing aspects. The temporal location of the rhythmic event is identified with its point of attack alone, and relevant durations (or the distances between events) have been conceptualized as the intervals between such attack points, the so-called inter-onset-intervals (IOI)." (Danielsen, 2010, p.9)

This corresponds to a concern explored in a number of my microtemporal works: here structures are not defined solely in terms of the temporal position of an event's onset, but investigate the duration of that event. In many cases (for example the start of Multistability track 2, which forms the opening piece of the presentation of microtemporal works) two fundamental parameters are engaged: the speed of events, and the duration of events (expressed as a percentage of Danielsen's IOI (inter onset intervals)).

Danielsen also asks "how does sound influence our experience of timing? How do the inner dynamics of sound influence our experience of the beat's onset?" (Danielsen, 2010, p.10). A concern that corresponds to my exploration of

⁸³ Nicolai in discussion with Fell, Sweden 2013.

sequences made up of synchronised timbral and temporal pairings, and the rhythmic articulation this produces.

Finally, a further relevant point developed by Danielsen, is a distinction between sounding events and non-sounding reference structures:

“[...] rhythm comprises an interaction between non-sounding reference structures (schemes used by the performer/listener in their respective music-related acts) and sounding rhythmic events. In rhythm, as in music in general, virtual reference structures and actual sounding events inform one another continuously.”
(Danielsen, 2010, p.4)

I find this model a somewhat problematic. Danielsen’s description of the non-sounding reference structure refers to the performer or listener but not to the machine – i.e. that which is central to her study (if we accept the books opening question). Despite her emphasis on the machine and its impact, in such passages we catch glimpses of how the machine (i.e. the technical) is subtlety left out of her model, pushed to the margins, present only in rhetorical nods. For example recall Danielsen’s opening question concerning the impact of the machine on music production, implying the possibility music production before machines, and thus the pre-mechanical or hypothetical artisanal ‘instrument’ is uncritically framed as non-machine-like in character. Furthermore Danielsen explicitly refers to non-sounding reference structures as “virtual” (p. 4)(i.e. non-material/mental) constructs:

“[...] the overall organising principles of music in general (such as pulse, subdivision and so on), to learned stylistic gestures, to categories established through the patterns introduced by one particular song [...] (Danielsen, 2010, p.4)

To unequivocally *re-include* the machine within this equation, I suggest that Danielsen’s non-sounding reference structures should be considered analogous to the computationally implemented procedures (that I describe earlier in this chapter) within which microtemporal patternisation takes place. And therefore in a wider sense, the *non-sounding* should include the physiognomies, behaviours and processes implicit in the machines used in the production of the musics that she cites, and not merely restricted to the vocabularies present within various traditions and practices. If we follow Latour (1999) and Clark

and Chalmers (1998) such machine-based (i.e. the Latourian non-human, the cognitively non-neuronal) physiognomies, behaviours and processes are the building blocks within Danielsen's non-sounding structures are formed.

Presenting my 'Microtemporal' works



Figure 32, Presenting "Microtemporal works" at Paradiso Amsterdam as part of Sonic Acts Festival February 2012. Photo by Rosa Menkman.

The first presentation of my microtemporal works was in Sheffield (UK) at CADS artspace in April 2011 where it featured as part of their *Listen Up* festival of sound art. Since then I have presented it on a number of occasions and in a number of different environments – from unruly clubs and bars, to art galleries and auditoria. The presentation follows the following structure:

- Multistability track 2
- Periodic orbits, "this" side section 2
- Multistability track 8
- Multistability track 1 and 9
- Periodic orbits, "that" side section 2

- Multistability track 3
- Manitutshu side C track 3

On some occasions I omit the first piece “Multistability track 2”.

The presentation tends to last between 25 to 35 minutes. On one occasion I was asked to play for 45 minutes as I was the only act present (number 23, YU contemporary, Portland USA). The 4th presentation, which took place in London, featured ambisonic panning of sounds over an irregular array of 12 loudspeakers.

UL8 is not included in the presentation of microtemporal works.

The system used to present my microtemporal works is implemented in MaxMSP. Percussive sound is typically sample based with the exception of a synthetic hi hat constructed from detuned and filtered square waves. FM synthesis is produced with three instances of FM8. There is one case where a keyboard sound is sampled and is not synthesized in real time.

The following diagram shows a topological structure of the presentation system.

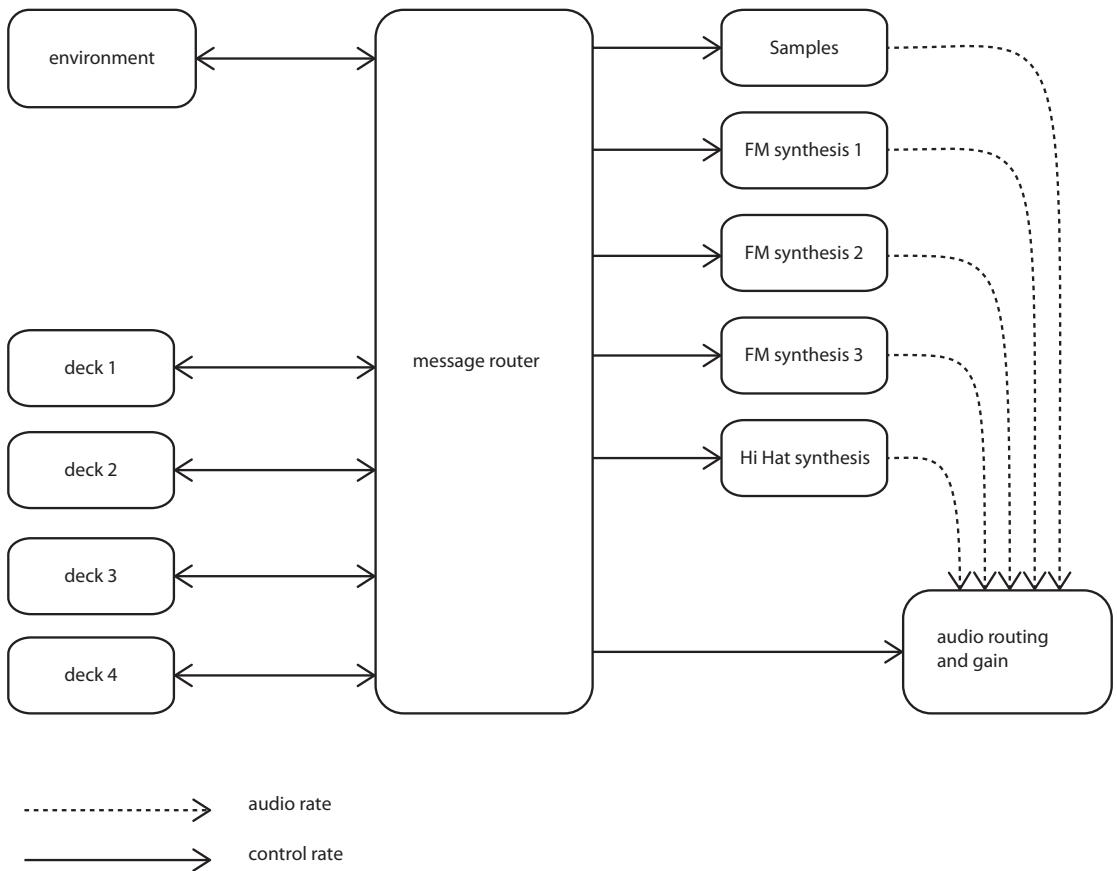


Figure 33, Microtemporal works presentation system topology.

The environment contains four “decks” into which different processes, or “tracks” can be loaded. These can send and receive control messages and event data. In doing so tracks contained within decks can communicate with one another, and share data and event messages. In this manner they can be synchronised, control one another and share parameters within the wider environment. A track, therefore, when loaded into a deck, can generate pattern data and trigger sound, control the wider environment itself or any other decks.

Five sound producing modules are included (samples, FM synthesis 1 2 and 3, and Hi Hat synthesis). These are connected to an audio out module that routes outputs and controls the gain of each sound producing module. Audio from the sound producing modules can be routed to different physical outputs on an audio interface, or mixed to stereo, or panned and decoded using ambisonics.

List of presentations of microtemporal works

1. CADS artspace as part of Listen Up sound art festival Sheffield 20/04/11
2. Electra Festival (with Attack on Silence radial (AOSR) visuals) Montreal 6/05/11
3. Hyatt regency room 1013 private show (with AOSR visuals) Montreal 7/05/11
4. Ambisonic version as part of Blank Canvas event at village underground London 30/06/11
5. We can elude control, Peckham multi-storey car park show London 20/08/11
6. Café otto London 28/09/11
7. MSPF festvial Shreveport 14/10/11
8. Neon Marshmallow festival New York 15/10/11
9. Artisphere (with AOSR visuals) Arlington 19/10/11
10. Middlesex lounge Boston 20/10/11
11. Human Studios event Sheffield 3/11/11
12. Berghain Club Transmediale Berlin 31/01/12
13. Paradiso Sonic Acts Amsterdam 24/02/12
14. Mago Nagoya 2/03/12
15. Blackout Fukuoka 3/03/12
16. Nuoooh Osaka 9/03/12
17. Soup Tokyo 11/03/12
18. Eco Festival Madrid 18/03/12
19. Slip Discs launch Manchester 27/06/12
20. CADS artspace Sheffield 5/09/12
21. NK artspace Berlin 29/09/12
22. Bristol 13/10/12
23. YU contemporary Portland 16/10/12
24. Modern Music Guild Oberlin 18/10/12
25. Urban Prototyping festival San Francisco 20/10/12
26. Wundergrund festival Copenhagen 28/10/12

27. Sound of Stockholm festival Stockholm 24/11/12
28. Madeiradig festival Madeira 3/12/12
29. PAF festival Olomouc 7/12/12
30. Kultur Vaerftet Helsingor 14/12/12
31. Lullcec Barcelona 22/12/12
32. Birthdays club London 14/01/13
33. Golden Pudel club Hamburg 26/01/13
34. reiheM, Zimmermanns Cologne 29/01/13
35. Editions Mego DLW Pavilion Bexhill 10/05/13
36. Heart of Noise Festival Innsbruck 21/06/13

5. Works responding to house musics

Introduction

In the previous section I discussed my “microtemporal” works, a primary characteristic of which is the use of generative procedures to produce rhythmic patterns that are not constructed from temporally related subdivisions of a determinate and fixed loop. In opposition to this, during 2011 I began to consider a series of works where patterns should be exclusively constructed within a timeline based composition environment using a “pencil tool” to enter note data. Although this tool was intentionally excluded from my microtemporal works, here it assumes a central and significant role.

The works covered here are divided into three projects. A series of three 12” singles called *Sensate Focus* released on the label of the same name in 2011; an album *Sentielle Objectif Actualité*, released in 2011 on Editions Mego; and *n-Dimensional Analysis* which was completed in March 2012 and was released on Liberation Technologies in July 2012.

These works are intended as a response to the musical structures, techniques and vocabularies present in house musics. By this I refer not primarily or exclusively to the sonic palette, but principally to the division of music into repeatable patterns of observable and fixed duration; the placement of percussive events at specific points within patterns to demarcate distinct levels of temporal division; the organisation and repetition of patterns to form larger “arrangements”; and, strategies by which layers of instrumentation are introduced and removed.

The works’ core ideology promotes the view that such structures and vocabularies are established in parallel to technical paradigms; and in particular, to the popularisation of MIDI and the development of computer based editing systems that organise musical data within timeline schema. A full

analysis of this co-development is peripheral to this discussion, however I want to briefly outline one or two matters that are pertinent to the works discussed here.

The popularisation of MIDI-timeline paradigm

Although the MIDI interface was included on synthesisers as early as 1983 with the Prophet 600⁸⁴ the first computer to have on-board MIDI ports did not appear until 1985 with the Atari ST⁸⁵. Some years later, in 1989, Steinberg produced Cubase⁸⁶, a major revision of their earlier PRO24⁸⁷ software. Unlike PRO24 or its rivals such as C-Lab Creator⁸⁸, Cubase's underlying principle is the timeline. Additionally it places a hierachal division between the "pattern" and the "arrangement", according to which the "pattern" is a collection of notes, and the "arrangement" is a collection of "patterns". At the level of the pattern pitch is placed on a vertical axis, with time (divided into bars, beats and further subdivisions) running horizontally; at the "arrangement" level, individual musical layers (associated with MIDI channels) occupied the vertical axis, and time again placed horizontally. Within this two dimensional space patterns are structured and placed within the arrangement. One should also note that initial versions of Cubase did not handle audio data, and functionality was restricted to MIDI data⁸⁹.

As an obsessive consumer of electronic music at that time (refer to appendix 2) I imagined a kind of speculative shift: a parallel change in music technology and musical aesthetics. To me the expanding house music scene of the mid to late 1980's seemed somehow commensurate with the emergence of this new wave

⁸⁴ Sequential Circuits Inc. (SCI)

⁸⁵ The Atari Corporation

⁸⁶ Steinberg

⁸⁷ Steinberg

⁸⁸ Creator was a forerunner of Notator, which later became Notator logic, and finally Logic which Apple bought in 2002.

⁸⁹ Although early house and techno musics' made frequent use of older generation of pre-midi equipment, such as the Roland TR808 drum machine or the Roland TB303 bass synthesiser and sequencer (Roland Corporation), it was also customary to have such equipment retrofitted with MIDI ports or brought into the MIDI paradigm using MIDI to Control Voltage (CV) convertors. Certainly in the electronic music studios I visited in Sheffield—Fon, Epic Head, Simplex Complex—at that time were, without exception, based around a computer hosted MIDI sequencer with any pre-MIDI equipment subsumed into an homogenised MIDI network.

of music technologies. My belief at that time was not that house musics were simply determined by technical development, rather that formal features could be thought of as a response to conceptual schema implied in the tools used in its construction. There seemed to be to be a correspondence between the vocabularies, techniques and structures present in house music, and the techniques and structures present in the MIDI-timeline paradigm: music as a series or more or less linear layers that introduced and muted throughout the composition in various combinations. Although one could indeed use this framework to reproduce the verse chorus structure of a pop song, this, I would argue, is not what the framework fosters or facilitates.

With the benefit of twenty-five years further consideration, following Latour's account of activity as constituted within networks of humans and non-humans (Latour, 1999, 2009) and studies in extended cognition (Clark and Chalmers, 1998), I would suggest that it is no coincidence that one might detect a correspondence between house music's formal structures, and the technical paradigms embedded in its production.

Energy and excitement

My aim here however is to extend this view. The works discussed here should not be read as merely aesthetic or technical exercises, rather they adopt the position that the structures and vocabularies are at some rudimentary level formed in relation to the construction and conditioning socially understood, shared behaviours. Indeed a primary focus of the works discussed here concerns the relation of house musics' rhythmic and narrative structures to the instigation and organisation of energy and excitement.

