# Augmenting Percussion with Electronics in Improvised Music Performance

Commentary in support of portfolio of recorded performances

Paul Hession

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The candidate confirms that the work submitted is their own, except where work which has formed part of jointly authored publications has been included. The contribution of the candidate and the other authors to this work has been explicitly indicated below. The candidate confirms that appropriate credit has been given within the thesis where reference has been made to the work of others.

Audio files *Oldingi Mash Torting* (solo) and *Nja*, *Rindade Insult*, *Balbuzie* and *La Taaban Karo* are duets by Ewan Stefani and myself previously published and issued on a CD recording: *Concretes* (Bruce's Fingers BF128, 2015).

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# Abstract

This commentary augments audio and video recordings that should be considered the essence of the study. The sound recordings comprise an original body of work that resulted from my interest in extending the possibilities of a standard drum set by augmenting it with electronics. It developed from an early interest in analogue, electroacoustic devices – such as the Dexion frames used by Tony Oxley and Paul Lytton to an engagement with digital electronics, specifically Max MSP, that was unknown to me at the outset of the study. The digital tools caused me to re-evaluate my thinking; to go beyond extending the sound-world at my disposal to engage with and consider artificial intelligence and the potential of creating a surrogate, software improviser with a degree of agency that challenged my thinking about human-computer interaction and confounded the issue of whether I was playing in a solo or duo setting. The commentary demonstrates the centrality of free improvisation to my approach and the recordings document my use of technologies, varying from the seemingly primitive (wooden beaters) to the apparently sophisticated (Max MSP) where I fully explore the affordances of each encounter.

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# Chapter 1. Introduction

As a drummer working as a free improviser and an active solo performer, I discovered at an early stage that the standard kit, which evolved as an accompanying instrument, presents a great challenge as a solo instrument and my research is predicated on finding a way to expand its sound-world using live electronics, drawing on early work by drummers Tony Oxley and Paul Lytton combined with modern, digital technology. Many contemporary drummers use digital electronic or hybrid kits and of those working in jazz and improvised music an increasing number are making use of the latter. The emphasis being, in most cases, on augmenting the acoustic kit with electronics while maintaining the kit's primacy. This often amounts to adding additional timbres, with the use of samplers, to the acoustic sounds. Off-the-peg digital kits play sampled acoustic drum sounds and I see no practical use for this technology beyond making quiet or near-silent practice possible (with the use of headphones). Use of elements of these electronic kits combined with acoustic percussion to create hybrid instruments is a more inventive use of the technology, particularly as it is an additive process; building on the strengths of the original instruments.

At the outset, I had little knowledge of digital music software programmes, but had enthusiasm to explore the possibilities of both these tools and the more 'hands-on' analogue devices used by an earlier generation. I had to make an early decision about whether to learn to programme Max MSP, which I estimated would be a full-time study for a prolonged period, or whether to co-operate with existing programmers and to engage with the software purely as an end-user. I chose the latter for reasons of expediency.

The thesis is structured to give a contextual basis for my research, set out my influences and my approach to playing and particularly my belief in free improvisation as the most natural way for me to interact with the various technologies and explain why I place emphasis on solo improvisation. I demonstrate how I set out to discover ways of expanding the possibilities of the instrument by trying different interventions in a systematic way to achieve an original outcome and I give a detailed breakdown of the technologies used. The research herein takes the form of audio and video recordings made between 2012 and 2017 in Huddersfield, Leeds, Stavanger (Norway) and York. There are nineteen audio recordings of me playing solo using acoustic percussion (drum set) with variations in the details of the kit combined with a laptop computer with soundcard and different combinations of a condenser microphone, contact microphones,

ring modulator, echo machine, octave divider, analogue mixer, Roland sampler, volume pedal and powered monitor (combined amplifier and loudspeaker). One of these pieces is played entirely with electronics, with no acoustic percussion and another is the inverse: acoustic percussion, with no electronic intervention. There are four solo videos including one example of a complete improvisation demonstrating the loading of raw material (sampling percussion), playback and interaction.

There are also four audio and two video examples of duo recordings in which my partners and my own sonic input is frequently conflated so that it is virtually impossible to determine who is playing what. My analyses of these pieces reveal much of the detail that would be impossible to evaluate without a first-person testimony. I have analysed several of the audio and video examples using a synthesis of Lawrence Ferrara's phenomenological approach and Nattiez' work on musical analysis.[1]

My principal research themes were:

- To engage with the technology to develop my solo playing into new areas
- To explore how the application of the above could be applied to duo improvisation
- To find out which of the technologies (including acoustic and digital and analogue electronics) work most effectively for these purposes

I have limited the research to solo and duo settings, as the Max patches used do not lend themselves to ensemble interaction. Their (intended) unpredictability makes them unsuitable and further, separate research needs to be done beyond this study to resolve this issue. I have sought to go beyond accessing different sounds when striking a drum or pad to be able to utilise parameters that are usually inaccessible to the drummer – pitch manipulation, randomised sampling and an element of artificial intelligence with a degree of agency to challenge me as a player. My portfolio of recordings presents an original contribution to knowledge as it

[1] Lawrence Ferrara, 'Phenomenology as a Tool for Musical Analysis', *The Musical Quarterly*, 70, 3 (1984), 355-373 <http://0-www.jstor.org.wam.leeds.ac.uk/stable/742043> [accessed 5 May 2013] and
Jean-Jacques Nattiez, *Music and Discourse: Toward a Semiology of Music* (Princeton NJ: Princeton University Press, 1990).

demonstrates a new way of interacting with a hybrid drum set. This study developed from an initial intention to enlarge my sonic palette to an encounter with artificial intelligence that was unforeseen and that presented new psychological challenges to be overcome, specifically; accepting that a software collaborator can have agency and that my role as a soloist had, in some circumstances, evolved into a human-computer duo. This question of creative responsibility and attribution has been posited by Ashline: 'When one listens to a performance involving live or improvised processing, whose musicianship should be credited more? The acoustic or electronic instrument of origin or the one that processes the sounds?'[2]

[2] William Ashline, 'The Pariahs of Sound: On the Post-Duchampian Aesthetics of Electro-acoustic Improv.' *Contemporary Music Review*, 22:4 (2010), 23-33 <https://doi.org/10.1080/0749446032000157008>

# Chapter 2. Context and Influences

## 2.1 Free drummers

When first developing my playing and listening skills to play free improvisation, the drummers that I investigated who were working in this field were principally Tony Oxley, Paul Lovens and Paul Lytton. These three drummers mixed contemporary classical percussion techniques with American jazz drumming sophistication and, in Oxley and Lytton's case, live electronics. A common factor with many improvising drummers is the fluid nature of their set-ups, which is usually determined by the musical setting in which they are working and site-specific considerations. I have seen Paul Lovens play various concerts over the past thirty-five years and he tailors his selection of percussion instruments to each situation. In fact, he uses the expression 'selected percussion' on recordings, to highlight the bespoke nature of his kit on each outing. Other drummers working in this genre since the late 1960s were Han Bennink, John Stevens and Eddie Prévost, but their more conventionally-rooted playing did not interest me in the same way as Oxley, Lovens and Lytton, although Bennink has to be acknowledged as a notable exception. In the nineteen-seventies he expanded his kit to include absolutely anything – often collecting detritus found in venues to be included as part of his equipment and making use of huge bass drums normally found in marching bands. Much of his playing is provocative and often comic, but underlying his droll showmanship is a phenomenal, conventional technique making his playing closer to that of Buddy Rich than most free drummers.

**Tony Oxley** made his living as the house drummer at Ronnie Scott's Jazz Club in London from 1966 to 1972 accompanying visiting American musicians and while doing so he developed a more personal, freer music. He built a frame from Dexion, a slotted, angled steel shelf support system, that stood to the left of his acoustic kit to which he attached devices which include two clamped steel knives, small 12 Volt motors, domestic and catering sized egg slicers, taut wires, springs and several cymbals. The cymbals were clamped tightly, unlike when suspended on cymbal stands and were positioned vertically to facilitate bowing. Contact microphones were attached to the frame, rendering the entire structure sensitive to being plucked, twanged, bowed, rubbed or struck. His rationale for amplifying the attachments on the frame was to raise their audio level to that of the acoustic kit.

The output from the contact mics on the frame went into a combined ring modulator and oscillator; the latter supplying the only truly electronic signal, an octave divider and a

compressor. These devices were connected to a volume pedal and finally an amplifier and loudspeaker. The volume pedal is a key component in this assembly; allowing for swelling sounds to audibility, masking their origin by bypassing the initial attack. This was a technique that Oxley's close collaborator guitarist Derek Bailey used with great finesse. Dexion was used for expediency rather than for any design considerations and it contrasts markedly with later, commercially made drum frames. It was selected for the preponderance of holes, which allow for attaching items almost anywhere and to allow for almost infinite positioning possibilities.

Figure 1. Tony Oxley with Dexion frame, Viersen, 2012

**Paul Lytton** encountered the use of electronics in music in 1968 when he was invited to play (acoustic) drums on the recording of *An Electric Storm* by White Noise[3] (along with David Vorhaus, Delia Derbyshire and Brian Hodgson) and the following year from Oxley, who was experimenting with a crystal earpiece-type microphone inside a snare drum with which he was manipulating feedback in conjunction with his normal kit. Lytton had seen Derek Bailey and Hugh Davies using contact mics in the Music Improvisation Company and his first foray into using electronics was attaching a contact mic to a cymbal stand within a conventional drum kit. He was considering expanding the use of contact mics by making a kind of frame and he was aware of fellow drummer John Stevens using a Dexion frame to support some small Chinese drums and cymbals.[4] Although Oxley and Lytton's frames are superficially alike, they differ in that Oxley's uses contact microphones exclusively whereas Lytton's has only one contact mic, along with several single-coil electric guitar pickups. Lytton's frame places more emphasis on long wires and strings with connected foot-pedals to modulate pitch.

[3] White Noise. *An Electric Storm*. Island Records ILPS 9099, 1969.