The primacy of this connection was made very clear to me in a recent performance of a collaborative work with Mat Steel under the group name SND on the 18th December 2012. This took place in a fashionable invitation-only

club in the east end of London called The Boilerroom⁹⁰. Many prolific DJs and live acts have presented there work here, which is streamed live and then made available online. In fact with the Boilerrooms' extended audience⁹¹ this platform was an ideal way to test responses to such work.

The work I presented as SND shared some structural similarities with my microtemporal works, essentially the time base of house and techno patterns was disrupted to produce oddly distorted rhythmic structures. Secondly no attempt was made to produce levels of excitement and energy, and we as performers stood quite casually and did not move at all in time to the music. When the work was streamed, and following its posting to Youtube (brtvofficial, 2013), several hundred comments were posted. Many of these specifically dealt with issues relating to the absence of determinate rhythmic structures and the lack of energy and excitement present in the performance. I include selected comments to illustrate this position.

"header text > live show ... where is the show?" acidgreenvienna, comment (brtvofficial, 2013)

"this is utter shit! where are the beats" Throb, comment (brtvofficial, 2013)

"what the fuck?... these foos for real?" AdonaiiBodzin, comment (brtvofficial, 2013)

"They have to be more animated though, how could anyone get excited about their performance if the performers themselves look so bloody bored" Matthew Ternent, comment (brtvofficial, 2013)

"these guys dont even do anything wtf" Darcy Thornycroft, comment (brtvofficial, 2013)

"this is the worst music I've ever heard." s22we, comment (brtvofficial, 2013)

"what the flying fuck did I just watch" Therealoops, comment (brtvofficial, 2013)

"Is this a piss take?" Rampage0677, comment (brtvofficial, 2013)

"wtf is this shit supposed to be?" Dubbase Catharsis, comment (brtvofficial, 2013)

⁹⁰ <http://boilerroom.tv/>

⁹¹ Richie Hawtin's performance at the Boilerroom Amsterdam having over 3 million hits at the time of writing. <http://www.youtube.com/watch?v=sui24hHDZDI>

I have encountered similar responses in live presentations of my microtemporal works. On one occasion, at The Modern Music Guild Oberlin in October 2012, the curator saw fit to have me present the work to in a rowdy college bar. Throughout the presentation I was met with a barrage of verbal abuse, stage invasions and projectiles. Of course I was quite happy with this response⁹².

On this subject of energy and excitement the prominent house music producer Terre Thaemlitz (known as DJ Sprinkles) considers his role in making and presenting music as “work with the ups and downs [...] to balance the ups and downs”⁹³. He suggests that narrative arrangement of house music does not follow the verse chorus structure of the pop song and instead develops through a series of breakdowns and build-ups. He refers to these as techniques that “energize or de-energize the audience”. This, I would suggest, substantiates the claim that the vocabulary of house musics is formed in response to a club-based functionality.

I propose therefore that we consider the formation of house music’s aesthetic anatomy not as an isolated form, but as a response to cultural and technical processes, a locus where concerns of one sort or another interact and amalgamate. In this sense house music is viewed as particular configuration of social, technical and musical considerations.

The vocabulary as central concern

My intention in this series is not merely to replicate a well-known vocabulary, but to apply various distortions to its structure and to disrupt its behaviour. Key to this work is apply an “appropriate level” of disruption; house musics’ familiar rhythmic and narrative structures should be present, but as a skewed version, and not entirely obliterated as in the microtemporal works. Through the

⁹² As a rather interesting side note, on both occasions, SND at the Boilerroom, and microtemporal works at The Modern Music Guild, a small number of responses were overwhelmingly positive. For example 9emmett9 commented the Boilerroom show is “Absolute magnificence” (brtvofficial, 2013). And following the Modern Music Guild as small group of students were keen to ask questions about the work.

⁹³ Skype discussion with the author, 17th May 2013

evolution of this series a concern has emerged; this I feel is focused in the most recent pieces of the works collected here: *n-Dimensional Analysis*. The concern is to isolate and study the behaviour of techniques present within house musics without necessarily eliciting specific emotional responses in the listener. For me, a response to the musical structures, techniques and vocabularies present in house musics necessarily means a response to the technological structures, techniques and vocabularies present in equipment within which they are constituted, and also to their functionality within specific social contexts. In this sense I ask that the music included here is listened to, not purely in terms of its aesthetic appeal (or conversely a lack of it), but as a critical repositioning of the juncture at which technical and social imperatives meet. Although this critical manoeuvre is perhaps not entirely evident in the earlier works (the three *Sensate Focus 12"* singles and the album *Sentielle Objectif Actualite*) I feel it is resolved with the most recent pieces *n-Dimensional Analysis*.

Strategies and processes

1. *Pencil tool*: As with the microtemporal works, for these projects I conceived of a number of general methodological features to which the projects should adhere. The first of these, as mentioned earlier, was the use of the pencil tool. By contrast to the microtemporal works, here the pencil tool places specific events at specific places and in this sense I consider its use to be overwhelmingly deterministic. In this sense the pencil tool is the defining difference between the two strands of activity – the deterministic placement of specific events at specific positions, as opposed to the “multistable” conditional, random, often-unpredictable generation of events at a number of possible positions.

2. *Timeline*: Mentioned earlier is the hierarchy present in both Cubase and Logic between the “pattern” and the “arrangement” whereby the song is a collection of patterns structured within an arrangement. Digital Performer deviates this hierarchy and places all events at the same temporal level. I continued to work with Digital Performer for this reason.

3. Looping: Works are constructed from loops that are placed within a larger compositional structure. Digital performer has a particular and rather peculiar way of dealing with loops. Here loops are drawn around regions of events (in this case MIDI notes). Loops can be moved and resized independently of the events they contain; this facilitates experimentation with loop sizes and contents independently. Although this is possible in both Cubase and Logic, to do so necessitates moving between hierarchical levels; a process I find this slightly cumbersome and ideologically unacceptable.

4. Loop lengths: Loops are of a specific duration that is both fixed and clearly identifiable. Yet loops lengths are generally of an uncommon temporal interval. For example, rather than being 8 beats long, some are $7 \frac{3}{4}$ beats long, or $8 \frac{1}{2}$ beats long.

5. Loop division: Temporal divisions within loops often mix different subdivisions of a beat. Events placed within loops do not demarcate regular temporal divisions – for example the kick drum does not exclusively fall on the beat.

6. Sonic Production values: Despite uncommon loop lengths and temporal divisions, the production of the music attempts to be rather more ordinary. To this end a great deal of time was spent learning how to make combinations of sounds yield convincingly realistic house production. Here some personal prejudices, such as the non-usage of artificial echo and reverberation had to be overcome. Similarly personal habits, such as choice of kick drum sound and hi hat sounds in particular had to be reviewed.

When taken collectively, I suggest that these strategies present a revision of technical and musical vocabularies and structures at play in house musics and its production; ones distorted to a degree I consider appropriate in the context of the works discussed here.

Sensate Focus 12" singles

In June 2011 I was invited by Peter Rehberg to curate a sub-label for Editions Mego. Rehberg proposed that the musical remit of the sub-label should be house and techno. In response I suggested that its focus should specifically address house musics derived from a North American tradition circa 1990-1994;⁹⁴ (see appendix 2) and to bring this into dialogue with a newer generation of club musics being produced in the UK⁹⁵. Indeed, it appeared to me that this younger generation producers and labels, although placed within the urban UK club scene, were taking their sonic and stylistic cues from the earlier North American tradition—the specific tonality and modulation of chordal structures, the treatment of vocal samples, the character and placement of hi hat samples—refers heavily I would argue, to the works I cite as indicative of the 1990 to 1994 North American tradition.

Sensate Focus was chosen as a name for the sub-label. It refers to the sex therapy technique developed by Masters and Johnson (Masters and Johnson, 1966). According to this technique, “genitals, and in the case of female subjects, their breasts, are not to be touched. [partners] are informed that the purpose is to enjoy sensuous experience as such; they are not to expect to become sexually aroused” (Van Hasselt and Hersen, 1996, p.349). It is intended that this should correspond to the condition of the music as ‘sensual experience’ without the expectation to activate and regulate energy and excitement discussed earlier. Here the goal is removed and therefore its teleological status is undermined.

The label’s logo is a pencil, stylised to reference the “pencil tool” found in Digital Performer (the audio and MIDI editor within which the work is constructed). Further emphasis is placed on the pencil: any orders made directly from the record label’s online shop ship with a *Sensate Focus* pencil.

⁹⁴ Indicative works include *Can You Feel It* (Dubby Dub Marc Kinchen remix) by Chez Damier, released on KMS, 1992; *Hard To Get* by Choo Ables, released on E-SA records, 1993; and *Keep It Open* by Effervescence released on Hi-Bias Records, 1993.

⁹⁵ Particularly notable examples of this include the *Hyph Mngo / Wet Look EP* by Joy Orbison, released on Hotflush Recordings, 2009; and activity surrounding the Leeds based Hessle Audio label.

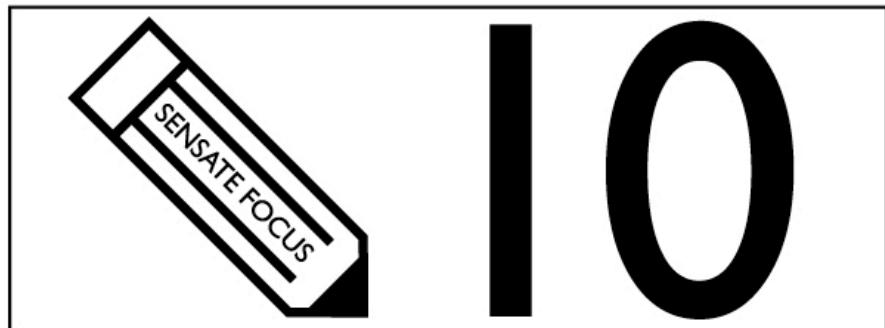


Figure 34, Sticker for Sensate Focus 10 showing the "pencil" logo..



Figure 35, Sensate Focus pencils, shipped with orders direct from web shop.

Here I aim to create a tension between the declared condition of the work as non-goal fixated ‘sensual experience’, and the emphasis on the pencil tool as determinate locus of the concentrated intentionality of the producer: a parody of the Cartesian paradigm. Furthermore, despite the exclusion of genital contact in the therapeutic technique, here the dominant iconography of the pencil unambiguously recalls the phallus. The intent therefore is to acknowledge notions of sexuality, sensuality, intentionality and functionality at play within house musics.

Each record is distributed in a plain white ‘disco bag’ (i.e. a plain white card cover) with a small sticker including a catalogue number and logo. This format is in keeping with labels prominent in the North American house music

tradition circa 1992. Catalogue numbers are derived using the following equation: $10 \div$ release number. The series is as follows:

Release number	Release date	Catalogue number
1	10th April 2012	10
2	19th June 2012	5
3	28th August 2012	3.333333333
4	22nd October 2012	2.5
5	15th April 2013	2
6	24th June 2013	1.666666667
7	future	1.428571429
8	future	1.25
9	future	1.111111111
10	future	1
11	future	0.909090909
12	future	0.833333333
13	future	0.769230769
14	future	0.714285714
15	future	0.666666667
16	future	0.625
17	future	0.588235294
18	future	0.555555556
19	future	0.526315789
20	future	0.5

Table 5, Senate Focus catalogue numbers.

The first three records in this series (10, 5 and 3.3333) were solo productions. The following three (2.5, 2 and 1.666666) were collaborative⁹⁶. Here I include

⁹⁶ *Sensate Focus* 2.5 with Winston Hazel (a founding member of the group "Forgemasters" responsible for the first release *Track With No Name* (1989) on the Sheffield based Warp records).

the first three solo records for consideration, I will now briefly outline some of the sounds and timing structures present on each of these.

Sensate Focus 10

Sensate Focus 10 was the first release on the new sub label. The work itself partially reuses materials that from a collaborative project with Terre Thaemlitz⁹⁷. After completing this project I was to some extent disappointed with its rhythmic structure and arrangement. I decided to rework this: specifically I used percussive sounds but not patterns, vocal samples, a synthetic chord and a melodic sound and pattern⁹⁸. The materials quoted from the earlier work were re-sequenced to form new arrangements. In fact this referentiality and reusability of materials occurs throughout the *Sensate Focus* series with the synthetic bell melody reappearing in modified forms throughout all three the releases discussed here.

Side X begins with an 8 beat loop; at 3 minutes this is replaced with a 7 beat loop. Side Y is a loop of 8 beats; at 8 minutes 30 seconds the end section is looped over $7 \frac{3}{4}$ beats.

Sensate Focus 5

For this release new vocal samples were introduced, and new drum sounds were implemented. Chord textures were developed from Sensate Focus 10, and the synthetic bell sound present on Sensate Focus 10 is again included.

Side X comprises three linked sections. Section 1 is 8 beat loop, sections 2 and 3 have loops of $7 \frac{1}{4}$ beats. Side Y is an 8 beat loop throughout.

Sensate Focus 2 with Mat Steel who I work with on the collaborative SND project. *Sensate Focus 1.666666* with Sasu Ripatti, also known as Vladislav Delay a prolific Finish musician and producer.

⁹⁷ *The Complete Spiral EP* (Comatonse Recordings, Japan, (2012)

⁹⁸ Percussive sounds were sourced by myself and Thaemlitz, Thaemlitz provided a number of drum sounds sampled from vinyl. Thaemlitz also sourced vocal samples. I produced synthetic chord and melodic sounds and patterns.

Sensate Focus 3.33333333333333333333333333333333333

On the third release time structures and sectionality of arrangements is increasingly distorted. Side X contains a number of different temporal structures and has a basic loop of 3 ½ beats. Each beat is subdivided into six smaller divisions. Different temporal divisions and durations used and are layered against one another.

Side Y has a basic loop of 3 ½ beats. A short pause is added at 7 minutes 22 seconds and a longer pause (about 15 seconds long) at 7 minutes 30 seconds. Within these pauses note data is sustained.

When comparing the three releases I detect a development of ideas and approaches. For example the use of unfamiliar timing structures and the “sectionality” (i.e. the division of tracks into distinct sections) becomes more pronounced as the series progresses.

Sentielle Objectif Actualité

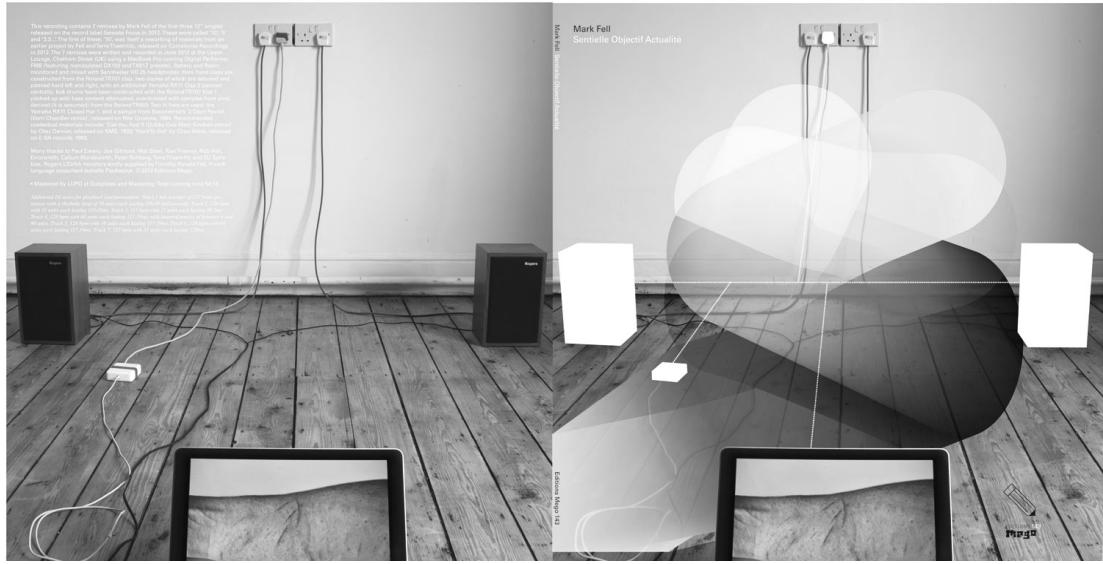


Figure 36, Sentielle Objectif Actualité album cover.

Additional DJ notes for playback synchronisation: Track 1 has a tempo of 137 beats per minute with a rhythmic loop of 30 units each lasting 109.49 milliseconds.

Track 2, 126 bpm with 31 units each lasting 119.05ms. Track 3, 113 bpm with 17 units each lasting 88.5ms. Track 4, 128 bpm with 60 units each lasting 117.19ms, with inserted pauses of between 4 and 80 units. Track 5, 128 bpm with 16 units each lasting 117.19ms. Track 6, 128 bpm with 64 units each lasting 117.19ms. Track 7, 125 bpm with 31 units each lasting 120ms. (Fell, 2012b)

The words *Sentielle* and *Objectif* are translations of Sensate Focus by Google translate⁹⁹ however the precise meaning of ‘Sentielle’ is unclear. Some discussion with French speakers seems to suggest that this was an invented word, an anomaly produced by the translation algorithm.

The project, released in September 2012, was conceived of as a remix album of the first three Sensate Focus 12" singles: a remix of works I had made under a pseudonym (Sensate Focus) remixed by me under my own name. Yet the methodology behind this remix was not simply to take each track one by one, re-edit it, adjust sounds or introduce new materials. Here each piece was broken into component parts and recombined to produce new works. Furthermore at the time of making, *Sensate Focus 3.333333333* had not yet been completed and was at the early stages of production; the remix was completed before the original. In fact, the pieces present on *Sensate Focus 3.333333333* could be more accurately considered to be a version of the work on the remix album.

This state of affairs I hope draws attention to a number of ideas: firstly, the re-usability and recombination of materials to create a number of works; secondly, the sense in which the idea of the ‘original’ is questioned; thirdly, the notion of different versions of the same material being released under different names.

This dynamic is present in works on the On-U sound record label circa 1985¹⁰⁰. Here musical materials would be reused and re-released in different combinations, with different production styles and under different project names. It is a particular feature of works by Mark Stewart (and the Maffia/Mafia), Tack Head, Fats Comet and Keith LeBlanc.

⁹⁹ An automated online translation service, Google Inc, Mountain View CA.

¹⁰⁰ Founded by English music producer Adrian Sherwood

A primary example is *Hypnotized* (Mute, 1985) taken from the album *As The Veneer Of Democracy Starts To Fade* (Mute, 1985) another version of which is released as a 12" single by the fictitious character "Fats Comet" as *Dee Jay's Dream* (World Records, 1985). While *Hypnotized* is a distorted, structurally 'corrupted' sonic production, *Dee Jay's Dream* by contrast has rather slick production style. Furthermore the tension exerted between the words 'hypnotized' and 'dream' promote a disturbing picture of state oppression on the one hand, and the gloss of consumerism on the other. The schism between the two is reaffirmed in the use of found sound: while *Hypnotized* includes samples from William Burroughs's authority-hostile tape piece¹⁰¹, *Dee Jay's Dream* takes samples¹⁰² of police officers joking with a member of the public for exceeding the speed limit. A dichotomous tension is therefore constructed between the two: the police as instruments of state oppression; and the jolly, sarcastic bobby on the beat.

To return to the works discussed in this section, the construction of dialogue between multiple incarnations of variously-transformed and re-presented materials is an important feature. This sense of interplay and dialogue (as opposed to an identifiable 'starting point' at one end of a linear chain) corresponds to my earlier discussion of extended cognition, recalling the position that "cognition materializes in an interpersonal space" (Hasson et al., 2012, p.1).

¹⁰¹ *Nothing Here Now But The Recordings* by William S Burroughs released on Industrial Recordings, 1981.

¹⁰² From a British comedy programme circa 1980, Source unidentifiable

n-Dimensional analysis

MARK
FELL
**n-DIMENS
IONAL
ANALYSIS**



Figure 37, n-Dimensional Analysis Cover.

This leads me to the last piece in this section *n-Dimensional Analysis* which is perhaps the most formally rigid of the works responding to house musics. Additionally I feel it is the most resolved of these works – in terms of the complexity and congruency of rhythmic structures; the sonic palette; the temporal re-structuring of materials to form multiple versions; the interplay between these.

Throughout the entirety of this work the same 7 percussion samples are used, these include 3 kick drum sounds, 3 clap sounds and 1 hi hat. A single keyboard sound is used which features filter modulation from a low frequency oscillator. All parameters are left unchanged throughout. A bass sound derived from the TX81Z LatelyBass¹⁰³ responds to the same midi data as the keyboard but is set to monophonic mode. Each side is divided into 7 distinct sections each of which lasts approximately 1 minute 45 seconds. Sections are of differing loop lengths and contain different temporal subdivisions – typically 4 and 6 divisions per beat.

A feature of which I am particularly satisfied is the production style. This I feel accurately references a number of stylistic components present in the works cited as indicative materials earlier in this section and appendix 2.

¹⁰³ Discussed in the previous chapter on “microtemporal” works.

Summary

In summing up I find myself reflecting on the progress made in the practical works and how the critical analyses I have presented relate to these. In terms of the four groupings of works I consider each of these to have reached a resolved state – by which I mean I feel that the work in those areas is complete.

The process of reflection on the works (necessitated by this document) has enabled me to explore specific readings of the practical component that were previously unclear – for example issues around how audiences encounter themselves encountering the work, and how this relates to Heidegger's analysis of boredom (Heidegger, 2001). Similarly my reading of the three solo exhibitions (in appendix 1) foregrounded a number of thematic correspondences between these and other works (for example the interplay between discourses by which materials are encountered and understood and how this relates to a prejudicial distinction (Latour, 1999) between artisanal and modern technologies). Furthermore the treatment of two themes (Thought, Technology, Practice, and Temporality) enabled me not only to resolve my approach to these areas, but to reflect on the relation between the two (for example in terms of the critique of the Cartesian dynamic and how this is related to temporality and music) and consider how these issues were dealt with within the practical works themselves – having a methodological and thematic relevance. Here the work itself is seen not only as an aesthetic exploration, but also as a critical and analytical process in its own right: for example, Multistability as a critical exegesis of musical and technical histories in which it is embedded.

I hope the description of tool use addressed in the first chapter is of some relevance to the reader and can facilitate new understandings of their creative activity. Here ideas and actions are not imposed on the world as a result of imagination then expressed with the aid of subservient tools; instead they are

considered to be fundamentally embedded in the world and responsive to the environments within which they are constituted.

Reflection On Outputs In Reference To Peers And Environment

In reflecting upon the practice-based component of this work several distinct pieces come to mind as important points of development. Of the audio-visual series the Radial works first screen in Sheffield at *Isomorphism and Totality* seemed to bring into focus a number of aesthetic and critical concerns. The foregrounding of minimal change, although often addressed in the sound work of my peers is seldom addressed in visual works¹⁰⁴.

In terms of musical practice, the environment containing myself and my peers has undergone a substantial change in recent years. A number of younger labels have emerged with a focus on electronic music. For example, Berlin based Pan records has an artist roster that includes Lee Gamble, Heatsick and NHK. Blackest Ever Black (London) artists include Raime, Regis, Cut Hands, Pete Swanson. And the large online retailer Boomkat (Manchester) produces and distributes several in-house labels including Modern Love with releases from Demdike Stare, Andy Stott and others.

Raime, Andy Stott and Lee Gamble share (to some extent) a production style that makes use of processing such as reverberation and echo to create a 'blurred' or 'hazy' sonic character. Such production methods stand in stark contrast to my own, which places an emphasis on untreated sound and sonic 'clarity'. This is particularly evident on my *n-Dimensional Analysis* (Liberation Technologies 2013) which uses distinct percussion sounds, one bass sound and one keyboard sound (with low-level artificial echo) throughout.

In a live context artists such as Cut Hands, Pete Swanson and Vatican Shadow (among others) employ intense and relentless rhythmic structures often

¹⁰⁴ A notable exception to this is Thomas Köner's audio-visual piece *Nuuk* (Mille Plateaux Media, 2004) the visual component of which, although non-computer generated, is a still shot over a bay and sea ice in Greenland.

incorporating noise. Similarly the multidisciplinary artist Russell Haswell has recently (since 2012) initiated a series of works incorporated rhythmic constructs derived from techno musics. This is an approach I have attempted to circumvent in the presentation of my *Microtemporal* works. Here I attempt to avoid rhythmic patterns familiar to house and techno musics, and to oppose the communal energy they are intended to generate.

In terms of what might be (somewhat problematically) labelled ‘self-reflexive’ house music, such as my Sensate Focus project, two other notable producers spring to mind: DJ Sprinkles (a pseudonym adopted by multimedia artist Terre Thaemlitz whom I mentioned earlier) refers to a similar period of North American house musics (1990-1998) yet generally retains a 4/4 rhythmic structure throughout. Also, in contrast to my work, his releases are often augmented with extended critical texts. Heatsick, based in Berlin and associated with the Pan Label, produces sophisticated works that refer to the emergence of house music as an identifiable genre. In a recent piece *Extended Play* (performed Berhain, Berlin 2013) the usual 45-minute performance was extended into a 3-hour epic. Here the performer simply took longer to step through each of the stages that constituted the overall work. Here breakdowns in the structure of the work became longer sections; their typical function—as a means to excite the audience in anticipation of the reintroduction of musical components—both foregrounded and undermined. This engagement with temporal structures present in house musics, although of a similar critical thrust to my own work, is in many respects quite different. A key difference is the temporal ‘scale’ addressed by the two projects (i.e. Heatsick and Sensate Focus). My emphasis is to deconstruct at the pattern level. And furthermore my work does not easily integrate into the actual club context.¹⁰⁵

Finally I want to mention a number of emerging artists who I feel some sense of affinity towards. Theo Burt (based in York UK) has produced a number of works that stochastically process house musics in both time and frequency domains.

¹⁰⁵ It should be noted that I have collaborated with DJ Sprinkles and Heatsick on record releases: *The Complete Spiral* (Comatose 2011), *Heatsick Heat-treated* (Pan 2012).

Gabor Lazar (based in Budapest) works with synthetic sound with timing structures that resemble those present in my microtemporal works.¹⁰⁶ I feel these artists represent a new direction in the *extreme* computer music first heralded by Mego almost two decades ago

Further work

Following the completion of this body of work I am faced with new projects and unfolding concerns. These are informed by the reflection and critical analysis undertaken throughout the development of this portfolio. My forthcoming work however will not so much be a response to the critical positions I have worked out here, but rather, I hope, will be enlarged by these.

In February 2013 I was resident artist in the Acoustics department at the University of Salford and produced work for their wavefield synthesis speaker array and presented this to the public in their anechoic chamber. In July 2013 I completed a composers residency at Elektronmusikstudion (EMS) Stockholm and produced a number of works with large analogue synthesisers. Of these some are complex layerings of multiple oscillators to be performed on multi speaker systems. I have been invited by Groupe de Recherches Musicales (GRM) Paris to develop these for presentation at their festival in 2014. And in October 2013 I will undertake an artist residency at The Curtis R. Priem Experimental Media and Performing Arts Center (EMPAC) at Rensselaer Polytechnic, New York. I'm very happy to have invites from such prestigious institutions as this indicates a willingness on their part to engage with a practice principally derived from popular, non-academic and non-electroacoustic, traditions.

Currently I am preparing work for a solo exhibition *Self and Now* at the Baltic39 gallery (Newcastle, UK). This develops some of the themes present in my earlier exhibitions using light, sound and multiple speaker systems. Rather surprisingly I have been commissioned, in collaboration with Jonathan Howse (Department

¹⁰⁶ I am corresponding with both artists and plan to release works by them on a forthcoming label.

of Chemical Engineering at the University of Sheffield), to produce a light installation for Blackpool tower which uses chemical reactions to control light changes. This will open in September 2014.

Works responding to house musics will continue and I plan to explore microtonal scales in this context. Initial work has included two installations *Microtonal House Chord* (London 2012 and Boston 2012) which explore and transform the pitch relationships found in a selection of house musics (cited in appendix 2). To this end Erik Wiegand, the developer of the Razor VST plugin (Native Instruments Berlin), has developed a microtonal version of the software for me that uses tables to specify pitch data.

Finally I have negotiated a deal with Editions Mego Vienna to establish and curate a journal, provisionally titled *Critical Sonology* that will provide a platform for artists, curators and theorists working in electronic musics and sound art.

Appendix 1. Three Exhibitions

Overview

Here I want to discuss three solo exhibitions that took place between August 2010 and February 2011. These were:

1. Matter-Space-Motion, Hive Gallery, Elsecar UK, August 2010.
2. Coherence and Proximity, Woodmill, London UK, December 2010.
3. Attack-Space-Decay-Time, Enjoy Artspace, Leeds UK, February 2011.

I have grouped the three items together in this document as I consider that, in some respects, they are a trilogy of parts and forming a series. Although at the time of making and exhibiting these neither had a formalised theme, on reflection I suggest that Matter-Space-Motion, deals with ideas of scale, movement and the 'multiple-state' systems; Coherence and Proximity, deals with formal relationships between the visual and aural; and Attack-Space-Decay-Time, addresses how different descriptive systems construct different understandings of time and space. It should also be noted that to some extent there is a degree of thematic crossover and dialogue between the works.

Each of the three exhibitions contains a number of distinct works, and no single work is common all three. A work for stroboscopic light, generative percussion synthesis and orange balloon *Factoid#3* was included in exhibitions 1 and 2; and a work for oscilloscope and two channel synthetic sound was included in exhibitions 2 and 3. In terms of specific works, these are the only crossovers. Thus the three exhibitions, although grouped together here, should not be understood as restaging or recombination of a finite number of works.

In the following I will describe each of the three exhibitions and their component parts, and then go on to identify and discuss common methodological and thematic features.