[4] Lytton recounted that it was saxophonist Evan Parker who first suggested using Dexion and John Stevens, Paul Lytton and Tony Oxley all constructed supporting frames from the material, although only Lytton and Oxley used them for electroacoustic instruments. From conversations with the author in Plombières, Belgium, 2016 and recounted with Lytton's permission.

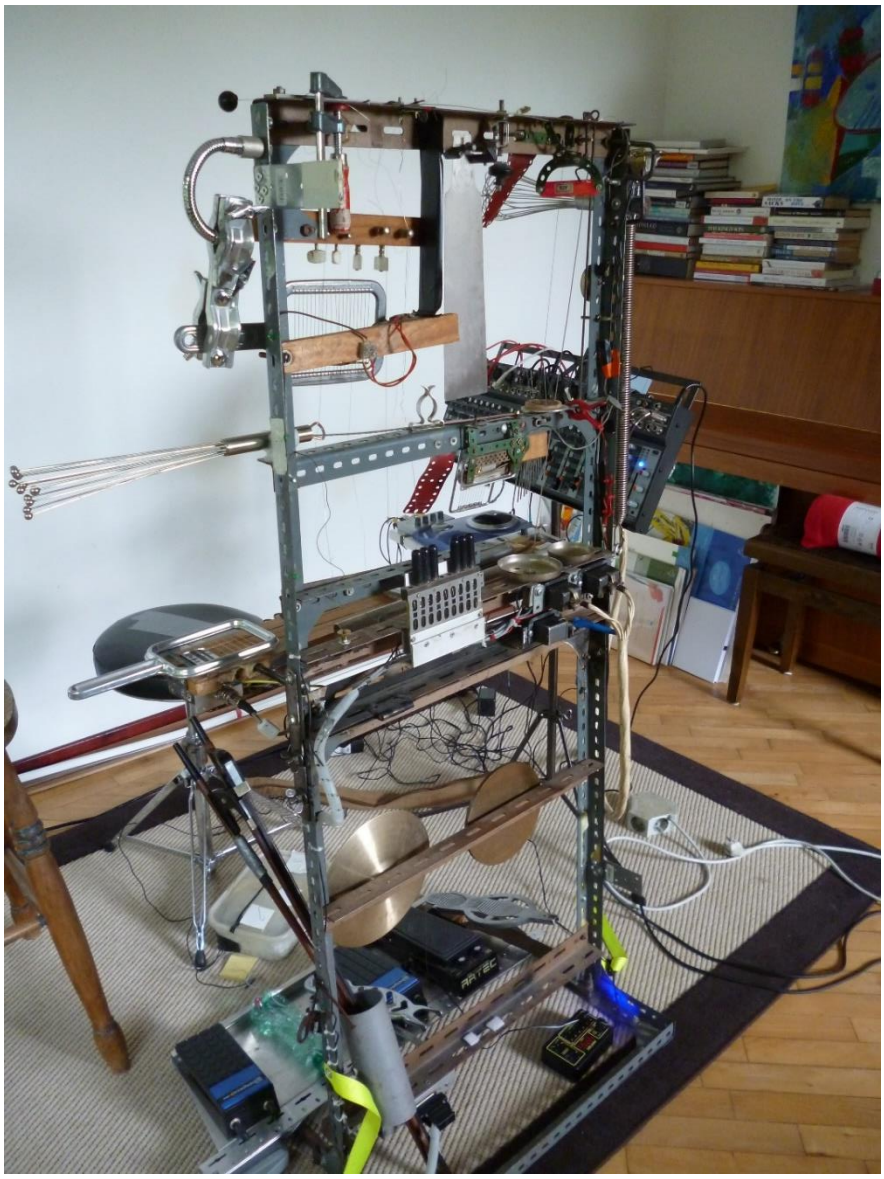

Figure 2. Paul Lytton's Dexion frame Plombières, Belgium, 2016

The greatest influences on Oxley and Lytton's use of live electronics were not to be found within their contemporaries working within improvised music (with the exception of Hugh Davies) but earlier generations working in Western art music. Principally John Cage with David Tudor in USA and Karlheinz Stockhausen in Cologne (WDR Studio). Davies worked as a personal assistant to Stockhausen from 1964-66 and later played live electronics in the *Music Improvisation Company* along with drummer Jamie Muir, vocalist Christine Jeffrey, saxophonist Evan Parker and guitarist Derek Bailey. It would be disingenuous not to acknowledge some

degree of influence from Davies — principally in his use of contact microphones and domestic utensils as instruments; particularly the egg slicer (which Oxley and Lytton both use). Lytton and Davies were friends and on one occasion Lytton deputized for Davies (playing live electronics) in M.I.C.[5] Oxley's only connection with the Music Improvisation Company was that he had long-standing playing relationships with both Evan Parker and Derek Bailey — particularly the latter, who he had first met in 1963 and the two men developed a rapport which endured until Bailey's death in 2005.

Other important influences on my playing were American drummers, starting with Max Roach and Elvin Jones early in my jazz career and later Sunny Murray, Andrew Cyrille, Rashied Ali and Milford Graves. These four drummers broke down the time-keeping role of the drummer and introduced a more open, abstract and expressionist approach. The American so-called free jazz style is an organic, free-wheeling way of playing that favours an ecstatic, almost trance-like approach. I absorbed a great deal from these players and the later influence of the European players combined to inform the development of my own percussive style.

### 2.2 *Space Patrol*

A great influence on my appreciation of electronic music occurred in 1963 when, at the age of seven I watched the television series *Space Patrol*. This was a marionette science-fiction show that featured electronic music throughout, as well as incidental sounds created entirely by electronic means. Frederick Charles Judd created the music and sound effects for the series using what he termed 'musical aids' such as a Multi-Vibrator (a self-generating oscillator), inductive type filters, sine-wave oscillator, noise generator (single valve, super-regenerative oscillator), gating circuits (automatic 'bell-gate' and controlled 'bell-gate'), contact microphones and a ring modulator.[6] Central to his practice was the reel-to-reel tape recorder and he developed fine skills splicing tapes and creating controlled attacks and decays by cutting tapes at various angles and in different directions. These techniques now seem somewhat arcane and primitive, but the resulting sounds were sublime to my seven-year-old ears.[7]

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[5] This occurrence was related during conversations with the author at Lytton's home in Plombières, Belgium, 2016 and is recounted with his permission.
[6] F.C. Judd *Electronic Music and Musique Concrète* (London: Neville Spearman, 1961), pp. 31, 35-39.
[7] Judd, 1961, pp. 56-57.

Part of the attraction of using analogue devices, such as the ring modulator, is the potential to access sounds that evoke the 'space age' music of my childhood. Oxley's later use of such devices; giving them his imprimatur, strengthened my case for using such tools.
Video V.2 shows the ring modulator in use, although there are many other instances of its use in other tracks and often in tandem with other effects.

**2.3 William Isles-Pulford**

Another great influence on my musical thought and development occurred when I was a choirboy singing at church weddings during the late 1960s in Leeds. The choir usually (that is, at regular church services) consisted of two rows of boy sopranos and two rows of men singing alto, tenor, baritone and bass parts accompanied by William Isles-Pulford on organ. On Saturdays the choirboys (without the men) were an optional extra for weddings and we were paid to sing at these events, which meant a good attendance was guaranteed. It was usual for the brides to keep everyone waiting, putting particular pressure on the grooms who, as we were positioned at the front of the church next to the organ, could observe quite closely. It was during these, often long waits that Mr Pulford (the organist) came into his own as an improviser.

Derek Bailey included church organists in his summary of musical traditions that feature improvisation as an essential factor: 'The main reason for the survival and continuous development of improvisation in organ playing, when throughout the rest of European classical music improvisation was being neglected or suppressed, is probably the adaptability and purely practical inventiveness required of any church organist in his working situation, a situation in which the creation of music is a necessity.'[8]

On a busy Saturday there could be four or more weddings in succession and I noticed that the organist's playing seemed to take on different characteristics during these waiting periods. It was clear that he was following his own muse and apparent to my young self that I was in the presence of an accomplished improviser, although I would probably not have described him as such at the time. Furthermore, the acoustics of the stone church and positioning of the organ pipes meant that the sound caused the whole edifice to vibrate and one could feel the music physically. I was usually positioned on the opposite side of the church with a view of the organ

[8] Derek Bailey, *Improvisation: Its Nature and Practice in Music*, (London: British Library, 1980), p. 30.

and I watched, fascinated, as having been tipped off that the bride was at the church door, Mr Pulford made his extemporization segue into the Wedding March.[9] The transition was invariably seamless and the manner of manipulating the organ stops in varying combinations to sculpt the sound captured my imagination. Perhaps significantly, these were also my first paying gigs. Please listen to Audio File 14. *Choral* to hear a modulated vocal example which alludes, albeit obliquely, to my early vocal exploits as a choirboy.

### 2.4 Free Improvisation

In most Western musics there are clear distinctions between the composer and the performer. These roles are well entrenched and similar classification is carried over into music analysis, where the roles of composer, performer and audience are slightly modified by the analyst replacing the audience. It is the case that virtually all the literature pertaining to Western music, from the work of Heinrich Schenker (1868 – 1935) to contemporary thinkers such as Lerdahl and Jackendoff (1983) and Jean-Jacques Nattiez (1990), despite the fact that Nattiez' work has informed my own analytical methodology, seem to treat separate composer and performer roles as being normative. These roles are freighted with hierarchical implications that give the former a degree of respect and acknowledgement for their pre-eminent position while the performer's role is, in most cases considered to be that of an interpreter – an intermediary with finely honed physical skills who can realise the composer's intentions without troubling themselves with making decisions about the architecture of the music. It is, to be blunt, a subservient role.

By contrast, a free improviser assumes responsibility for the entirety of the music with no separation of composer and performer; the player fulfilling both roles simultaneously. One would assume that a free improviser might be able to play any sound, at any time and to be able to dip freely into or out of any style of playing as the word free implies. Some players do take the term literally and include any sounds and styles as they feel, but the majority working within the European scene adhere to an unstated but implicit set of rules for them to be accepted into the usual playing circles and Derek Bailey's observation that the music resists easy classification holds true:

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[9] Richard Wagner, *Treulich geführt* from *Lohengrin*, 1850.