Matter-Space-Motion

The first exhibition in the series took place at Hive Gallery in Elsecar, a small village on the outskirts of Sheffield in the North of England. The gallery is comprised of two rooms, each of which contained a single work. The work in room 1 *Supersymmetry*, and the work in room 2 *factoid#3* both involved sound and movement.

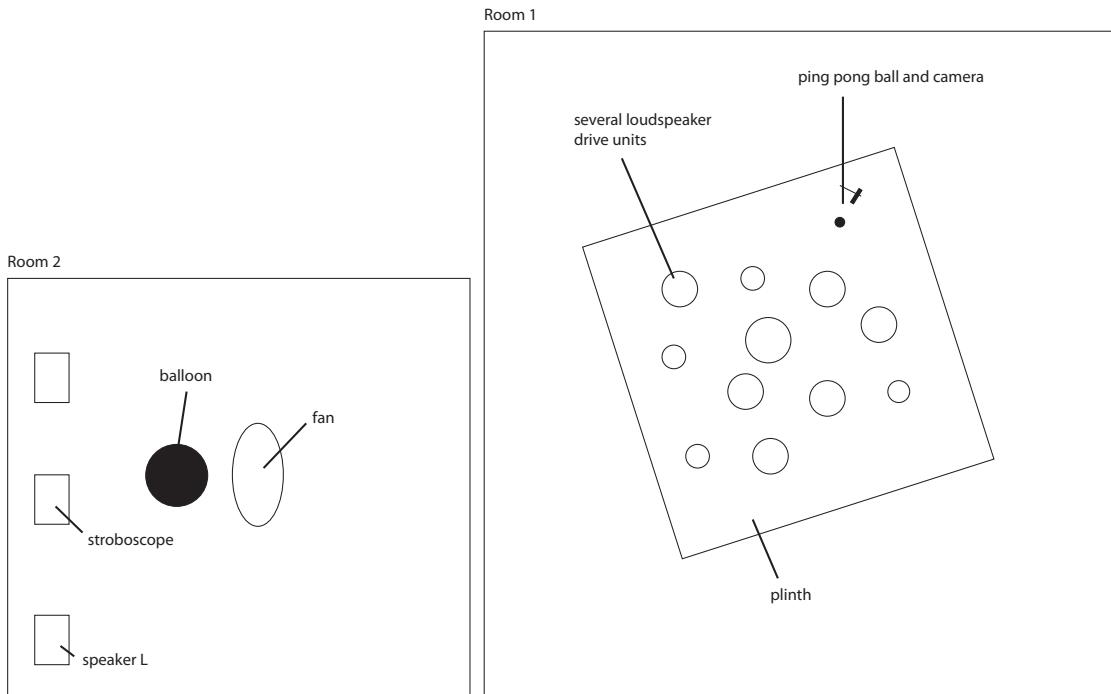


Figure 38, Matter space motion floor plan.

Room 1 Supersymmetry

In room 1, the larger of the two rooms, a plinth 2.4 meters wide, 2.4 meters long, and desk height was erected. Several loudspeaker drivers were arranged on top of this. A circular hole was cut into the top of the plinth and a domestic hair drier fixed underneath so that its air outlet was flush to the upper surface of the plinth. Above this an orange Ping-Pong ball was suspended in the air stream. A camera, fixed in a retort stand, tracked the movements of the Ping-Pong ball and data (the amount of change in x and y) was fed into a sound synthesis algorithm. Here each speaker emitted a rectangular waveshape, the frequency and duty

cycle of each was modulated with a low frequency oscillator in response to the movement of the Ping-Pong ball. 8 separate channels of sound were produced; and mapping procedures in each channel were different, so that each responded differently to the same movement.



Figure 39, Supersymmetry at Matter Space Motion, Hive Gallery.

To some extent the work was influenced by a visit I made to The Ten Thousand Buddha Temple at Sha Tin in Hong Kong in 2003. Around the walls of the temple are thousands of very small, seemingly identical, Buddha statues. Upon closer inspection however, one can see that each is slightly different from all the others – for example the position of an arm or hand. I felt that this structure

articulated a description of the self (as a series of multiple permutations of a set of finite elements) that was in contrast to the singular self of western culture (one characterized by the Cartesian subject described earlier in this document). I found this particular arrangement both intriguing and informative. Rather than presenting a singular object that encompassed all possibilities, here a vast number of different versions of the same thing were presented each of which represented a single state of the overall system... parallel manifestations of the same system.

It occurred to me that these figures could be understood as a documentation of possible systemic states. This resonated with technical questions that I had been confronting within the context of my work. For example, a recurrent issue in the development of my works that are responsive to real time data from the environment concerned choices about mapping procedures – how the system might react to data so that different behaviours (and therefore sonic outcomes) are produced. This necessarily meant rejecting some mapping strategies and pursuing others; at each point of development therefore, some possibilities and behaviours were rejected. Typically my approach was to aim for a high level of behavioural and sonic change, and to develop a single system that was as adaptable as possible. This necessitated building rather complex systems that acted conditionally upon the input. By contrast, in response to the Sha Tin methodology, I began to consider environment responsive works where several mapping strategies are implemented in parallel; formally mirroring the multi-state arrangement of the small figures in the temple. Here then the aim was not to produce a single, fully resolved, and (ideally) infinitely adaptable system; but by contrast, multiple permutations of the system that functioned in related yet distinctive ways: a kind of parallel form.

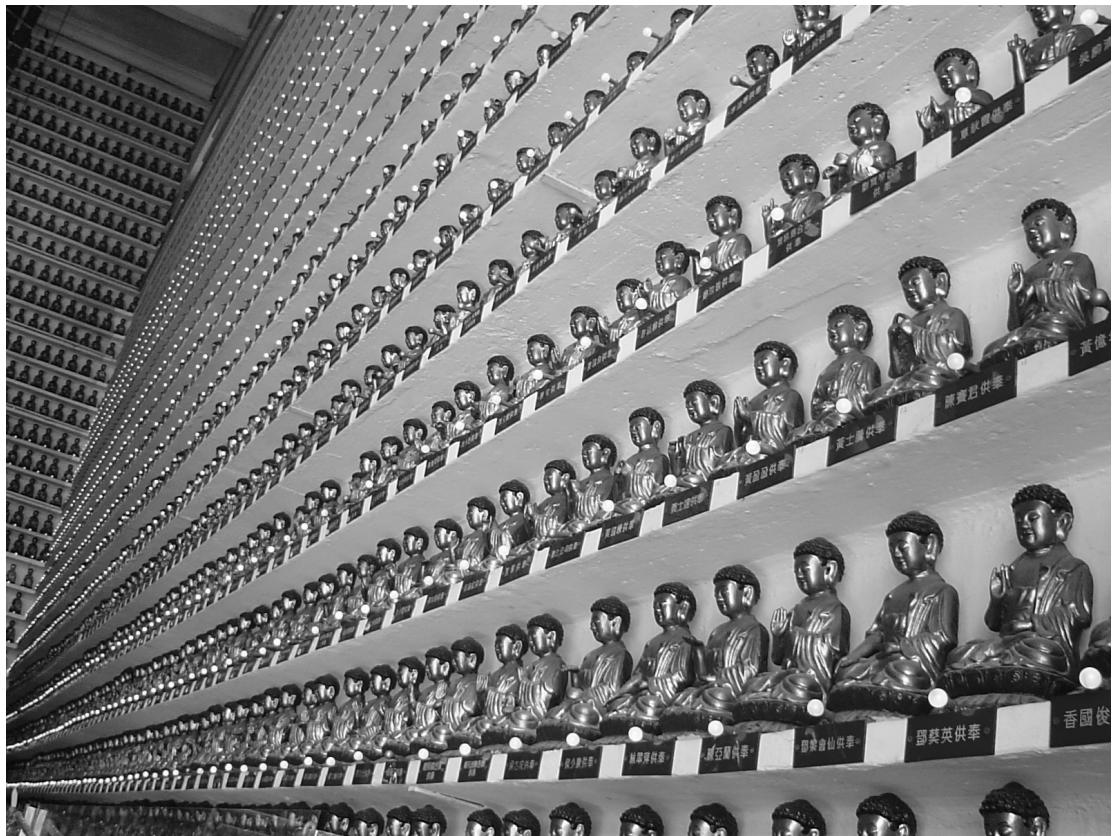


Figure 40, Ten Thousand Buddha temple Sha Tin, Hong Kong, photo Mark Fell 2003.

My intention with the piece *Supersymmetry* was therefore to draw attention to the condition of the work as having a number of parallel sonic outcomes – the sound in each speaker, although related, reacted in different ways to the movement of the Ping-Pong ball. While walking around the room this produced an indistinct haze of synthetic sound. However as one approached a specific speaker, detailed elements producing this haze became apparent. This I felt alluded to the formal arrangement of figures encountered at Sha Tin.

Room 2 Factoid#3

In the smaller room (room 2) was a second piece – *Factoid#3*. Here an orange balloon was suspended from the ceiling (which was about 3.5 meters high); beneath this a fan was positioned so that unpredictable movements were induced in the balloon. The room was completely blacked out. A pattern generating system implemented in MaxMSP produced irregular temporal

intervals that triggered percussion synthesis and a flash of light from a high power stroboscope. The effect therefore, was that the balloon appeared in a different position each time the stroboscope and sound triggered.

An attempt was made to establish a dialogue between the two works in rooms 1 and 2. The use of orange in an otherwise monochrome setting was intended to place an emphasis on the two spherical objects as they buffet around chaotically within air currents; to instigate an interplay between the Ping-Pong ball and the balloon.

When we look at the two we see similarities: colour, shape, movement; but also differences: the principal difference being size. Scale is therefore implied. Similarly, the use of the oscillating spherical object and the title itself is intended to suggest the atomic or molecular... of activity at very small scales.

On entering the second room, my intention was to suggest therefore that the viewer is in some way rescaled, shrunken within the space; the viewer him or herself is scaled to the atomic. The work proposes that, at this order of magnitude, motion as a continuous linear flow does not emerge as it does at the human scale. This clearly responds to Husserl's (1992) assertion that temporality, flow and so on, is constituted by the subject in the act of encountering the temporal object. Thus the 'factoid' to which the title refers—the thing that in this case purports to be factual—is the description of movement, and by implication the self, as linear, rational, predictable; as identifiable within a linear temporal flow. In this sense one can see a further thematic linkage across the two works – a questioning the singular, fixed and coherent as characteristics of the classical (Cartesian) subject. And furthermore a correspondence to my analysis of the Multistability series and my discussion of temporality included earlier in this document. The conception of the self is echoed by Haber:

[A] move from the contention that the self is always and necessarily linguistic to the claim that the self is therefore fragmented, decentered, protean, and incomplete. (Haber, 1994, pp.13–14)

Coherence and proximity

The second exhibition, Coherence and Proximity, took place at the Woodmill artspace in South London. Previously this had been a council-operated bus depot and garage. It offered very large spaces over two floors, and I decided to work in all of its four rooms.

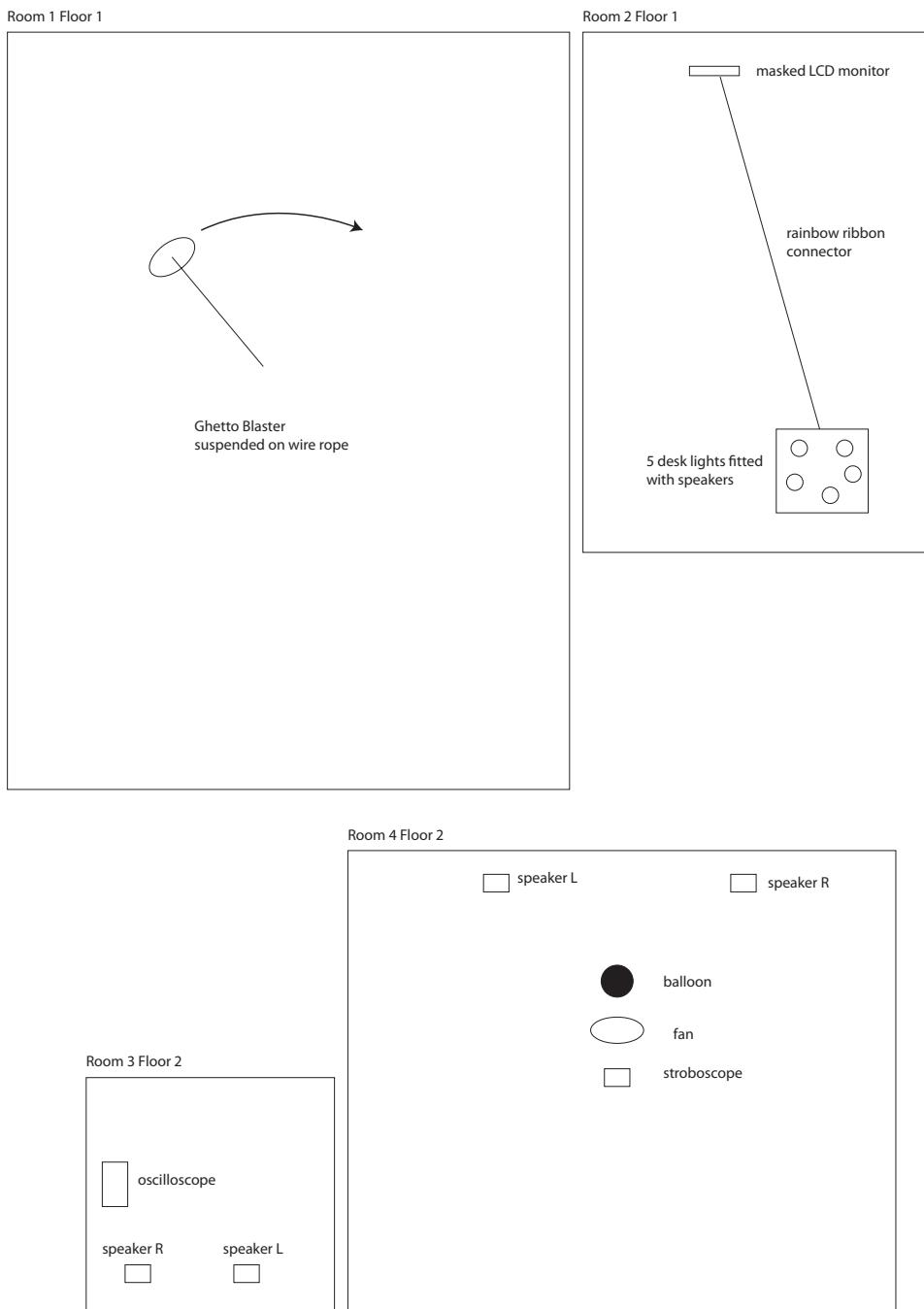


Figure 41, Coherence and Proximity floor plan.