> Diversity is its most consistent characteristic. It has no stylistic or idiomatic commitment. It has no prescribed idiomatic sound. The characteristics of freely improvised music are established only by the sonic–musical identity of the person or persons playing it.[10]

Perhaps I am placing too much emphasis on the semantics of the terminology. Bailey coined the term 'non-idiomatic improvisation' to differentiate it from idioms that have an improvisatory tradition set within an accepted style, such as flamenco, jazz, Hindustani and Karnatic Indian music, etc.[11] Others have pointedly disagreed with this appellation, such as Edwin Prévost who asserted that 'once a form of music-making becomes recognisable as such (for example Derek's own guitar playing) then it has developed its own idiomatic framework and references.'[12]

My own observations led me to the realization that much free improvised music can be predictable and often sound broadly the same. Naturally, musicians develop habits and have preferences. We also choose to inhabit areas that interest us and which yield satisfying results. When one has developed a recognizable sound or style, one might be considered to have matured into having a unique voice, but the down-side can be accusations of predictability. Perhaps predictability is not entirely a bad thing, as when an audience seeks out a player because of prior knowledge or recommendation, they reasonably expect to hear a certain outcome. While discussing free improvisation with a student, I found myself placing emphasis on a willingness to explore small areas of the music fully by exploring the detail of timbres and spectrum in a way that is unusual in conventional Western approaches to music and the importance of taking a philosophical approach and trusting the process and valuing this way of music-making. The student in question was concerned with being dismissed as a charlatan and he described parts of the music as 'messing about'. I advised him to hold onto the concept of playfulness and to make playing, in its truest sense, a priority.

For the improvising percussionist, like myself, who came to free improvisation from a jazz background but with an interest in contemporary classical music as well as Indian music, Chinese Jīngjù (often referred to as Peking Opera), Japanese Gagaku[13] and many other musics; a

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[10] Bailey, 1980, p. 83.
[11] Bailey, 1980, p. xii.
[12] Edwin Prévost, *Minute particulars* (Matching Tye: Copula,2004), p. 13.
[13] Japanese Imperial Court music that was established in the 9th Century. [It] 'is a modification of the Gagaku of the Nara period, which was almost an exact imitation of the contemporary music of China and Korea.'

desire to explore percussion techniques and instruments beyond jazz was inevitable. The Chinese and Japanese influences on my playing are most apparent in my use of woodblocks, temple block and gongs and musical techniques: sudden stops, accelerandi and decelerandi, use of 'free rhythm', as described by Kishibe[14] and occasional adoption of a quasi-ceremonial approach. In short, and in common with most open-minded musicians, I draw on influences from anywhere and anything and these include from other artistic disciplines outside of music.

While playing solo, my intention is for the music to connect with the audience directly, transcending the source of the sound. I hope to make a connection with the listener's psyche that might make them forget that I am playing percussion and/or electronics and stimulate them in a similar way as when they are confronted by a sculpture, an abstract painting or a haiku. The challenge is to charm or seduce the listener into my sound-world. Analysis of my playing has revealed a propensity for mimicry. This is the case in my improvising with human partners particularly; I frequently hear material played by my collaborators and react by modulating the sounds at my disposal to come close to the perceived pitch or timbre.[15] This might take the form of rhythmic alignment, playing pressure-induced pitch glissandi on drums and bowed or squeaked cymbals. Matching or approximating textures or pitches is a way of getting closer to the other player and finding common ground for exploration.

There is one significant difference between my approach to playing with Max MSP and with human partners; whereas I seek to get closer, in musical terms, to my human collaborators, I often make deliberate use of contrasting material when playing with the former, as I am all too aware that I am effectively improvising with (a version of) myself and as my intention is to create spontaneous music that includes a degree of complexity and a wide textural range it would seem counter-intuitive to mimic the patch excessively, although there are instances when the output from *MWTPD* or *Stavpatch* stimulate me to react, often fleetingly, to provocative motifs. However, while listening for examples of mimicry by myself of the computer's output in the portfolio, it became clear that there are instances where the patch plays modulated output that could pass as mimicry of my playing, for example from 1:49 – 1:54 and 1:54 – 1:59 in Audio

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[14] Shigeo Kishibe, *The Traditional Music of Japan* (Tokyo: The Japan Foundation, 1966), pp. 32, 41.

[15] Despite my emphasis on human-to-human mimicry, there are fleeting instances in this folio, too numerous to annotate, but some examples are described in Video Analysis V.4, pp. 85-91.

File 2. *Breaks*. Perhaps the patch's modulation and replay of my input could be said to be a form of mimicry and it adds to my earlier assertion that the patch has a degree of agency that confounds convenient separation of human or computer collaborator. A brief example of mimicry in my playing is during Audio File 7. *Ceremonial Industry* at 6:51 – 6:56 as I match the sounds of sampled, choked cymbals on the patch with a small, hand-held cymbal. This is one example, but much of this activity happens at the micro level throughout the folio, during the cut-and-thrust of the improvisations.

I use methods which are sometimes referred to as extended techniques (see 3.7, p. 50) to exploit the detail potential of my materials, particularly when playing solo acoustically. 'Extended techniques' is a problematic term, as all techniques must have been innovative when first devised, before becoming a part of orthodox practice. I use the expression here to mean playing methods that go beyond standard practices used in mainstream musical situations. Saxophonist John Butcher has written forcefully about his dislike of this concept and expression:

> It seems to derive from the reducibility of the pen-on-paper composer's world where an instrument plays fixed notes and, after referral to the published lists of possibilities, certain extra colours and articulations are then bolted on. Because they are rarely derived from the player's own needs and personality they invariably end up sounding like the awkward appendages they are.[16]

As I have a finite number of drums, usually four or five with broadly similar timbres, it feels quite natural for me to extend the available pitches beyond those to which the drums are tuned. I also place great emphasis on cymbals for their capacity to sustain, to yield indeterminate pitches, complex shimmering sounds and inharmonic partials that can be accessed by bowing. When a cymbal is held steady with one hand at its cup and bowed repeatedly at ninety-degrees to its edge to generate consistent vibrations 'at a critical level, depending on the exact frequency, the period of the vibration increases by a factor [of] 5, giving multiple subharmonics'.[17] Cymbals have also been described as revealing 'typical features of … nonlinear behavior: amplitude-

[16] John Butcher, 'Freedom and Sound – This time it's personal', *Point of Departure*, 2011.
[17] N.H. Fletcher, 'Nonlinear Dynamics and Chaos in Musical Instruments', *Journal uncredited*, p. 114

dependent level of harmonics in the spectrum, pitch glide, bifurcations, [and] energy exchange between modes through nonlinear coupling and chaos.'[18]

I may be untypical as a kit drummer in that I think in terms of pitch as well as timbre and a/rhythmic placement. This is motivated by a desire to access and exploit the full possibilities of the instrument for the widest possible expressive ends. While considering my approach to playing the drum set, it is cogent to consider the concept of *affordances*, particularly as I use often quite unorthodox and unusual techniques, such as rubbing sticks together, squeaking cymbals and pitch modulation on drums. The term 'affordance' was coined by psychologist James J. Gibson and introduced in *The Theory of Affordances* (1977). Windsor and de Bézenac adapted Gibson's thinking to a musical context, citing Gibson's definition of an affordance as 'a property of an event or object, relative to an organism, which represents its potential for action'.[19] I try to identify a wide range of affordances when I consider the tools at my disposal, although this approach is innate and predates my awareness of the concept or nomenclature. The technologies, varying from a wooden stick, to a drum, to a laptop computer afford me the opportunity to create a playful and complex outcome and, as some examples in my portfolio attest, affordances beyond drumming were found and exploited: the use of voice as sampling material and the realisation that I could, on some occasions, play the laptop controller and analogue effects using the sampled source material exclusively without acoustic percussion.

### 2.5 The Solo Improviser

Cecil Taylor described the piano as being 'eighty-eight tuned drums' (Wilmer, 1977) and this led me to compare the situation of the solo acoustic pianist with the solo drummer. Both play percussion instruments, but there the similarity ends, as the piano has a range of seven octaves and is tuned chromatically with the potential for playing a huge repertoire of music from almost any tradition. The drum set, on the other hand, was designed as an accompanying instrument and specifically for the role of timekeeping. It is tuned to itself, that is the drums are tuned indeterminately, but usually the descending pitches, from snare drum (with snares off) to small

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[18] A. Chaigne, C. Touze and O. Thomas 'Nonlinear vibrations and chaos in gongs and cymbals', *Acoustical science and technology,* 26,5 (2005), 403-409 (p. 403) <DOI: 10.1250/ast.26.403>

[19] James J. Gibson, *The Ecological Approach to Visual Perception* (1979) cited in W. Luke Windsor and Christophe de Bézenac, 'Music and affordances', *Musicae Scientiae,* 16-1 (2012), 102-120, p. 104. <https://doi.org/10.1177/1029864911435734>

tom-tom, to floor tom-tom to bass drum are tensioned with intervals of approximate fourths. The pitches are frequently made more indeterminate by the addition of damping materials to give a 'thud' rather than a 'bong' sound. The four (or more) drums are combined with hi-hat, ride and crash cymbals, which also have indistinct pitches and this becomes apparent when a cymbal is struck and listened to close to its edge. The shimmering effect is made up of a whole range of pitches (inharmonic partials). The drummer is working with basically three timbres, if the snare-on sound is included and a very limited number of pitches, compared to the pianist.

Drummer Andrew Cyrille played with Cecil Taylor from the mid-1960s until the early 1970s and his playing on the Taylor recordings *Unit Structures* and *Conquistador*[20] of 1966 and particularly his solo recording *What About?*[21] caught my attention. Hearing this and considering the implications of a drummer playing only a conventional kit for an entire album presented what felt like the ultimate challenge: to play solo for more than a brief interlude in the middle of a piece of music, on what is essentially a time-keeping instrument. Cyrille's playing on *What About?* seemed to be a declaration that the drum set is deserving of respect and can stand alone, in the hands of the right player, and be equal to any other solo instrument. This coincided with me seeing and hearing British improvisers; saxophonist Evan Parker and guitarist Derek Bailey playing solo on many occasions. I had internalised the idea that any self-respecting improviser should be able to play solo and that ultimately this degree of self-reliance could only help in collective playing situations where a willingness to be pro-active and decisive, combined with highly developed listening skills, would make one into a worthy participant.

The drum set can function beautifully as a time-keeping instrument and it does lend itself to short drum solos in the traditional sense, that is, a usually flamboyant exposition based on variations of the preceding rhythm which often builds to a dramatic climax, before the theme of the tune is restated by the ensemble. In rock music these solos are the butt of many jokes and there is a widely used cliché that the drum solo is the best time to head to the bar for a drink, as they are perceived to be boring and uninteresting.

Drum solos in rock music often are vapid, macho displays that give justification to the well-worn joke, but there are examples of drum solos in jazz that, in this listener's opinion, border on the sublime. Joe Morello's solo on *Castilian Drums* is an engrossing construction that

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[20] Cecil Taylor, *Unit Structures.* Blue Note, BST 84237, 1966 and *Conquistador!* Blue Note, BST 84260, 1966.
[21] Andrew Cyrille, *What About?* BYG Actuel 529316, 1971 (Recorded 1966).

explores the potential of the instrument fully.[22] Morello exploits the whole dynamic and timbral range of the kit, playing with sticks, brushes, mallets and his hands and fingers, playing the snare drum with the snares both on and off and using unconventional techniques such as rubbing his hand down the stick which is resting vertically on a drum head to produce an almost vocal effect. Morello's exploitation of the possibilities of using a range of beaters, including his hands and fingers allied with a phenomenal technique, demonstrated how an open mind and a playful approach could yield remarkable results.

By contrast, Tony Oxley's piece *Oryane* is credited as a 'percussion solo' on the album *Ichnos.*[23] The sleeve notes state: 'This piece is for Drums, Cymbals, metal and wood surfaces, metal strings both acoustic and amplified. They are played with metal sticks and bowed. There are no recording techniques used in this piece other than the placing of microphones around the kit.' Clearly, Oxley's notes were intended to make the listener aware that the electronically treated sounds were played in real-time and simultaneously with the other percussion. He used the electronics to extend the sustain of cymbals and bells and to transform the sound texturally while modulating the pitch. He bowed strings and cymbals, simultaneously plucking amplified egg-slicer strings while playing staccato drum strikes. The acoustic and electronic sounds are completely integrated in *Oryane* and there is even a section of controlled feedback redolent of Jimi Hendrix. This is a very different approach to that of Morello, but these two drum solos could be likened to paintings by Caravaggio and Jackson Pollack. Morello's time-frame and development can be compared to the former's compositional structure and narrative while Oxley's piece is abstract but stands complete and has a form that gives equal weight to the acoustic and electronic threads.

Derek Bailey described his reasons for working as a soloist:

> The need, after a considerable time thinking only in group terms, was to have a look at my own playing and to find out what was wrong with it and what was right with it. I wanted to know if the language I was using was complete, if it could supply everything that I wanted in a musical performance. The ideal way of doing this, perhaps the only way, it seemed to me, was through a period of solo playing. Alternating periods of group playing with solo playing is something I have tried to maintain ever since.[24]

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[22] *The Dave Brubeck Quartet Live at Carnegie Hall, Part 2* (CBS BPG 62156, 1963).
[23] Tony Oxley, *Ichnos* (RCA Victor, 1971).
[24] Bailey, 1980, pp. 105-6.

The solo free improviser faces a unique set of challenges. The player needs to be resourceful to find stimulus from within, although factors such as the acoustic conditions of the performance space, environmental sounds (traffic noise, bird-song, etcetera) and audience noise can all contribute to stimulate (or distract) the player. In my own case, as a drummer, I have chosen to work with digital electronics to create a surrogate other player. The computer programme that I am running samples my playing and randomises it for me to interact with on playback, so that I am playing a duet with a (mediated) version of myself. Given that I am the only human involved – am I playing solo? Does a computer programme constitute 'an other?' Limerick, Coyle and Moore (2014) observed 'how our sense of agency for actions differ[s] when collaborating with computer[s] vs. human partners.' [25]

**2.6 Use of Silence (*ma*)**

When considering an improvisation that may be formally difficult to categorise using established musical analytic tools it can be helpful to use parallels from the visual arts, for example Japanese calligraphy. I consider the silence into which I place sounds to be the equivalent of the paper on which a brushstroke is placed. The decisiveness and sureness of the stroke will be apparent from the outset. Any tentativeness will be detected and the sounds, like brushstrokes, cannot be unmade. The formal design of the piece depends on imaginative and surely-placed sounds being juxtaposed to form a successful outcome. I approach solo improvising with this attitude in mind. It differs from playing with others as there is only my playing and silence to consider. The silence is the canvas or perhaps the silence is *the other*, but it can only be such as an unreactive contributor. By including silence as a part of the music, I am maximising the material on which I can draw to shape the performance.

In the same way that the painter's blank canvas and the calligrapher's blank paper can be intimidating; the silence offers a similar set of possibilities for the solo improviser. The first stroke/sound to be made is loaded with meaning. It is the most important act, yet it can dissipate almost instantly as subsequent or overlapping sounds are added. By placing subsequent sounds within this continuum, the physical act of playing gets under way and one's nerve endings tingle

[25] Limerick Hannah, Coyle David, Moore James W. The experience of agency in human-computer interactions: a review. *Frontiers in Human Neuroscience*, Vol 8, 2014. <https://www.frontiersin.org/article/10.3389/fnhum.2014.00643> DOI=10.3389/fnhum.2014.00643.

as a feedback loop is established. By this point thought and physical reactions will be almost instantaneous and if one is relaxed enough to enjoy the activity, coupled with being alert and open; a 'flow-state' can ensue. This concept was identified by Csíkszentmihályi which he also describes as *optimal experience*: 'It is what a painter feels when the colors on the canvas begin to set up a magnetic tension with each other, and a new *thing*, a living form, takes shape in front of the astonished creator'[26] This description works equally well to describe how sounds are juxtaposed to create a musical work and it is coincidental that it aligns itself with my earlier analogies with practitioners of the visual arts.

This emphasis on silence as a starting point works in a formal concert setting but may not be possible in more informal settings where one adapts to use the acoustic environment and find other ways of commencing playing. Furthermore, when playing live I often react to sounds made by audiences or passing acoustic phenomena in or near the concert environment. Loud footsteps, often as a member of the audience takes their leave or makes their way to the WC, can be an incitement to react. I realise that this can be provocative, but if the footsteps are so loud as to be a disturbance, then I consider the intrusion to be fair game as a stimulus. The use of all available sounds feels quite natural and inevitable and they can be particularly constructive for the soloist, as one acknowledges stimuli beyond the instrument. Cage's infamous work 4'33" (1952) drew attention to ambient sound and he stated that 'There is no such thing as silence. Something is always happening that makes a sound'.[27] Despite this assertion, silence here fulfils the criteria of being an absence of foreground sound.

Within this portfolio silence is used throughout as dramatic punctuation, much as it is used in Japanese Gagaku (Imperial Court music) and Kabuki (popular music theatre). The conductor (of Western music) Seiji Ozawa draws attention to this while describing pianist Glenn Gould:

> In Japan we talk about *ma* in Asian music – the importance of those pauses or empty spaces – but it's there in Western music, too […] That's what putting in these empty spaces, or *ma*, is all about […] You grab your audience and pull them in.[28]

Please listen to Audio Files 16 and 20 for the use of silence.

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[26] Mihalyi Csíkszentmihályi, *Flow: The Psychology of Optimal Experience*. (New York: Harper Collins, 1990), p. 3.
[27] John Cage, *Silence: Lectures and Writings* (London: Calder and Boyars Ltd, 1968), p. 191.
[28] Haruki Murakami and Seiji Ozawa, *Absolutely on Music* (London: Vintage, 2016), p. 22.

### 2.7 Duo Improvisation

I adopt different psychological approaches to free improvising depending on the number of players. I have a great enthusiasm for playing in duos, particularly as it is a very direct setting that gives the players a great deal of space to interact and offers three possible combinations:

- Player A solo
- Player B solo
- Duo

These combinations are there to be exploited and this should be borne in mind while playing, even if all three permutations are not used. I would usually expect a duo improvisation to begin with both players together 'setting out their stalls' and both feeling out the other's playing to get the measure of them. This can be analogous to a conversation, although this implies leaving each other space to speak.

Wilson and MacDonald identified the shortcomings of the conversation analogy:

> Despite parallels drawn with conversational language use, […] contributions to improvised music are predominantly simultaneous rather than turn-based. Unlike conversation, participation in improvisation may be shaped by instrumental limitations. Instrumental music is essentially ambiguous and improvised for the ends of aesthetic achievement and involvement, unlike those of information exchange or task completion through talk; the expectation of creativity and innovation within the former activity means that goals are necessarily contingent or flexible.[29]

I prefer to think in terms of a wrestling match, where the action is almost continuous and both participants are involved in the push and pull of the activity. This also works very well for me as I particularly enjoy playing in a duo when the players feel confident to 'push each other around' in a playful way and not be overly polite. A further analogy that seems apt is to compare the activity to making love, although I am aware that this might make some readers slightly queasy. If one considers that successful love-making requires both participants to be sensitive, fully aware of the moment, playful and that there is a dynamic factor in the activity then it can be much like an improvising duo.