Room 1

Room 1 had previously been used as the bus garage – it was extremely large with a very high ceiling. Seeing this as an opportunity, a motor was fixed to the ceiling and, suspended from this, was a portable compact disc player. A small mp3 player preloaded with a recording of a Shepard tone (Shepard, 1964) was connected to the compact disc player's auxiliary input. The motor propelled the compact disc player around the circumference of a circle; and as it moved, the Shepard tone was played. Thus a correspondence was formed between the continuous rotation of the compact disc player, and the (seemingly) continuous ascension of pitch; or more precisely, in technical terms, between the circularity of movement and the tone's harmonic circularity.

[...] the tones can be represented as equally spaced points around a circle in such a way that the clockwise neighbor of each tone is judged higher in pitch while the counterclockwise neighbor is judged lower in pitch. Diametrically opposed tones—though clearly different in pitch—are quite ambiguous as to the direction of the difference. The results demonstrate the operation of a “proximity principle” for the continuum of frequency and suggest that perceived pitch cannot be adequately represented by a purely rectilinear scale. (Shepard, 1964, p.2346)

The construction of these correspondences was a fundamental consideration of the work.



Figure 42, Coherence and Proximity Room 1, Woodmill, London, 2011. Photo by Michael Heilgemeir.

Room 2

The work in room 2 used a technique I refer to as ‘masked’ computer screen. Here opaque silver card is cut to the size of the screen. This is sliced at an angle, and the two halves are moved apart leaving a gap of about 1 millimetre and then fixed to the screen. This creates a very sharp illuminated line¹⁰⁷. It occurred to me that the ‘diagonal lines’ we typically encounter on computer screens are therefore rather ragged; the ‘masked’ screen however produced a very sharp, and therefore rather unusual and visually striking diagonal line.

¹⁰⁷ My motivation in creating this process came about in response to a conversation with the British computer artist Ernest Edmonds who, pointed out that the computer display cannot produce a diagonal line (Hathersage (UK) 4th November 2009).

In this work a number of colours flashed at the monitors refresh rate to create an iridescence character. A ribbon connector was used to convey 5 channels of sound from the computer (housed beneath the masked monitor) to the 5 loud speakers. In this case strands of wire forming the ribbon were of different colours. The ribbon's spectral character was intended to refer to the monitor's iridescent diagonal line – a spatial analogue of the monitor's temporal activity. Furthermore the coloured ribbon (which carries sound) deliberately alludes to the notional 'colour' of sound. Here the work's references to colour and sound are interwoven; its vocabulary and signifiers are disrupted and rearranged to foreground the hypothetical border between tonalities of one sort (visual) and another (sonic). This 'distorted' boundary is simultaneously reiterated and transgressed in the loudspeaker design itself. Here small tweeters are housed in desk lamp fixtures, emitting sound not light.

As well as repositioning visual and aural signifiers, the work presents its own parody of the speculative division between visual and aural. Here the monitor (visual) is placed at one end of the space, whereas loudspeakers (sonic) are placed as far away as possible – diagonally opposite at the other spatial extreme – as if pushed apart by the conceptual equivalent of magnetic repulsion. Emphasis is therefore placed on the otherwise unobtrusive ribbon connector, glued to the gallery floor.¹⁰⁸ Its aim is to suggest a spectral tension holding the two 'halves' of the work in some form of taut and antagonistic orbit with one another.

¹⁰⁸ Typically the cable is hidden from public view, disguised, or deemed to be a trip hazard. The foregrounding of this is explored in the following exhibition – Attack Space Decay Time.

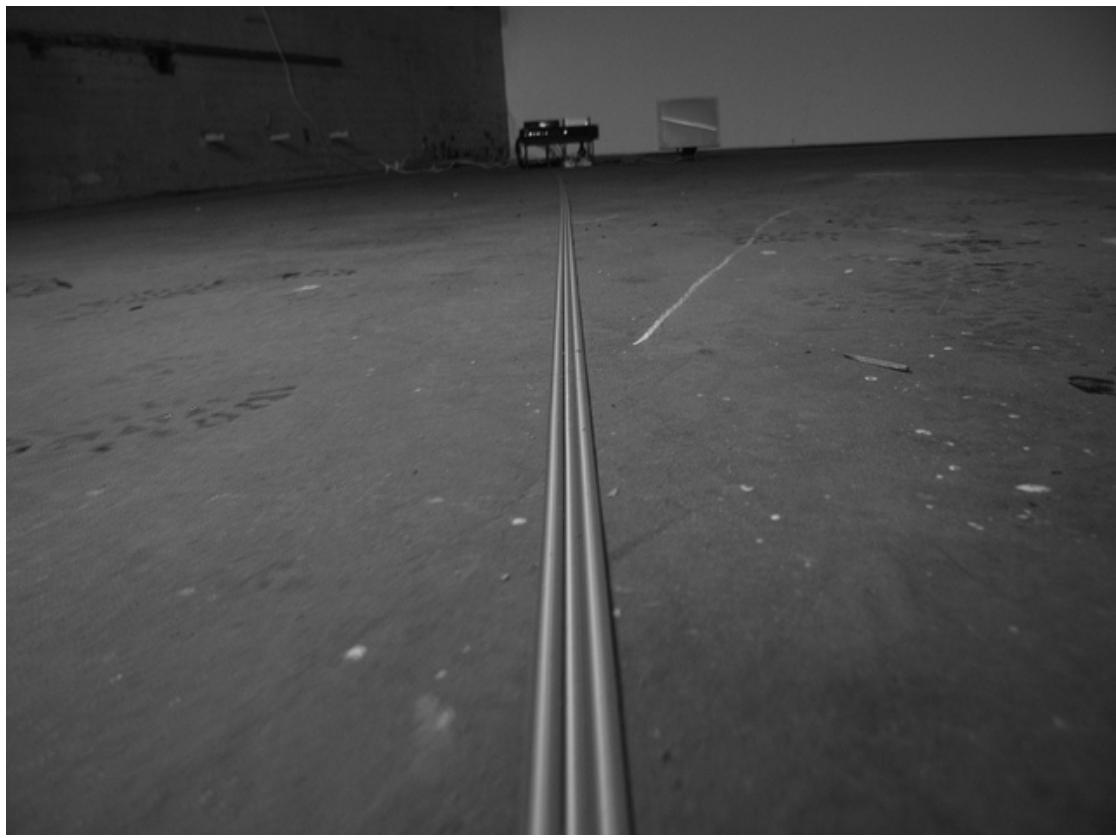


Figure 43, Coherence and Proximity Room 2, Woodmill, London, 2011. Photo by Michael Heilgemeir.

Room 3

Room 3 was a smaller space, approximately 2 meters x 2 meters, on the first floor of the building. Here a large 'vintage' orange phosphor oscilloscope was used to plot two channels of sound synthesis. The left audio channel was used to control the oscilloscope's x-axis, and the right audio channel used to controlled the y-axis. Various waveshapes were generated, creating a variety of two-dimensional forms that transformed over time. Sound was played back over two loudspeakers positioned at one side of the oscilloscope.



Figure 44, Coherence and Proximity Room 3, Woodmill, London, 2011. Photo by Michael Heilgemeir.

Room 4

In Room 4 the piece *Factoid#3*, previously shown at Matter-Space-Motion, was re-exhibited.



Figure 45, Coherence and Proximity Room 4, Woodmill, London, 2011. Photo by Michael Heilgemeir.

Attack-Space-Decay-Time

The final part of this series of three exhibitions “Attack-Space-Decay-Time” was staged at Enjoy Artspace, an independent gallery and studio complex in Leeds UK. The gallery area is a single room within which several works were shown, with an additional piece in the lobby area.

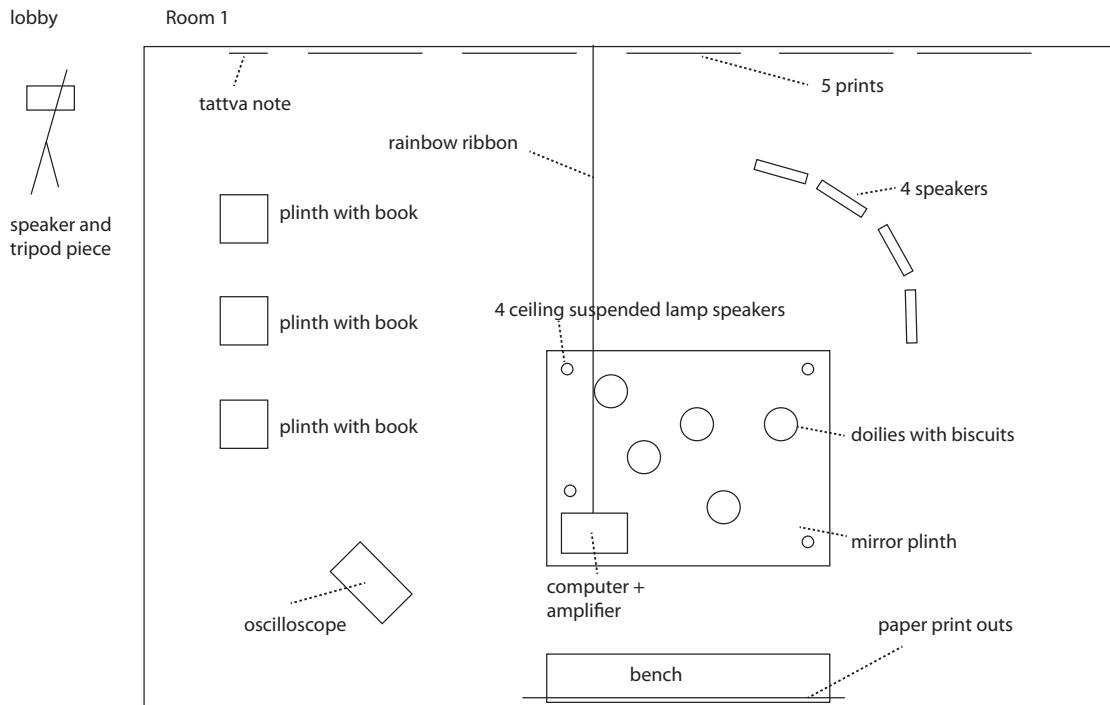


Figure 46, Floor plan Attack-Space-Decay-Time, Enjoy Artspace, Leeds UK 2012.

The work placed in the lobby included a single loudspeaker and a tripod. The tripod had a long extendable arm and one end of which was a portable sound recorder, at the other end a knife (see below).



Figure 47, Knife used in exhibition.

The portable sound recorder played back a looped sound file with a repeated Linn LM1 kick. Found sound—extracts from a presentation by neuroanatomist Jill Bolte Taylor describing the effects of a stroke on her consciousness¹⁰⁹—was also included.

The contrast between the inhumanity modern technics and primitive artisanal tools (recalling Latour's assertion concerning the prejudicial distinction between the two (1999, p.194)) reiterates the opposition between discourses surrounding mediation (as liberating) versus mind control (as domineering) explored in the Audio Visual works discussed earlier. Furthermore the placement of this association (in the lobby) as a preface to the body of the work itself (situated within the gallery space proper) hints at the thematic trajectory of the works about to be encountered and their interplay.

The main gallery space included several objects and works. Along one wall was series of large brightly coloured prints. These were derived from the five Tattvas¹¹⁰, represented as 5 shapes: blue circle, yellow square, red triangle, silver crescent, and black oval. The prints were made using a computer process that calculated additional in-between shapes, these were then plotted to create the appearance a single and continuous form. Here the spatial 'continuity' is

¹⁰⁹ Taken from http://blog.ted.com/2008/03/12/jill_bolte_tayl/

¹¹⁰ Described earlier in the chapter on Audio Visual works.

analogous to Husserl's temporal continuity as a function of time constituting consciousness (1992).

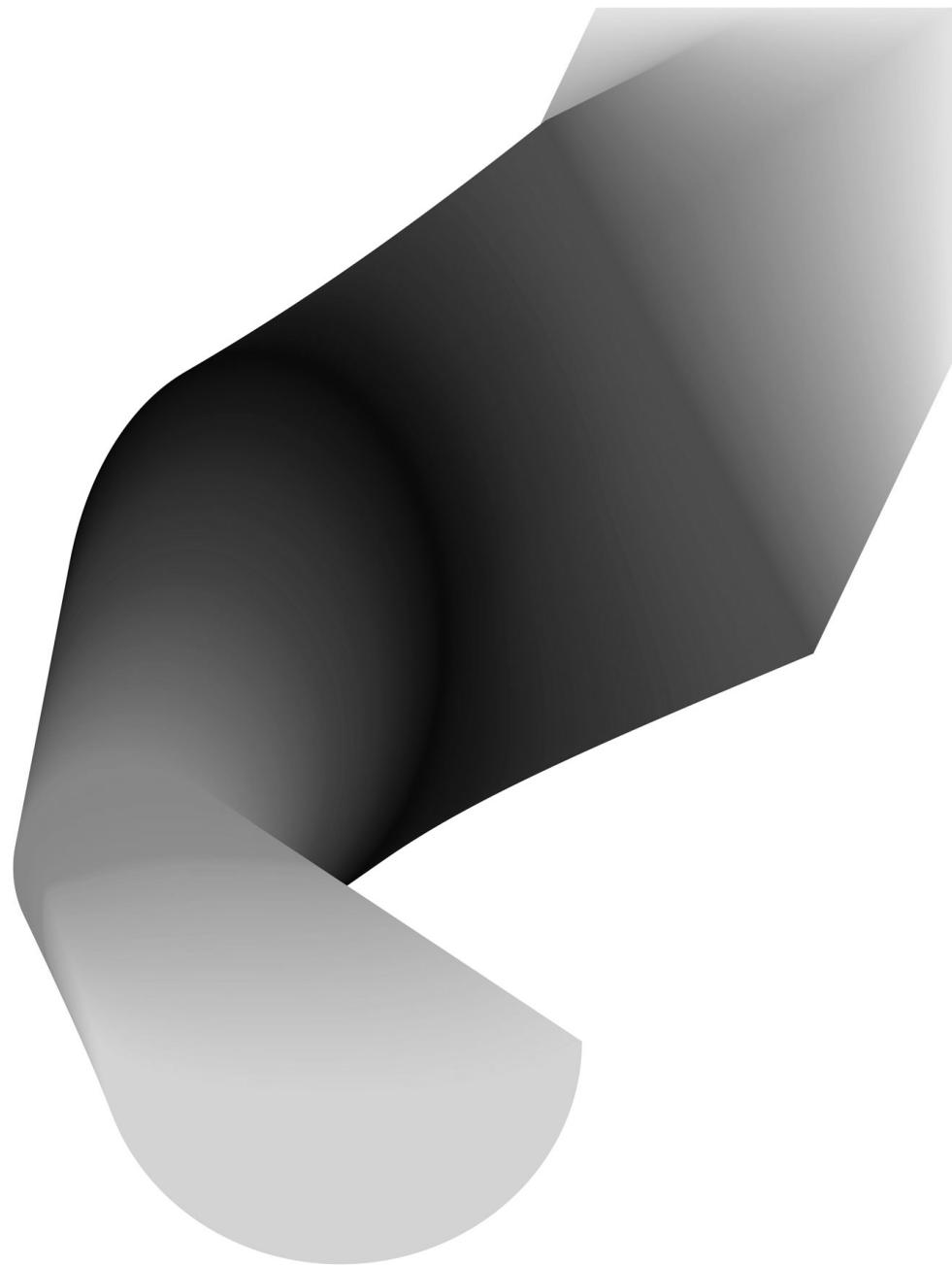


Figure 48, Spatial Blend 11, Attack-Space-Decay-Time, Enjoy Artspace, Leeds UK 2012.