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[29] Graeme B. Wilson and Raymond A.R. MacDonald, 'The construction of meaning within free improvising groups: a qualitative psychological investigation', *Psychology of Aesthetics, Creativity & The Arts* (2017) <http://dx.doi.org/10.1037/aca0000075>

I committed myself to fully engaging with free improvisation in 1980 after an apprenticeship playing conventional music in northern Working Men's Clubs from the early 1970s. The transition from conventional to free music was facilitated by the change from playing rock-based drumming (with regular beats played on bass drum, snare drum and closed hi-hats or ride cymbal) to the, what I considered to be, more advanced and sophisticated demands of jazz drumming which involve a ride cymbal and hi–hats holding the time while the snare and bass drum are used to add colour, accents and develop a polyrhythmic counterpoint to the swing pattern of the ride cymbal. Bass guitarist Jerome Harris defined swing: 'as a version of the shuffle family of rhythms […] triplet-based rhythms that give a "12/8 feeling" to a piece.'[30]

The drum set evolved in the twentieth century from an often-ramshackle collection of percussion instruments into an integrated set in the nineteen-thirties when the kit, as now recognised, came into being.[31] As free improvised music frequently makes use of sounds and techniques borrowed from other musics, many drummers have resorted to adding any number of idiophones to their set-ups and others have redesigned the kit to suit their needs. Tony Oxley made radical changes to his kit; replacing the snare drum with a pair of bongos and overlapping all the components to make possible his development of a unique sweeping stroke that cascades across multiple surfaces.

There are some video examples of my duo with Dag Egil Njaa that confound the normal expectations of duet interaction as the origin of all the sounds come from my playing and although he appears to be playing an electric guitar, he is in fact using it as a movement controller (with the addition of a Wii motion detector attached to the back of the guitar headstock and an iPhone attached to the guitar body) to modulate the *Stavpatch*. Both Njaa and myself used the *Stavpatch* independently during these sessions.

Please view videos 5 and 6 (Dag Egil Njaa Duos, Stavanger).

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[30] Ingrid Monson, *Saying Something: Jazz and Interaction.* (Chicago: University of Chicago Press, 1997), p. 52.
[31] Matt Dean, *The Drum: A History.* (Washington DC: Scarecrow Press, 2011)

## 2.8 Existing research on HCI systems and Contemporary Drummers using live electronics – Critical Assessment

Section A – Research on HCI systems in music

Human Computer Interaction (HCI) in music is a field of research where most authors, perhaps unsurprisingly, come from a computer science background and many reveal insights into the design and programming of HCI systems which are then tested with the participation of external instrumentalists.

**Danby and Ng**[32] (2011) developed a system that 'generates an expressive drumbeat in real time' to accompany an externally connected audio signal. Like much HCI research with a focus on drumming, it does not look beyond rhythmic alignment and it places great emphasis on beat tracking.

**Murray-Rust and Smaill**[33] (2011) argue that 'there is a need for a formalized description of musical interaction, which allows reasoning about the musical decisions of human and computational players' and they describe a system that implements their concepts. As they are respectively a lecturer in design informatics and a computer scientist their work has a technological emphasis which is predominantly applied to conventional musical forms.

**Stowell, Robertson, Bryan-Kinns and Plumbley's**[34] (2009) work is concerned with the evaluation of live HCI and they present case studies of their analytical methods based on Discourse Analysis and the Turing Test. It is another study that places great emphasis on beat tracking and rhythmic alignment.

**Linson, Dobbyn and Laney's**[35] (2012) research about critically evaluating freely improvised music played with interactive computer systems places emphasis on human evaluation of the music by experienced musicians. Dobbyn and Laney have computer science

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[32] Danby, Elliot and Ng, Kia. *Virtual Drum Accompanist: Interactive Multimedia System to Model Expression of Human Drummers*. (Conference on Distributed Multimedia Systems, vol. 17 (2011), 110-113.
[33] Murray-Rust, D. and Small, A. 'Towards a Model of Musical Interaction and Communication'. *Artificial Intelligence*, 175 (2011), 1697-1721.
[34] Stowell, D., Robertson, K., Bryan-Kinns, N., Plumbley, M.D. 'Evaluation of live human-computer music-making: Quantitative and qualitative approaches'. *International Journal of Human-Computer Studies*, 67 (2009), 960-975.
[35] Linson, Adam, Dobbin, Chris and Laney, Robin. 'Critical issues in evaluating freely improvising interactive music systems'. *International Conference on Computational Creativity*, (2012).

backgrounds, while Linson is a musician and this study is not over burdened with technological detail, instead placing an emphasis on the relevance of qualitative analysis.

**Dannenberg and others**[36] (2013) describe their work towards synchronising computers as co-performers with humans, often in conventional rhythmic music, with an emphasis on alignment and beat tracking. Score tracking and even conducting are addressed in their study with an intended outcome to create a surrogate accompaniment that is as close to that played by a human participant as possible.

**Nick Collins**[37] (2011) worked with Max MSP to create a patch (*LL: ListeningLearning)*, specifically for interaction with a live free improvising musician, in this case drummer Eddie Prévost for a performance in London. It might appear to be close to my work with *MWTPD* and *Stavpatch*, but the system differs greatly in that 'timbral and rhythmic features are prioritized in the system, and no pitch information [is] treated'.

**Simon Waters**[38] (2007) is a flautist who has developed a 'VPFI flute' that passes the output of the flute through a system of digital signal processing. He has written a fascinating study on performance ecosystems wherein, while researching into HCI in music, he makes the point that most composers or performers, 'particularly in highly technologized environments, are wont to celebrate the technological, and to be reductive about […] the nature of music as an activity'.

**Alexander Schubert** is one of two contemporary composers that I have included in this overview, who have devised pieces specifically for solo drummers to interact with digital electronics. Schubert's *Laplace Tiger* (2009) was conceived for a solo drummer playing a conventional kit with movement sensors on his/her forearms to control live electronics and abstract video material as part of the performance. It consists of 'a very structured progression of […] scenes, which are clearly defined – but within these cells there is a great amount of freedom for the performer on a micro level.' [39] The piece is performed using a combination of acoustic

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[36] Dannenberg, Roger B. and others. 'Human- Computer Music Performance: From Synchronized Accompaniment to Musical Partner'. *Proceedings of the Sound and Music Computing Conference 2013,* (Berlin, Stockholm, Sweden: Logos Verlag, (2013), 277–283.

[37] Collins, Nick. *LL: Listening and Learning in an Interactive Improvisation System* in The Cambridge Companion to Electronic Music. (Cambridge: Cambridge University Press, 2011)

[38] Waters, Simon, *Performance Ecosystems: Ecological approaches to musical interaction.* EMS Conference Paper, De Montfort/Leicester, 2007

[39] Alexander Schubert *LaPlace Tiger*, performed by Jonathan Shapiro: <http://www.youtube.com/watch?v=rgOmMHNG2sM> [accessed 4 March 2014].

percussion (drum set) with Max MSP for sound synthesis and modulation and Max Jitter to control live video projection. It gives the drummer a great deal of room for self-expression during performance while working within the schema of the composition.

**Pierre Alexandre Tremblay** is a French-Canadian composer who teaches at Huddersfield University. His composition *La Rage* (2004-5) was devised for a 'free jazz drummer, processing, interactive processing and 8-channel fixed medium'. The score gives explicit instructions for the drummer to follow during performance, which include gestural and facial expressions and it is implied that the drummer would be visually at the centre of the activity during live performance. On the available recording drummer Stefan Schneider is reduced to a supporting role to Tremblay's acousmatic spatialisation and the composer is clearly asserting his authorship of the piece and making that explicit to the listener. [40]

In 2004 **Tim Blackwell** and **Michael Young**[41] convened the Live Algorithms for Music Research Network at Goldsmiths College, London with subsequent conferences documenting thinking and practice within this sphere. Blackwell's expertise is on the technological side, with an emphasis on artificial intelligence and algorithms derived from natural systems and Young[42] combines computer skills with being an improvising pianist. In 2007 he set out his 'Properties of a living computer music' which are quite strict properties for HCI systems that claim to be autonomous: Adaptability, Empowerment, Immersion, Opacity and Unimagined music.

**George Lewis** was known to me principally as an improvising trombonist, long before I became aware of his skills as a computer programmer and I sought out his research at an early stage of this project. He has defined his HCI system *Voyager* as 'a nonhierarchical, interactive musical environment that privileges improvisation' and his thinking seems to align with Young's regarding definitions of autonomy within HCI systems. Lewis programmed the first version of *Voyager* between 1986 and 1988 at STEIM, Amsterdam using *Forth*, a forerunner of Max 'the curiously hybrid compiled/interpreted environment created by Charles Moore around 1970'. [43]

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[40] ElectroCD website:https://electrocd.com/en/oeuvre/19370/Pierre_Alexandre_Tremblay/La_rage [accessed 10 September 2017].
[41] Blackwell, Tim and Young, Michael. 'Self-organised music'. *Organised Sound*, 9, 2 (2004).
[42] Young, Michael *NN Music: Improvising with a 'Living' Computer.* In: Proc. Of the International Computer Music Conference, ICMA, San Francisco (2007).
[43] Lewis, George E. 'Too Many Notes: Computers, Complexity and Culture in Voyager'. *Leonardo Music Journal,*10.1 (2000), 33-39.

Section B - Contemporary Drummers using live electronics

The drummers described here play on the jazz/free improvisation and/or noise scenes and all combine playing acoustic kits with electronics:

**Morten Olsen** born in Stavanger, Norway, 1981. Olsen plays a conventional drum set with *SuperCollider* which is a free, open source software programme that is comparable to Max/MSP, but more code-based. SuperCollider is described as 'a platform for audio synthesis and algorithmic composition [and the] granularity [of its] audio server […] allows the fluid combination of many known and unknown audio techniques, moving between additive and subtractive synthesis, FM, granular synthesis, FFT, and physical modelling.'[44]

He plays solo concerts as well as in *Ultralyd*, a guitar, bass and drums trio and *MoHa!* with Anders Hana (guitar). Olsen uses SuperCollider to augment his rhythmic playing with additive synthesis. Much of his playing is rhythmically complex with an additional layer of indeterminately pitched synthesized sound from the software. The synthesis seems to be triggered by and dependent on the drumming.

**Ståle Birkeland** is another Norwegian drummer, born in Voss but now based in Stavanger. He makes use of electronics with his kit for extended periods but does not limit himself to playing a hybrid set-up and often plays acoustically. While I was in Stavanger in 2014 I played with Ståle and, as he later explained, he sometimes made use of a drum machine along with:

> contact mics on various surfaces […] to trigger sound. From there the sounds were manipulated in a Max msp patch, and I controlled the different parameters using the Akai LPD8 midi controller using the pads for changing between (presets of) patches, and the knobs to control things like speed, timbre, delay, frequencies, etc. [There was also] a synth section in the patch […] set to random[ise] tones and panning and I could loop[45]

In the recording *Iced* the music begins with Birkeland's Max patch modulating (pitch changing) a recording of bells which he integrates with free-wheeling, free-jazz drumming and

[44] SuperCollider website: <https://supercollider.github.io/> [accessed 1 March 2018].
[45] This quotation is from an email exchange with the author in March 2018 and is used with his permission.

open, rock rhythms.[46] His use of electronics is subtle and he makes use of it as one contributory factor within his broad drumming skill-set.

**Thomas Strønen** is also a Norwegian drummer, born in Oslo in 1972. His playing is often understated, but a highly-developed technique is clearly apparent and he integrates the technologies in a very controlled way. He records for the German ECM record label that has, since the 1970s helped to bring Scandinavian musicians to a worldwide audience. The following passage is from an email exchange between Strønen and the author:[47]

> I use a few different set-ups, but often I have two samplers, a mixer and two small synths. Elektron Octatrack, Roland SP555...sometimes Akai MPC 1000.
> I have one (!) mic going from my drum-set to the SP555 and that sampler sends its signal to the Octatrack. Both samplers have only a few sounds stored, while most are being sampled live and always programmed live. I use no presets or preprogrammed beats, [it is] all done on the spot. The samplers are not synced, but lets me sample each other as one of the samplers has a lot of effects (SP555) while the other has a good sequencer.
> I look at the electronics as part of my drum-set and have practiced for years to incorporate it in my general playing.

**Rodrigo Constanzo** is a Spanish drummer born in 1976 in Madrid. He is resident in England and after studying at Huddersfield University now teaches on the Popular Music course at the Royal Northern College of Music in Manchester (2017). He plays a combination of acoustic percussion with self-made instruments, typically using contact microphones within drums or resonant boxes with strings or other idiophones and a Roland percussion sampler and digital controllers. Constanzo's playing is quite crude, in that he does not seem to have a refined drumming technique, but relies more on a 'scatter-gun' approach – that is, generating sounds haphazardly, both acoustic and electronic, and he seems to have channeled much of his creativity into designing and building his home-made instruments.

**Chris Corsano** is based in New York State but travels almost constantly and is often in Europe. His playing straddles the free improv and noise scenes and he toured and recorded with Bjork as well as improvisers such as Joe McPhee and Bill Orcutt. Corsano changes his equipment frequently. In the Summer of 2017 he told me:

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[46] The Geordie Approach, *Inatween*, (Bruces Fingers BF116, 2013).
[47] Reproduced here with Strønen 's permission.

> Lately, I've been using a contact mic on my hi-hat, run through a few effects pedals. I can control the pitch and amount of feedback depending on how much I press down on the hi-hat pedal. And then, either striking the hi-hats with mallets or putting things on the hats (springs, rubber strings, a melodica) will conduct the sound of that element through the cymbals and into the contact mic.[48]

He has a highly developed technique which he frequently uses to play dense, multi-layered improvisations although his use of electronics is often quite crude in conception, for example using lo-fi technologies such as a cardioid dynamic microphone to create feedback with a guitar amplifier. He is a drummer who makes use of electronics, but it is peripheral to his assertive and dynamic drumming.

**Chris Cutler** is a drummer, record label owner and author who played drums with Henry Cow from the early 1970s. He was aware of Tony Oxley and Paul Lytton's work with electronics and he experimented with adding re-purposed telephone microphones to drums and cymbals. Lytton was a key influence and this can be heard in Cutler's solo performances where he often takes a broadly similar approach – playing rapidly across many overlapping surfaces and instruments. He uses a 16-channel mixer with sixteen miniature microphones and transducers connected to the drums and cymbals.[49] He uses a multi-effects unit, a delay and a pitch shifter to get gong-like effects from cymbals and often plays in a dense way that is superficially Lyttonesque. There are often intrusive, to my ears, footswitch sounds and various clicks and buzzes. He comes from an 'experimental rock' background where perhaps extraneous noises go unnoticed or are positively embraced.

Noise-rock drummer **Brian Chippendale** of *Lightning Bolt* (duo with guitarist) and solo project *Black Pus* uses a face mask containing a contact mic for vocals that he puts through a Line6 DL4 delay pedal and contact and conventional microphones on his kit connected to guitar stomp–box effects units. Interestingly, he does not use a hi-hat and has effects units positioned on the floor in the hi-hat position. Chippendale's use of electronics seems to be quite primitive and it works to add an additional layer of noise to his free, rhythmic drumming. He is a provocateur who sets up and plays within the audience; eschewing the standard performer/audience differentiation. Audience members are usually within touching distance,

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[48] From an email exchange with the author in 2017, reprinted with Corsano's permission.
[49] Equipment details were taken from Chris Cutler's website <http://www.ccutler.com/ccutler/> [accessed 11 May 2016].

although his transgressive, masked persona and forthright playing style most likely protect him from outside intervention.

Australian percussionist **Robbie Avenaim** (born 1969) works in free improvisation as well as other genres of music. He builds electro-mechanical devices that are attached to or are co-incident with percussion instruments and other self-made or repurposed idiophones. These are frequently conceived as installations, but some devices are also used in real-time improvising settings.[50]

## Critical assessment

The researchers named in the early part of this research overview are a mixture of computer scientists, musicians and composers and while researching this project I became aware of the paucity of work with an emphasis on the act of playing and the human side of the equation. I have identified the following themes within the cited examples:

- A preponderance of beat tracking and rhythmic alignment, particularly in drumming related software
- A technological over human emphasis in HCI research
- Evaluation methods of both composed and improvised music with HCI
- Live HCI with composed and/or improvised human input

Of these, beat tracking and rhythmic alignment were deliberately eschewed in my research, as I aimed to enrich my interaction with unpredictable behaviours and, rather than being technology-led, the emphasis has been on my viewpoint as a player and on the activity of the electronics as a computer collaborator. I applaud Waters' observation about most HCI in music research having an overemphasis on 'celebrating the technological'.

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[50] Avenaim's S.A.R.P.S. (*Semi Automated Robotic Percussion System)* is one such invention that he uses 'as a way of introducing inhumanly intricate, fast and dense rhythmic embellishments into his acoustic performance practice' Avenaim, Robbie, *robbieavenaim.com* (2017) <http://www.robbieavenaim.com/robbieavenaim.com/sarps.html> [accessed 14 January 2017]

I included Schubert's *Laplace Tiger* as an impressive example of integrated live electronics and drumming, with the player's activity being the focus of the piece.[51] Tremblay's *La Rage* although being conceived for a 'free jazz drummer', the drummer's role is here subsumed into the overarching scheme of the composition and leaves little room for expressivity beyond the composer's explicit instructions. Young and Lewis' direct experience as improvising musicians gave their writing direct relevance to my own practice, although they have both defined quite strict definitions of autonomous HCI systems for improvising[52] and I doubt that my own entirely fulfil their criteria. However, I have heard Young improvise with *Aur(or)a* and Lewis with *Voyager* and, in both cases, there is a separation between the human activity and the output of the computer. If accompaniment was their goal, then they have succeeded. I would argue that my work is more integrated, human–centred and it is most definitely an 'unimagined music' (Young's 'fifth attribute of living computer music').

Of the drummers described here, there are some similarities of approach to my own; Birkeland uses Max with an Akai LPD8 controller, as I do, but the output is quite different in character, particularly as he uses the technology within group contexts. The specifics of any Max patch's programmed, behavioural characteristics determines its ultimate use and the playing context has to be considered at the programming stage. Avenaim's augmentation of his acoustic percussion with electro-mechanical devices is an electro-mechanical analog to my own playing with *MWTPD* and *Stavpatch*, in that the technology serves to enhance and extend his playing and to add not just new sounds, but a degree of complexity that could not be accessed in any other way. Although it is a markedly different use of technology to my own and both Avenaim and Constanzo's engagement with constructing devices to augment their instruments is an area that I mostly chose to avoid, as I wanted to augment my instrument electronically and not extend or add to it in any significant way.

Olsen's use of additive synthesis works well and Strønen's refined approach is highly engaging. I noted with interest Strønen's emphasis on his use of only one microphone to sample

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[51] I contacted the composer in 2014 to express an interest in performing the piece, partly as I wanted to gain first-hand knowledge of the technology being used, but a planned meeting was thwarted by an airline strike.

[52] Young, *NN Music: Improvising with a 'Living' Computer* and Lewis, George E. 'Live Algorithms and the Future of Music'. *Cyberinfrastructure Technology Watch Quarterly*, (2007).

his kit which is a similar approach to my own. In my own case, the choice was informed by my belief in the drum set as being one, self-contained instrument rather than a collection of separate components. Although, this belief was challenged at times during this study as I made use of a contrary approach while considering contemporary art music practices. Chris Corsano's use of electronics is a minor part of his drumming and he has focused his attention on developing a playing style that serves him well in varied improvising contexts. Cutler's playing is so clearly inspired by Paul Lytton that I am drawn back to the original source. I think there is very little overlap between Cutler's playing and my own and this applies more so in the case of Brian Chippendale; his confrontational performance style is at odds with my own, in that I am at ease with the separation of audience and performer and my intention is to seduce rather than confront.

I feel that my playing is distinctly different to the named players here, particularly my solo work, in that I have made use of the Artificial Intelligence capabilities of electronics to create a surrogate improvising, playing partner. This was not my original intention, which was to add to my available sound-world bringing me closer to the work done by some of the drummers named here. It arose from my research, particularly during 2013 and was inspired largely by George Lewis (Lewis, G.E. 2000, 2007) who I was familiar with as an active improvising musician.