An explanatory note concerning the 5 Tattvas placed next to the five large prints suggested the following:¹¹¹

Tattva is a Sanskrit word meaning 'thatness', 'principle', 'reality' or 'truth'. According to various Indian schools of philosophy, a tattva is an element or aspect of reality conceived as an aspect of deity. Although the number of tattvas varies depending on the philosophical school, together they are thought to form the basis of all our experience. The shapes are a blue circle, associated with air, yellow square - earth, red triangle - fire, silver crescent - water, and black oval - spirit. The tattvas were used by the English occultist Aleister Crowley as a means of focussing consciousness. These shapes, as waveshapes, are also used on analogue synthesizers - the square, triangle, sine and so on - are used as the basis for a variety of sounds. (Fell, 2012a)

In the centre of the space was a large square plinth approximately 2.5 meters long and about 20 centimetres high. The upper surface of the plinth was covered in acrylic mirror. On top of this a number of paper doilies were arranged with biscuits¹¹². Also placed on the plinth were a computer, multichannel audio interface and amplifier. Above the plinth were four of desk lamps fitted with tweeters (previously used at Coherence and Proximity), suspended upside down from the ceiling. These could be seen reflected in on the surface of the mirrored plinth.

¹¹¹ This is the full text included in the note.

¹¹² For American readers it should be noted that biscuits in this context translates to cookies. At the opening these were home made biscuits in 5 shapes corresponding to the 5 tattvas; as these ran out they were replaced by "Shorties" sourced at the local market.

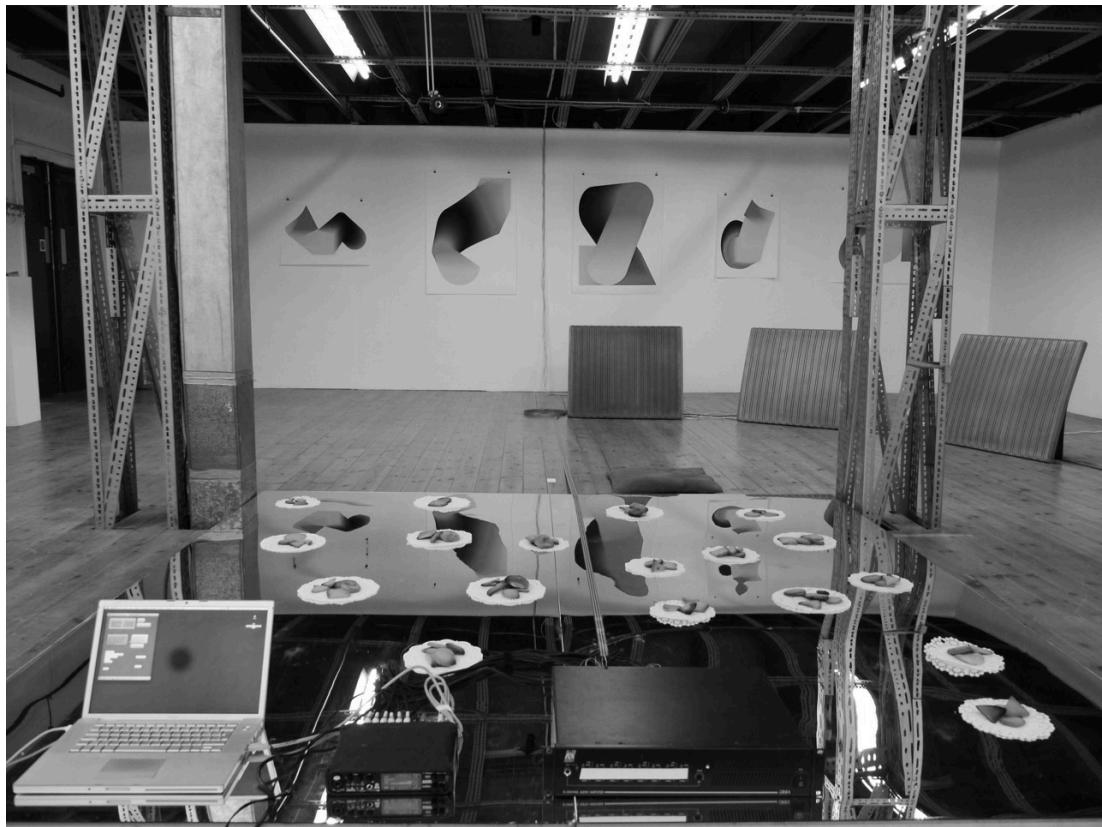


Figure 49, Mirrored plinth, speakers and prints.

Between the mirrored plinth and the 5 coloured prints I arranged 4 large loudspeakers in an arc formation. Various synthetic waveshapes were generated and processed using convolution reverberation techniques (Lyons, 2010).

Sound relayed by the upside down lamps fitted with tweeters was not convoluted in this manner. The large mirrored surface in this sense not only provided a visual reflection turning the lamps the “right way up” implying spatial inversion, but was also intended to parody the artificial sonic reflections imposed by the convolution process and the spaces it sought to emulate.

The sound played over the speakers switched between different convolution settings, and synthesis types at regular intervals. During periods of change the computer’s internal loudspeaker was used to relay any parameter messages as

they occurred within the system, this was ‘spoken’ using the computer’s speech function.

The orange phosphor oscilloscope used in room 3 at the Woodmill reappeared here, but this time without sound. Here an attempt was made to use two-channel sound to generate shapes that referred to the 5 large prints on the opposite wall. I labelled the oscilloscope piece *temporal blend* forming a correspondence with the prints which were named *spatial blend #1* and so on.

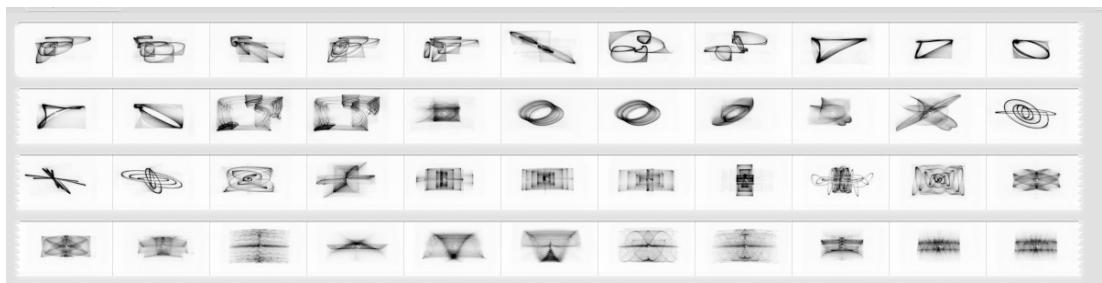


Figure 50, Shapes generated by two waveforms plotted on oscilloscope

Also reappearing was the multi-coloured ribbon connector, here this was wound and placed to form a number of clearly labelled “trip hazards” taking it further from the background and into the foreground of the work. Next to each trip hazard was a small cushion, intended to lessen any potential impact or harm. Two types of trip hazard were developed each having different structural and aesthetic features. Type one was very firmly attached to the surrounding objects so that a foot, when lodged in the structure, would become halted (see photo 5 below). The second type was a carefully constructed “Yin and Yang” arrangement (see photo 6 below). In contrast to type one, here the arrangement was not attached to its surroundings, so that when disturbed by a foot it would entirely or partially unfold, necessitating protracted and meticulous reassembly by the interloper; a great annoyance to many visitors.

Three plinths were installed, and on top of each were the following three books: *The Tibetan Book Of The Dead* (Evans-Wentz, 1960), with a bookmark placed on page 221, in a section referring to the use of sound to control substances; *The*

Third Mind, by William Burroughs and Brion Gysin (1979) with a bookmark on page 76 at the “Permutations” chapter; and, *Rhythms of Vision* by Lawrence Blair (1975) bookmarked on the chapter concerning “vibration”.

Along the wall opposite the coloured tattva prints were a number of academic papers. Of particular significance is *Geometry Of Time And Dimensionality Of Space* by Metod Saniga (2003b) a mathematician based in the Astronomical Institute at the Slovak Academy of Sciences with an interest in, among other things, “Distorted Perceptions of Time and Space” (Saniga, 2003a). In his paper Saniga aims to provide a mathematical account that “sheds fresh light on how the physical view of space-time and its experiential counterpart can possibly be interconnected.” (2003b, p.141)

I had a number of reasons for including the books and the papers in the exhibition. Typically each inclusion suggests or alludes to a thing called ‘reality’, and (also typically) that reality has an underlying structure which can be meaningfully described, experienced, examined or understood. Each however does this in a different way. References to the five Tattvas and *The Tibetan Book and the Dead* present the visitor with ancient and mystical systems of thought. *Rhythms of Vision* (1975) recalls the transcendental leanings of the then counter culture. By contrast *The Third Mind* (1979), its systematic and repetitive reuse of materials referencing gun culture and popular press, proposes a dystopian inversion of the then counter culture; in Burroughs’s world, reality is a thing to be wary of, to be methodically interrogated. Finally the collected academic papers employ rather more scientific vocabularies.

Although the theoretical content of these textual components is relevant to themes presented in the work (and of this exhibition in particular) the primary reason for their inclusion in the exhibition is to foreground how such themes are presented and processed within distinct conceptual systems.

It is my intention therefore, that the textual components should function in two ways: firstly, as contextual materials that might enhance the experience of

encountering the works and the themes they address; secondly, in terms of contrasting conceptual schema within which reality at a fundamental level is constructed, defined, understood, experienced or scrutinized.

This is reiterated throughout the exhibition – wires coiled into Yin and Yang forms, biscuits in the shape of the five Tattvas and their consumption as a way of assimilating and by implication understanding.



Three exhibitions: common methodological features: 1, constructing dialogue between works

A defining characteristic of the three exhibitions discussed here is that they are, first and foremost, collections of works: works that are in necessarily and carefully placed dialogue with one another. This means that my concern is not only with specific works, but also with their placement within the gallery space(s) and the thematic and formal interplay between them. But it does not follow that my concerns are not merely transposed from one level (the work) to another (the collection of works); instead different opportunities and concerns emerge... What does this mean?

Reflecting on the development of this series of exhibitions, I want to suggest that (when dealing with several works, when considering the dialogue that is constructed between them) exploration of aesthetic positions, technical processes, and thematic materials is extended in a manner that is beyond the scope of any single piece. A very clear example of this is the relationship between the two works exhibited at Matter Space Motion. Here the suggested scale change (from Ping Pong ball sized to Balloon sized) is made possible as a result of the interplay between the two distinct works. Similarly in Attack Time Decay Space, the relation between shapes spatially plotted on the large coloured prints, and shapes plotted over time on the orange phosphor oscilloscope create an additional reading of the interplay between temporal and spatial that is outside each specific work itself.

One might argue that this level of concern (for the dialogue constructed between works) is traditionally the role of the curator, and I would not want to argue against this point. However, having worked as a curator for several years¹¹³ I find the methodology I describe here, and opportunities it presents, are quite dissimilar to curatorial practice. Here one is not only arranging the

¹¹³ Between 1998 and 2012 I worked as a curator of digital music for the Lovebytes festival of digital art, Sheffield (UK); I worked as music consultant for Sight Sonic festival, York (UK); and at a number of other events and festivals both nationally and internationally.

works of others according to whatever methodology, but producing works and considering their interplay as part of the same developmental process. I want to be clear that my intention in making this point is not to suggest that my practice is somehow superior (to the creation of works by artists or the recombination of works by the curator), but simply that, formally speaking, (a) making singular works, (b) the arrangement of works by others, and (c) the co-development of works and their interplay are distinct types of activity that necessarily offer distinct conceptual and aesthetic opportunities.

To attempt to clarify this point further... in this portfolio there are a number of single works (encountered by the audience in any number of different contexts and in conjunction with any number of other objects and experiences). It is, of course, impossible for me to predict or control this. Nonetheless an important feature of my work is a concern for how the work functions as part of a wider network of other works, and the dialogue that can be established between them. For example the *Multistability* compact disc is a collection of works, yet I suggest that there are two versions of the work present within the disc, and therefore a relationship is constructed between the two that creates an additional layer of meaning. Furthermore *Multistability* is also seen in relation to another piece released at the same time, *UL8*; thus a further relationship is constructed and a further layer of reading added. Furthermore *Multistability* was a critical response to the work of specific label mates establishing a further relationship and reading. This was a deliberate and premeditated feature of those two works: to generate thematic interchange at a number of levels. This emphasis (on interplay and dialogue) is also apparent the works responding to house music where a number of pieces are developed constructing relationship between them in the re-use and re-interpretation of materials.

For me the three exhibitions discussed here function in a similar manner. Here a concern for components within specific works, combinations of works, and the relationships between those combinations of works again implies thematic construction at a number of discrete levels.

This emphasis (on interplay and dialogue) clearly resonates with the Latourian conception of action as constituted within networks (1999, 2009) and in studies in cognitive science that suggest “Cognition materializes in an interpersonal space” (Hasson et al., 2012, p.1). It promotes interplay and demotes the belief that the object is best understood in isolation.

Further thematic and methodological correspondences between the three exhibitions

A number of technical similarities exist between the works: sound synthesis, when used, typically takes the form of basic waveshapes, often rectangular waveshapes modulated in some manner by low frequency sinusoidal oscillators. Similarly multispeaker technologies are common to each of the three exhibitions. A further concern is the relationship between the use of sound and the geometry of the gallery space. For example speakers are not always positioned for optimum acoustic response. An example of this is the arc of speakers included at Attack Space Decay Time. It is quite likely that the arc arrangement detracted from the illusion of space created by the convolution reverberation. Similarly the use of loudspeaker drivers with no enclosure (Matter Space Motion) significantly compromised their sonic fidelity. Within these works, speaker choice and position is primarily ascertained according to sculptural considerations.

Although I have suggested that each exhibition could be seen to address specific areas (Matter Space Motion - scale, movement and the notion of a multi-state system; Coherence and Proximity - formal relationships between sound and image; Attack Space Decay Time - interpretations and descriptions of time and space) the mere fact that I have grouped these together here, within a specific section of this document, compels me to ask what form of thematic correspondence might exist between the works.