# Chapter 3. The Research

The research period has spanned seven years from 2012 to 2018 and my principal research methods involved extended periods of use of and interaction with different technologies in combination with my acoustic percussion (augmented/reduced drum set) and my usual daily practice routine became a laboratory for testing and combining digital and analogue devices. As I engaged with all the technologies as a free improviser, I need to stress the centrality and importance of this to the work. I firmly believe that the characteristics of the pieces, and particularly the details of the interactions, are unique and could not have been conceptualised in advance by composition to give the original outcomes heard here (See 2.4. Free improvisation, p. 11).

As most of my influences were from an analogue age and made use of hand-built devices, I chose to maintain a hands-on approach as it was important for me to be able to control electronics directly by turning knobs or pushing buttons, as physical gestures seemed to be directly analogous with playing conventional instruments.

The key technological interventions, in chronological order, were the use of:

1. Analogue technology A - contact microphones, ring modulator, echo machine
2. Digital technology A - laptop running Max MSP
3. Control interfaces - LPD8 laptop controller, volume pedal, practice pad trigger, local amplification
4. Analogue technology B – *Plankophone*, signal generator and octave divider
5. Digital technology B - Roland SPD-SX sampler and trigger pads
6. Analogue technology C - Oxley-style frame with contact mics

| Technological interventions | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|---|---|
| Analogue A: Contact mics, ring modulator, echo m/c | | | | | | | |
| Digital A: Laptop running Max MSP | | | | | | | |
| Control Interfaces: Practice pad trigger | | | | | | | |
| Control Interfaces (2): Volume pedal | | | | | | | |
| Control interfaces (3): LPD8, 'local' amplification | | | | | | | |
| Analogue B: Plankophone, signal generator | | | | | | | |
| Analogue B (2): Octave divider | | | | | | | |
| Digital B: Roland SPD-SX sampler and trigger pads | | | | | | | |
| Analogue C: Oxley-style frame | | | | | | | |

Figure 3. Technical interventions timescale

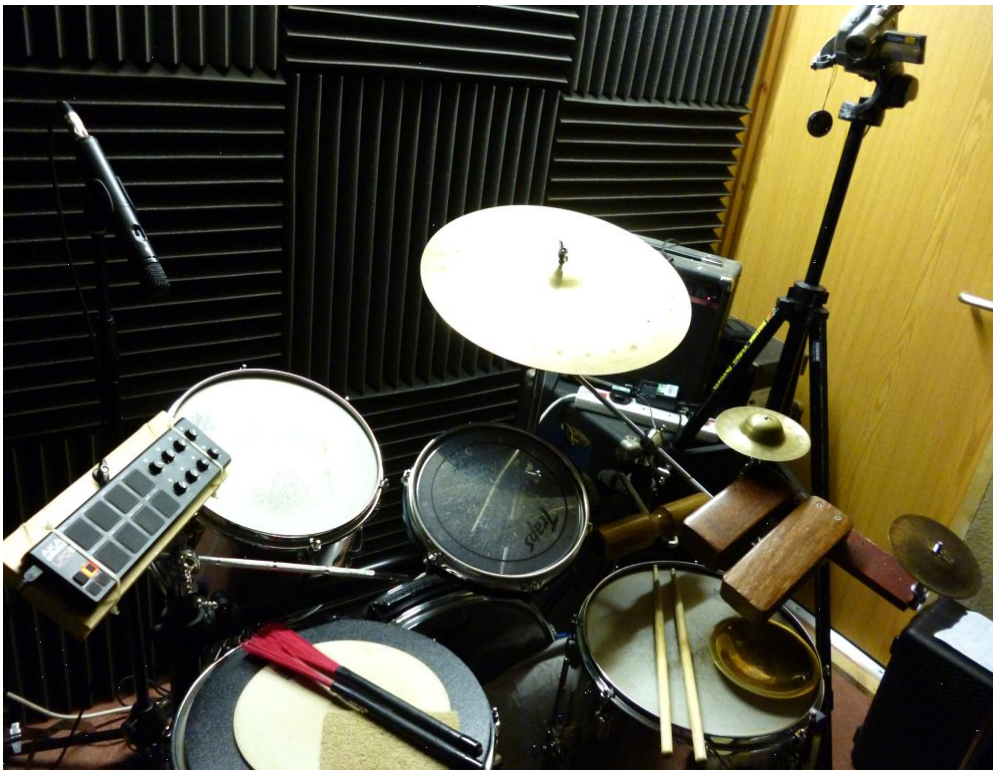

Figure 4. Huddersfield home studio 2013

### 3.1 Analogue technology A - contact microphones, ring modulator, echo machine

I chose to make use of devices broadly similar to some of the equipment used by my influences in electroacoustic music (Oxley, Lytton and Judd). Principally a ring modulator. Karlheinz Stockhausen, who's work exerted a significant influence on Oxley,[53] made frequent use of such devices[54] and by choosing to use one myself, I seem to have stumbled into what might be termed 'retro-futurist' territory; the sounds produced are evocative of a bygone era and I have embraced them unashamedly. Judd described the ring modulator as being:

> a device frequently employed in electronic music creation, but is, however, an expensive one and very difficult to obtain. Audio-frequency ring-modulators are used in carrier telephony applications, and for these and other specialised purposes the modulator must be perfectly balanced. As a consequence it employs specially designed and therefore expensive transformers. For electronic music purposes one is only concerned with the actual modulation of one tone by another and a reasonably balanced ring-modulator will suffice.[55]

There is a clear assumption that anyone who aspired to create electronic music at that time, like Judd himself, would have to construct many of the 'musical aids', as he referred to them, or obtain them from government and army surplus or scientific suppliers. Tony Oxley had a ring modulator, a compressor and an octave divider built for him by Alan Willey, a guitarist in Liverpool and Paul Lytton had a volume pedal converted to a ring modulator by his tabla teacher P.R. Desai, who was also an electronics engineer. Such devices are now commonly available and I acquired an off-the-shelf ring modulator known as a *Moogerfooger* (See video V.2). However, although ready availability makes life easier for modern-day experimenters, it may have the unintended consequence of bringing a degree of sonic homogenisation.

Early in the research period I sought to find an additional effects unit that was not prohibitively expensive and I settled on a Behringer Echo Machine. This is not strictly speaking an analogue device, as it emulates a vintage tape echo unit using digital signal processing, but it is a hands-on unit and can be controlled manually. The Time control adjusts the delay time, but it can also be set at a low rate to function as a flanger. I frequently use this low setting in

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[53] Ulrich Kurth, *Tony Oxley: The 4th Quarter of the Triad*, Hofheim: Wolke Verlag, 2011, pp. 35, 38, 57.
[54] Karlheinz Stockhausen, *Gesang der Jünglinge* (1955-56), *Telemusik* (1966), *Mixtur* (1964), *Mikrophonie II* (1965) and *Mantra* (1970).
[55] Judd, 1961, p. 45.

combination with the Repeat control (set to give the maximum number of delays) and by selecting the Sweep setting (echoes with sweeping filter feedback) in the Mode control, I get maximum sustain. An example of this can be heard on Audio File 10. *Belt-driven Drone* at 7:05 – 7:29.

Virtually all electroacoustic musicians have made use of contact microphones, and I have used several that I made myself using cheap components from an electronic parts supplier as well as some more expensive and intermediate priced units. These are essentially a piezoelectric ceramic disc (positive charge) glued to a thin brass disc (negative charge) that sense vibrations in solid bodies. I experimented attaching contact mics on drum heads, drum shells, on a Dexion frame fitted over the bass drum and directly onto the underside of cymbals. The cables connecting the mics to the mixer often exerted pressure due to gravity, which made the contact mics prone to falling off and after early use I put most of them aside, although I revived their use during the later research stages while using the Oxley-style frame over the kit (Chapter 3.6, p. 48).

In 2016 I obtained a Roland drum trigger that is essentially a contact mic fitted into a slick case for attaching to a drum counter-hoop with a shaped clamp. There is a compressible cone that engages with the drum head that transfers the vibration to the combined discs. These devices are convenient and reliable and, unlike the hand-made devices, do not require taping or gluing in position.

Figure 5. Roland drum trigger

### 3.2 Digital technology A - Max MSP

Max is a modular, graphic user interface for creating music software on a computer. In common with many users of this software, I run it on a laptop alongside my instruments. My first encounter with Max MSP was to use software replicas of analogue effects (ring modulator, echo, phaser and flanger) prior to obtaining the actual devices (see above). I became disenchanted with the lack of control afforded by the computer; the laptop touchpad that functions perfectly well for word processing does not function effectively to control sounds compared to real knobs, switches and buttons. It proved too difficult to control accurately while playing percussion, therefore the issue of effective control interfaces which could be accessed while drumming became a high priority. (Chapter 3.3, p. 41).

### 3.2.a Delay patch

In late 2012, prior to the creation of *MWTPD* and *Stavpatch,* I had been considering reducing the number of components in the drum set to challenge my usual playing habits and for a performance at the iFIMPaC Conference[56] I chose to replace the two tom-toms of my Western kit with a Chinese animal skin drum and to dispense with one of my cymbals. I commissioned a Max delay patch from a colleague which was designed to be used in a very direct, intuitive way using a contact microphone on a practice pad as a triggering device. Delays were timed by the interval between strikes on the trigger pad – the patch looked for attacks (strikes) and played a delay rate based on the timed interval. This system was based on a stereo audio interface with one channel being used to trigger the delay and the other channel (condenser mic) sampling the kit. The pad was moveable and positioned alternately on the Chinese drum or the snare drum. This was an attempt to bypass the laptop controls and to integrate the triggering into the flow of playing the kit (see video V.3 analysis p. 84). In the performance at iFIMPaC the output was routed to a four-channel loudspeaker system with the delay being set at different rates in each loudspeaker.