In my view, the clearest response to this would be to point out that, although I have suggested that each exhibition is directed towards primary thematic areas,

those areas are not mutually exclusive. Evidently each of the three exhibitions deals with several issues (relating to scale, movement, systems, the relation between sound and image, descriptions and analyses of time and space) yet each has specific points of relative emphasis. For me therefore any differences and correspondences between the three exhibitions in terms of thematic crossover are to be found in points of emphasis.

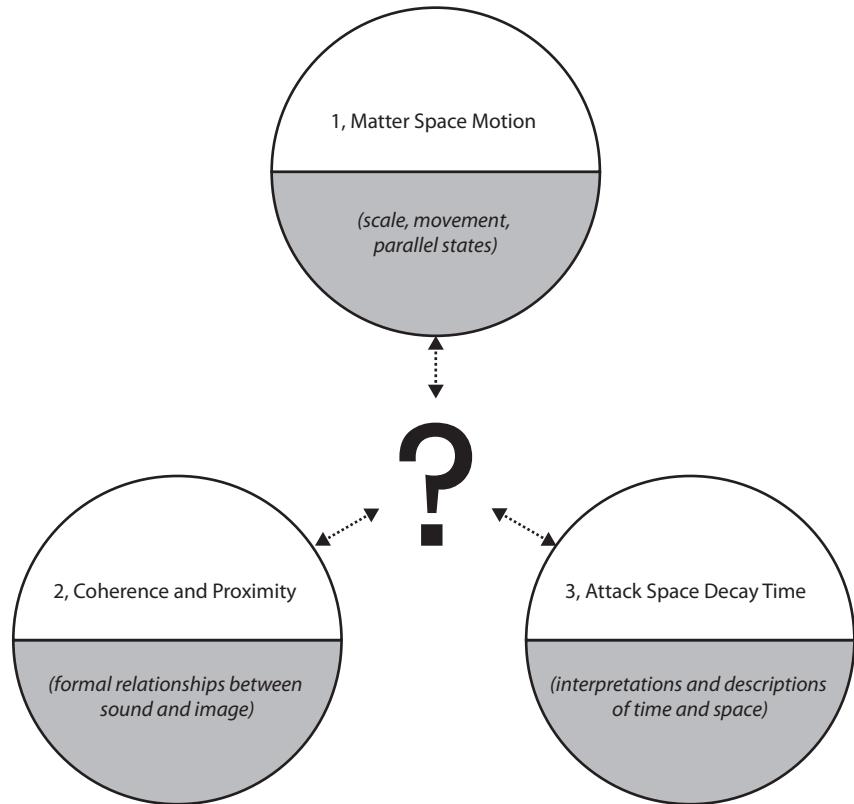


Figure 52, Thematic concerns of the three exhibitions and their interplay.

But, If we are to extend the logic I described earlier (how the placement and thematic interplay between works establishes an additional level of concern, outside individual works themselves) then we might also be prompted to ask what, if anything, is established in the dialogue between exhibitions – at a hypothetical meta-level of discourse.

Here I would suggest a particular concern, one enacted in each exhibition and in their combination, is how the audience encounters the work. In each, and in their combination, the audience is placed in a particular relation to the work where a questioning is encouraged. My aim therefore in making the works, combining them, and constructing three distinct public platforms is not to present coherent or resolved aesthetic or critical positions, but rather to present materials in forms that foster certain types of curiosity. According to this position, I do not primarily view my work as a vehicle to promote explicit emotional responses (for example either joy or melancholy); aesthetic responses (to the work's beauty or grotesque-ness); technical appreciation and understanding; or particular critical readings. For me an ideal response (ideal in the sense of hypothetically ideal) is a carefully constructed sense of indefinitely sustained curiosity (remember I call this an 'ideal' state not one that may or may not be achieved). This state, it should be noted, is quite different from bewilderment. Bewilderment, in my view, is what happens when curiosity "throws in the towel". It is my intention therefore—in the context of the three exhibitions discussed here, the specific works, and the dialogue between them—to both promote and simultaneously undermine evaluation. This strategy emerged (both in terms of being increasing evident and conceptually formalised) during the staging of the three exhibitions.

In order to clarify what is meant by this methodological position, I want to refer to specific examples drawn from the three exhibitions. In the final show, for example, the use of textual materials—presented as primary sources as opposed to being re-articulated in specific works—offers the visitor a series of interrelated conceptual components that should, by implication, be reconstructed to form an integrated understanding. My intention was that the precise selection of those materials would necessarily obviate the possibility of ultimately resolved evaluation; and, at the same time, to eschew mere bewilderment. This dialogue therefore necessarily implies an active audience, one 'ideally' positioned somewhere between resolved understanding and mere bewilderment.

While the above example functions at a thematic level, I want to suggest that there is a further more fundamental level at which this methodological imperative functions within my work. Recall the Shepard tone and rotating compact disc player piece exhibited at Coherence and Proximity, here a kind of ambiguous yet concrete fusion of circular motion and ascending frequency is constructed. This fusion is clearly evident in terms of one's phenomenological encounter with the work; yet a description of its form, based upon its phenomenological mode of appearance, is (I feel) very difficult to articulate. It presents the audience with a resolutely holistic form, yet one not typically encountered in nature. The fusion is concrete but illusive: forming an overwhelmingly anomalous gestalt modality. In this sense the phenomenological encountering of the work is both simultaneously coherence and incoherent. This, I consider, is an overriding aim of the works and the exhibitions discussed in this section.

Appendix 2, An Autobiographical Account Of My Musical Background

The following is an autobiographical account of my musical background with appropriate discographical references. It begins with my early interest in 'synth pop' circa 1981 and ends with developments in my recent career as professional artist. The structure of the following loosely follows a similar document that I produced for the British anthropologist Georgina Born in 2011.¹¹⁴ Here I hope to establish connections between specific movements and artefacts and my own aesthetic and technical concerns.

The early 1980s from synth pop and backwards into industrial music

On reflection, my early interest in music became apparent in 1981 with the emergence of groups such as The Human League and Soft Cell. During the summer of 1981 the prevailing mood of the British singles chart shifted heavily towards electronic musics with 'breakthrough' releases from both The Human League and Soft Cell, as well as Duran Duran, Depeche Mode, Visage and others (see figure 53).

¹¹⁴ These were ironically titled "The Dawn of Man" and can be found at www.markfell.com.

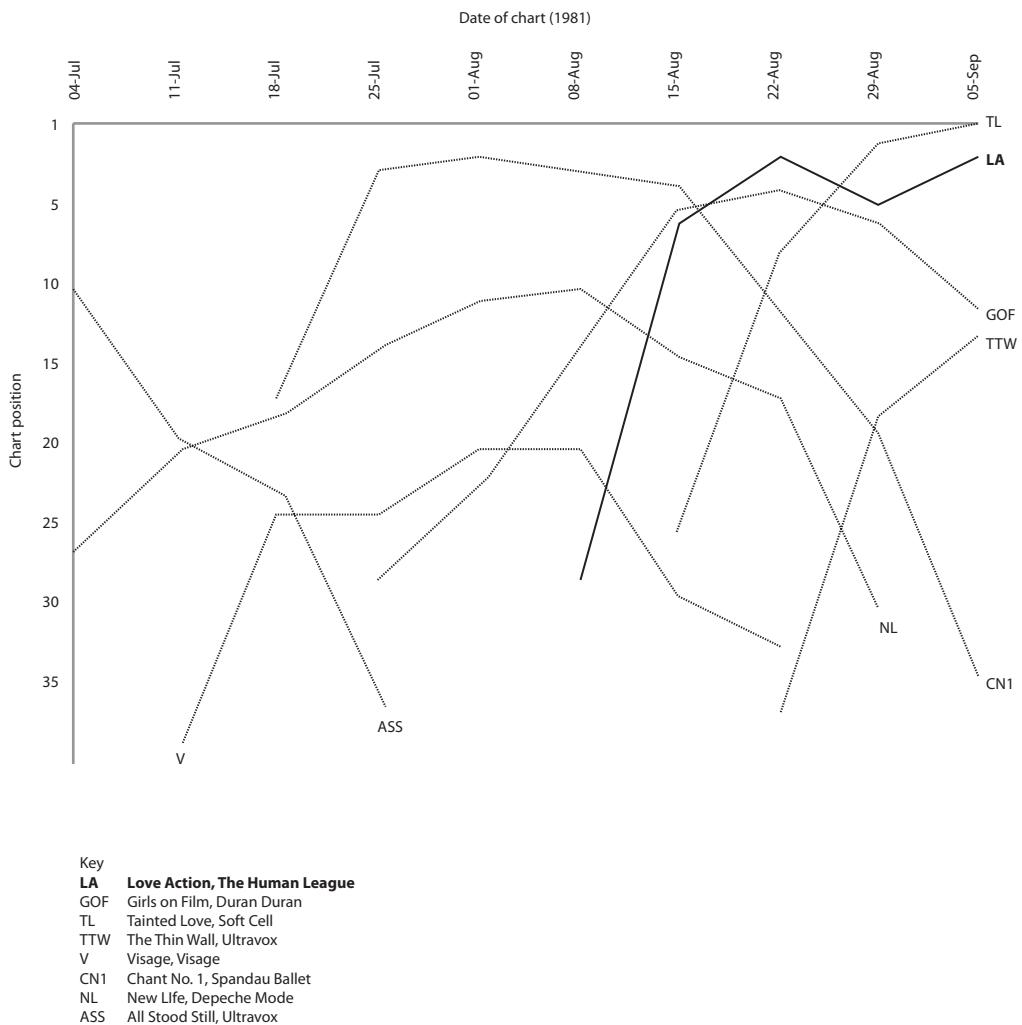


Figure 53 The presence of New Romantic groups in the British Singles chart, summer 1981.

I took and active interest in following all of these, with a heightened interest in The Human League, triggered by *Love Action* (Virgin 1981). In particular I was drawn to its production style developed by Martin Rushent (1944-2011) who had worked on a string of singles from *The Sound Of The Crowd* (Virgin 1981) and the album *Dare* (Virgin 1981), culminating in *Don't You Want Me* (Virgin 1981) reaching top of the charts later that year.

As an untrained listener I encountered these productions as *sharp* and *clean*, the component parts of which appeared to lock together seamlessly, yet remain as distinct audible elements.

The sonic agenda advanced by Rushent centred on the Linn LM1 drum-machine and the Roland Jupiter 8 synthesizer. Fortunately my older brother was something of an audiophile and I was able to listen to these works at high volumes on relatively well-specified playback equipment. Thus I became interested in the sonic clarity of these works and in the *production* of music as opposed to the *writing* of songs.

Another notable producer of this period was Eric Radcliffe, responsible for Depeche Mode's *Speak and Spell* (Mute 1981). His production style—which often made use of synthetic drum sounds and monophonic sequences with automatic control of filter cutoff, techniques—is apparent on *Upstairs At Eric's* by Yazoo (Mute, 1982) and, *Or So It Seems* by Duet Embo (Mute, 1983).

During my early interest in electronic music (circa 1982) I was able to borrow a Korg MicroPreset synthesizer from one of my older brother's friends, and a Transcendent T2000 from my parents' next-door neighbour. This, and a Boss DR55 drum machine, became the heart of a small bedroom studio.

As my interest in electronic music developed I began to look back to its immediate history, firstly with earlier works by Human League including *The Dignity of Labour* (Fast Records, 1979), groups such as Throbbing Gristle, and artists associated with the Industrial Records label. This shift to more unfamiliar, perhaps more *challenging* musics, coincided with my emerging political views, anti-fascism and anarchism; as well as an interest in writers such as R.D. Laing and William Burroughs; and my enrolment to the local art college (Rotherham College of Art and Technology) after leaving school (1983).

1984 to 1988 Marginal dance musics and electronic tonal works

Toward the mid 1980s emphasis among artists previously associated with Industrial musics shifted towards the use of sampling technologies to produce dance musics. Test Dept for example, who had been known for the

reappropriation of metal objects in the production of works such as *Shockwork* (1983), had adopted sampling technologies – evident in *The Faces Of Freedom 1 2 & 3* (The Ministry of Power, 1986); presenting the listener with an almost proto-techno rhythmic sensibility. Similarly Einstürzende Neubauten's *Halber Mensch* (Some Bizarre, 1985) employed production techniques and rhythmic constructions quite different to their earlier *Zeichnungen des Patienten O. T.* (Some Bizarre, 1983). While *Zeichnungen des Patienten O. T.* was a discordant and abrasive affair, *Halber Mensch* by contrast was somewhat polished and electronically sequenced.

Around this time the British producer Adrian Sherwood came to prominence with works associated with the On-U sound record label, working on projects including Tack Head's *Mind At The End Of The Tether* and *What's My Mission Now?* (On-U Sound, 1985) as well as Mark Stewart's (and the Mafia) *As The Veneer Of Democracy Starts To Fade* (Mute, 1985). Sherwood's unconventional approach placed production techniques in the foreground, with excessive processing, temporal fragmentation and so on used to deconstruct and replace musical materials.

This shift of focus from those involved in marginal musics to vernacular form is apparent in a number of compilation records of that period. For example *Funky Alternatives 1* (Concrete Productions 1987) which included: *King Of The Beat* (Tack Head), *Needle Time* (400 Blows), *Shugyosha Step* (23 Skidoo), *October Love Song* (Chris & Cosey, previously of Throbbing Gristle) among others; its format and aesthetic direction perhaps echoing the earlier *Methods Of Dance* compilations, particularly volume 2 (Virgin 1982).

During this time I also maintained an interest in electronic musics that would not be defined as 'dance music', including activity surrounding L.A.Y.L.A.H. Antirecords label. These included *LASH TAL* by Current 93 (1984), and *How To Destroy Angels* by Coil (1984). In a similar vein I followed the work of The Hafler Trio and The Anti Group (or T.A.G.C., a side project of the more prominent Clock DVA). In particular the latter's *Meontological Research Recording Record 1*

(Sweatbox, 1987) featured extended synthetic tones with little or no rhythmic component. It should be noted however that both The Anti Group and Coil produced works during this period that referred to dance music. Notable examples include The Anti Group's *Big Sex* (Sweatbox, 1987) with a remix by Robert Gordon – an unknown sound engineer who would later produce the first release for Warp Records (*Track With No Name* (1989)) with Winston Hazel as The Forgemasters. Similarly Coil's *Horse Rotovator* (Force & Form, 1986) included *The Anal Staircase* and others that nebulously corresponded to early electro styles.

Like these works, throughout this period I sat on the border between 'marginal' forms of dance music and rather more unusual sonic and tonal compositions, having a more or less equivalent interest in both. From the mid to late 1980s I began to associate with individuals involved in The Anti Group with whom I produced musical works (Mark Holmes and Robert Baker).

1988 and the emergence of techno

In 1988 I became aware of a brand of electronic music, principally from Detroit, referred to as 'techno' (after I received a mix tape from the aforementioned Baker). In particular, the compilation album *Techno! The New Dance Sound Of Detroit* (10 Records, 1988) provided a definitive aesthetic statement for this emerging movement, with a number of seminal works: A Tongue & D Groove, *Feel Surreal*; Shakir, *Sequence 10*; Rythim Is Rythim, *It Is What It Is*; and the vastly popular *Big Fun* by Inner-City (KMS, 1988).

In the UK early adopters of this style included A Guy Called Gerald with the release of *Voodoo Ray* (Rham!, 1988) and the slightly later *Peel Sessions* (Strange Fruit, 1989). In Sheffield, Warp Records was established, with an inaugural release *Track With No Name*, by Forgemasters (Warp Records, 1989). And along with Bradford's Unique 3 and *The Theme* (10 Records, 1989) promoted a 'bleep' aesthetic that was to rival acid house's squelchy bass. An interesting crossover here is Sweet Exorcist, a collaboration between DJ Parrot (Richard Barratt) and

Richard H. Kirk (a founding member of the electronic music group Cabaret Voltaire) with releases including *Clonk* and *Testone* (Warp Records, 1990).

During this time I had started a course at the local polytechnic (Sheffield City Polytechnic) in fine art film and video. The course was highly regarded and the campus (on the outskirts of the city centre) was steeped in the city's musical history (having hosted the first performance by the Human League among others). During my time at college, although working on film and video, my main concern was to explore music and sound. However several unproductive tutorial sessions with a number of visiting lecturers¹¹⁵ led me to conclude that my musical and sonic interests were best left outside the course. It seemed that my interest in sound—the history of specific sounds and their use in specific cultural context, as opposed to the transformation of sound into something ostensibly free of social and cultural reference; and my interest in sound in *place* as opposed to sound in *space*—was somehow at odds with the formalist leanings of the electro-acoustic community. I continued to make music at home and in the small sound studio on campus. My setup at this time consisted of an Atari ST computer running Cubase, and an Akai S900 sound sampler.

In 1990 I encountered the Juan Atkins mix of *I Believe* by Octave One (Transmat, 1990) and this became something of a turning point. Following the initial emergence of techno, the subsequent 'Hard-Core' variant had not appealed to me, and the marginally pre-hardcore Xpansions *Move your body (Elevation)* (Optimism Records, 1990) marked my departure from that scene and the club nights associated with it. In contrast to the energy of hard-core techno, the central focus of Octave One's *I Believe* was a lush synthetic chord that seemed to smear its way throughout the entire track. In many ways this led me to the production style found in North American house musics, referred to as 'New York' house.

1992 House

¹¹⁵ Including Trevor Wishart.

A kind of gateway into New York house was *Can You Feel It* by Chez Damier (KMS, 1992) which I picked up from the 50p bin at my local record store. Although stylistically more aligned to New York house, its production team, which included Derrick May, was principally associated with Detroit techno. Also credited was MK (Marc Kinchen) who, at that time, was a relatively unknown producer. His style included the use of presets found on the budget end of the Yamaha FM series of synthesizers – the DX100 and the TX81Z. A particularly relevant example is *Push the Feeling On* by Nightcrawlers (Island Records, 1992), which probably did more to establish the group's career than Kinchen's own. Although I dislike the original version and the vocal content Kinchen's remix features several sounds that are central to my practice. For example, the Jazz Organ preset (mentioned earlier) and an unidentified 'reed' type preset; here these are sequenced and interlocked in a way that I continue to explore in my work. Similarly his exploration of vocal cut up techniques was at that time more sophisticated than the mere retrigging of samples employed by his peers and precursors. Sadly, although Kinchen is an extremely successful producer, he is not widely recognized (as Derrick May is for example) outside specialist communities.

On reflection I think it's fair to say that Kinchen, along with Rushent (specifically his work with The Human League circa 1981), form the two main influences on my own production practice. Certainly most of my work, including *Multistability* and a number of the parts of the *Sensate Focus* series, allude to the combinations of sounds formulated in both Kinchen's and Rushent's early practice.

Around 1993 I met a local DJ (and record shop assistant) Callum Wordsworth who led me further to the North American house music scene with records including: *Hard To Get*, Choo ables (EFA, 1993); *No More Mind Games*, Classic Man (Nervous, 1993); and *Keep It Open*, Effervescence (Hi-Bias Records, 1993); which I eagerly bought from him. Here a common stylistic theme is the use of repetitive keyboard stabs (typically with the sonic texture of an electric organ), percussion consisting of kick drum, clap and hi hat, and vocal samples; a combination that much of my work refers to. At the time, this format provided

an aesthetically satisfying alternative to trance, progressive, psych and so on sub-genres forming in the wake of hard core.

1994 developments in UK and German Techno.

Around 1994 I felt that interesting developments were taking place in the techno scene. Following Warp Records *Artificial Intelligence* series isolated releases came to light (forming the beginnings of a movement) that included rather unfamiliar rhythmic patterns. Of these *Monolense*, Baby Ford (Ifach, 1994) and *Anti EP*, Autechre (Warp Records, 1994) caught my attention. These appeared to be quite unlike the earlier techno formats from which they had potentially emerged – seeming almost like a kind of revised agenda that avoided the clichés collected over the previous 5 years. At the time I was struck by the ambiguity and unfamiliarity of their rhythmic structures. Similarly the pitched elements were neither ambient, overtly joyous or frenzied; yet somehow they snaked around the percussive component. In contrast to this, the emerging mood in Germany included the linear hypnotic form of Maurizio's *M4* (Basic Channel, 1995) and the circularity of Mike Ink's *Polka Trax* (Warp Records, 1996).

Late 1990s independent experimental musics

As is often the case one's musical development and tastes are often informed and extended by the friends we encounter and the circles we move in. The next pivotal stage in my musical development is a case in point. Callum Wordsworth (who had introduced me to New York house) also introduced me to his flat mate Jeremy Potter. Unlike Wordsworth, Potter's main interest (circa 1995) was in the abundance of non-dance musics emerging from dance music culture.

Notable works include: + / -, Ryoji Ikeda, (Touch, 1996); *Metri*, Ø (Mika Vaino) (Sähkö, 1994); *Frantz*, General Magic (Mego, 1997); *Fsck*, Farmer's Manual (Tray, 1997); and, *Init Ding*, Microstoria (Mille Plateaux, 1995). Unlike previous groupings of works identified here, these are not defined by any common set of sonic materials, patterns or processes but are rather divergent. While displaying

an awareness of the vocabularies present in house and techno, these works clearly reject or critically engage those vocabularies. This had a relevance to my own practice and enabled me to reduce the sonic content and activity in my work.

1997 Professional development

Soon after meeting Potter I joined him on his radio show, running from midnight until 6am on Saturday nights. As I became a regular contributor we renamed the show *Non-Axiomatic Living Room*. To prepare for the show we would make materials throughout the week. Russell Haswell (who was associated with the MEGO record label and had released Farmers Manual's *Fsck*) approached us with the offer of producing a CD for his OR label. We recorded the album and it was released as *Good News About Space* (OR, 1999) under the project name Shirt Trax (a reference to Robert Baker's auntie and uncle Jean and George Shirt). Around the same time I was producing collaborative work with a friend Mat Steel. In 1988 we found a financial backer enabling us to produce an independent 12" single *Tplay* (Snd, 1998). This was an immediate success and the estimated 450 copies sold very quickly. On the back of this we were approached by Mille Plateaux to produce an album – *Makesnd Cassette* (Mille Plateaux, 1999). The Mille Plateaux album won widespread popular and critical acclaim.

In terms of career development I had made a substantial step forward with projects on two significant labels: Mille Plateaux and Or (a sub-label of sorts handled by Touch). The two projects (Snd and Shirt Trax) represented polar opposites of my musical approach: while Snd was regular, linear and rather predictable with a reduced sonic palette; Shirt Trax was erratic in terms of musical structures and uninhibited in use of sonic materials.

Snd continued to release works for a number of years, with two more additional projects on Mille Plateaux and more self released 12" singles. In 2009 we

produced a 4th album *Atavism* (Raster Noton, 2009). The project continues perform live regularly.

Although I had been active as a solo artist from 2001, following the release of *Atavism* I decided to focus on solo works, and I began to develop the works contained in this portfolio. A major gear-shift in my solo career happened with the dual release of *Multistability* (Raster Noton, 2011) and *UL8* (Editions Mego, 2011), again two prestigious labels; the solo activity circa 2010 mirroring the collaborative works circa 2000.

Appendix 3, Folio Contents

The disk format is Mac OS Extended (Case-sensitive); the content has been tested in Mac OS X 10.6.8 using QuickTime player Version 10.0 (131)

Folder 1. Audio Visual works (see chapter 3 for commentary)

1. aos--pov-edit.mov

Codec Apple animation, resolution 720 x 480, frames per second 25, audio 16-bit 44.1 kHz, stereo, file size 116.13mb, duration 11 minutes 25.48 seconds.

2. aos--dvd-edit.mov

Codec Apple animation, resolution 640 x 480, frames per second 25, audio 24-bit, 96kHz, 5.1 surround, file size 6.21gb, duration 59 minutes 59.24 seconds.

3. gaussian--hi-def-example.mov

Codec Apple animation, resolution 1920 x 300, frames per second 25, audio 24-bit 96 kHz 8 channels (discreet), file size 2.15gb, duration 10 minutes 4.88 seconds.

4. radial edit--2010b.mov

Codec Apple animation, resolution 720 x 576, frames per second 25, audio 24-bit 48 kHz stereo, file size 3.88gb, duration 11 minutes 9.49 seconds.

5. psychoneural.mov

Instruction to viewer: please cross your eyes and attempt to align the two circles for the duration of this piece.

Codec Apple PNG (still), resolution 2000 x 1000, frames per second 15, audio 16-bit 44.1 kHz, file size 61.67mb, duration 6 minutes 6 seconds.

Folder 2. Microtemporal works (see chapter 4 for commentary)

1. Multistability (sub folder)

17 files. Waveform Audio File Format (WAV), 24-bit, 96 kHz, stereo. Total duration 1 hour, 3 minutes, 12 seconds. Total file size 2.2gb.

2. UL8 (subfolder)

20 files. Waveform Audio File Format (WAV), 24-bit, 96 kHz, stereo. Total duration 1 hour, 15 minutes, 8 seconds. Total file size 2.25gb.

3. Manitutshu (subfolder)

9 files. Waveform Audio File Format (WAV), 16-bit, 44.1 kHz, stereo. Total duration, 26 minutes, 57 seconds. Total file size 285.3mb.

4. Periodic Orbits (subfolder)

2 files. Waveform Audio File Format (WAV), 16-bit, 44.1 kHz, stereo. Total duration 46 minutes, 32 seconds. Total file size 493.2mb

Folder 3. Works responding to house musics (see chapter 5 for commentary)

1. sensate focus 12"s (sub folder)

6 files. MPEG3, Stereo, 320kbs. Total duration 1 hour, 6 minutes, 24 seconds. Total file size 159.5mb. (Note where projects were distributed on vinyl and download, digital files use mpeg3 compression.)

2. Sentielle Objectif Actualité (sub folder)

7 files. Waveform Audio File Format (WAV), 16-bit, 44.1 kHz, stereo. Total duration 53 minutes, 27 seconds. Total file size 574.4mb.

3. n-dimensional analysis (sub folder)

2 files. MPEG3, Stereo, 320kbs. Total duration 22 minutes, 19 seconds. Total file size 53.6mb.

Folder 4. Three exhibitions (see chapter 6 for commentary)

1. matter space motion (sub folder)

1-factoid short.mov

Codec H.264, resolution 1920 x 1080, frames per second 25, audio AAC stereo 44.1 kHz, file size 9.46mb, duration 24 seconds. Note this video features was shot at PAF film festival, Czech Republic 2011 where the work was restaged.

2-supersymmetry.mov

Codec H.264, resolution 320 x 240, frames per second 30, audio AAC stereo 44.1 kHz, file size 4.32mb, duration 1 minute 42 seconds. Video by Bret Dodds 2010.

2. coherence and proximity (sub folder)

1-shepard.mp4

Codec H.264, resolution 1280 x 720, frames per second 30, audio AAC stereo 48kHz, file size 88.49mb, duration 1 minute.

2-oscilloscope.mov

Codec H.264, resolution 1024 x 576, frames per second 29.97, audio 24 bit 48 kHz stereo, file size 156.72mb, duration 2 minutes 38 seconds.

3. attack space decay time (sub folder)

1-five prints.pdf

Portable Document Format (PDF), file size 2.5mb. Contains the following prints: spatial blend #01, size 594 x 841mm; spatial blend #11, size 1120 x 841mm; spatial blend #22, size 1110 x 841mm; spatial blend #50, size 594 x 770mm; spatial blend #67, size 950 x 880mm. Each an edition of 5 signed and stamped by the artist. Printed on Hahnemühle Photo Rag 308gsm 100% cotton acid-free paper to Fine Art Trade Guild approved standards with archival pigmented inks.

2-synthesis with convolution reverb example.aif

Audio Interchange File Format PCM sound file, 16-bit, 44.1kHz, file size 19.73mb, duration 1 minute 57 seconds.

3-scope.mov

Codec mpeg4, resolution 1024 x 576, frames per second 30, audio AAC 44.1kHz stereo, file size 16.89mb, duration 1 minute 24 seconds.

Appendix 4, Resources

Folder 1, Sound examples

1. didjeridu Solo excerpt.aif

Audio Interchange File Format PCM sound file, stereo, 16-bit, 44.1kHz, file size 4.99mb, duration 29.65 seconds. From Laade, W. (1993) Australia: Songs Of The Aborigines And Music Of Papua, New Guinea. New York: Lyrichord.

2. Antjali Song - Mimic Entertainment Dance excerpt.aif

Audio Interchange File Format PCM sound file, stereo, 16-bit, 44.1kHz, file size 4.29mb, duration 25.50 seconds. From Laade, W. (1993) Australia: Songs Of The Aborigines And Music Of Papua, New Guinea. New York: Lyrichord.

3. lm1-tr808-tr909.aiff

Audio Interchange File Format PCM sound file, stereo, 16-bit, 44.1kHz, file size 8.08mb, duration 48.01 seconds.

4. Latelybass.aif

Audio Interchange File Format PCM sound file, stereo, 16-bit, 44.1kHz, file size 3.7mb, duration 22 seconds.

5. Jazzorg.aiff

Audio Interchange File Format PCM sound file, stereo, 16-bit, 44.1kHz, file size 5.38mb, duration 32 seconds.

Folder 2, Pattern generating examples

The following examples require Max 6 Runtime, it can be downloaded here:

<http://cycling74.com>

1. Random duration

A system to randomly determine the length of a note as a percentage of the time between the on point of successive notes (which is manually specified)

2. Length velocity table

A system that steps through a list of numbers and uses these to determine velocity of volume percussion, and volume brightness and duration of chord.

3. Time sequence

A system that steps through values and uses these to determine the time between successive on points.

4. Duration repetition

A system that creates pairs of durations (the time between successive on points) and repetitions of those durations

5. Compression expansion

A system that enables the user to specify the speed of a number of events: 1 to 5, and the time between the on point of the first of these.

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