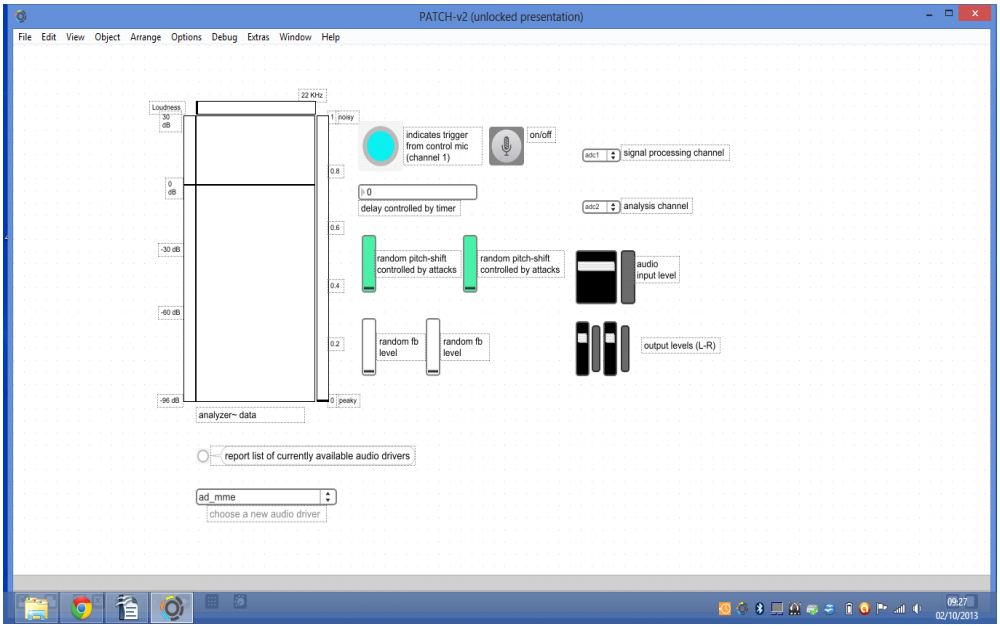


Figure 6. Practice pad delay patch - presentation view

[56] The International Festival for Innovations in Music Production and Composition at Leeds College of Music.

### 3.2.b Max Wants To Play Drums (*MWTPD*)

Reading trombonist, improviser and computer programmer George Lewis describe his system *Voyager*, the first version of which he conceived and developed between 1986 and 1988 at STEIM, Amsterdam[57] and thinking about ways to interact with Max myself, brought about a turning point in my research. My attention moved from sound manipulation to the possibilities of using this technology to create a surrogate 'other player'.

In 2013 I co-created a 'patch' with programmer Chris O'Connor which he named *Max Wants To Play Drums* and I refer to as *MWTPD*. As I had no programming experience and Chris had not heard free improvised music, he programmed the patch based purely on my description of my requirements and several sessions in the studio of me playing with it to refine its operation. The requirements were that it should sample my playing and play it back reconstituted randomly (changing pitch, timbre, randomizing timing, creating unforeseen silences) to approximate the unfamiliar playing of an unknown other (human) playing partner. In effect, for me to play a duet with a randomized version of myself.

This led to some unforeseen psychological implications, such as accepting that I was playing in a duo, despite being the only human present. For me to become comfortable with this, I had to acknowledge the patch's (partial) agency and treat it as an individual. Also, my ego was challenged by the creativity, if that is what it was, or at least its volubility, to sit back at times to allow the patch to be the featured soloist.

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[57] Lewis programmed the first *Voyager* using *Forth*, a forerunner of Max 'the curiously hybrid compiled/interpreted environment created by Charles Moore around 1970' George E. Lewis, 'Too Many Notes: Computers, Complexity and Culture in *Voyager*'. *Leonardo Music Journal*,10 (2000), 33-39, p. 34.

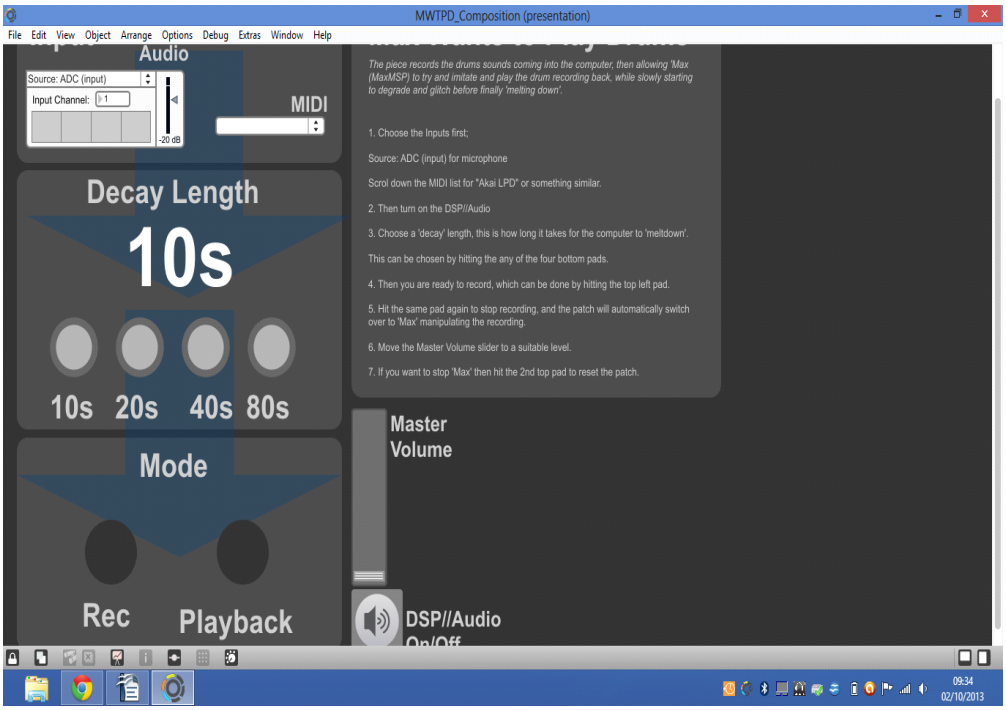


Figure 7. *MWTPD* Presentation View

It was clear that I needed to allow the patch to have sufficient space to be the leading voice at times and I dealt with this by frequently taking a traditional, accompanying role and playing in the background. Psychologically, this could be challenging, as my natural tendency is to assume responsibility for the shape and content of the music when playing solo – accepting the patch as an equal stretched my imaginative and conceptual powers. I should make it clear that *MWTPD* is not autonomous and it cannot play without my input, both in terms of sound and as I am the controller who selects 'sample' and 'playback'. However, during early interactions with the patch I formed clear opinions about its character. I almost immediately anthropomorphized it – assessing its manner of playing in a similar way as I would a human collaborator. Through regular interaction I discovered which playing approaches within my sampled input gave the most stimulating results on playback and which were less successful. I discovered its habits.

I often fell into a routine where an improvisation would begin with me playing a staccato introduction (which usually gave good results), to be sampled for playback that I considered to be a preamble to the actual music. Having a part of the music that was devised as raw material for the patch to modulate, but not as an integral part of the piece being played was a new and

unfamiliar experience. I realised that whatever the purpose of this section, it was essential to the piece and therefore a constituent part of it and might be compared to the expository section of a sonata. While considering my 'raw material' as being a separate preamble to the main body of the improvisation to follow, I adjusted my thinking while considering Molino's quote in Nattiez: 'Is music the art of combining sounds according to certain rules (which vary according to place and time) for organizing a durational unit […] by means of sonorous elements? […] Here, music is defined according to the conditions of its production (it is an art) and by its materials: sounds.' And Nattiez himself when he states that 'a sonorous fact of any kind is recognized as music when we make the distinction between music and non-music' and 'music is whatever people choose to recognize as such'.[58] By these definitions my 'raw material' is an integral and legitimate part of the music because I define it as such

George Lewis acknowledges that computer programmers' personalities are embedded within their programmes:

> Musical computer programmes, like any texts, are not "objective" or "universal", but instead represent the particular ideas of their creators. As notions about the nature and function of music become embedded into the structure of software-based musical systems and compositions, interactions with these systems tend to reveal characteristics of the community of thought and culture that produced them.[59]

In Lewis's case he stresses that his programming of and performing with *Voyager* embodies 'African-American cultural practice' which emphasise 'the aesthetics of multidominance'. This is a propensity for artworks, whether they be visual or auditory, to be vibrant and multi-layered and, as a drummer with foundational influences taken from jazz, I borrow heavily from this tradition.

Chris O'Connor interpreted my requests for how *MWTPD* should process the raw material (my playing) for playback and we refined this over several meetings. I think it was fortuitous that he was unfamiliar with free improvised music, so he came to the challenge with only my input to help him devise the patch's behaviours. If he had been a free music afficionado,

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[58] Jean Molino. Fait musical et sémiology de la musique. Musique en Jeu, 17, 1975, p. 37 and Nattiez, 1990, pp. 41, 47.
[59] Lewis, 2000, p. 33.

paradoxically I think he would have been less open to imbuing the patch with the anarchic characteristics that *MWTPD* went on to possess. I was initially bemused by the patch's actions before realising that Chris's input was a vital ingredient and that if I had asked several programmers to interpret my ideas, I am confident that each patch would exhibit distinct character traits from their progenitors.

### 3.2.c Stavpatch

While I was based in Stavanger I collaborated with Dag Egil Njaa, another Max MSP programmer and he modified the *MWTPD* patch by adding a second sampling and playback channel and two spectral samplers to play sustained pitches with a frequency control. I refer to this later version as the *Stavpatch*. This version gives more possibilities for complexity as I can switch between samplers or playback, have one continuously playing back while I sample 'on the fly' and play drones simultaneously or separately. An advantage of *Stavpatch* is the greater flexibility means that I do not necessarily have to load 'raw material' at the outset; there is more facility for sampling as the music progresses and these adaptations gave new possibilities which I think are evidenced on many of the Stavanger recordings.[60]

[60] Examples are audio files #8. *Homage to F.C. Judd* and #15. *Stapler (Melodic Armature).* Analyses are on pp. 70 and 75.

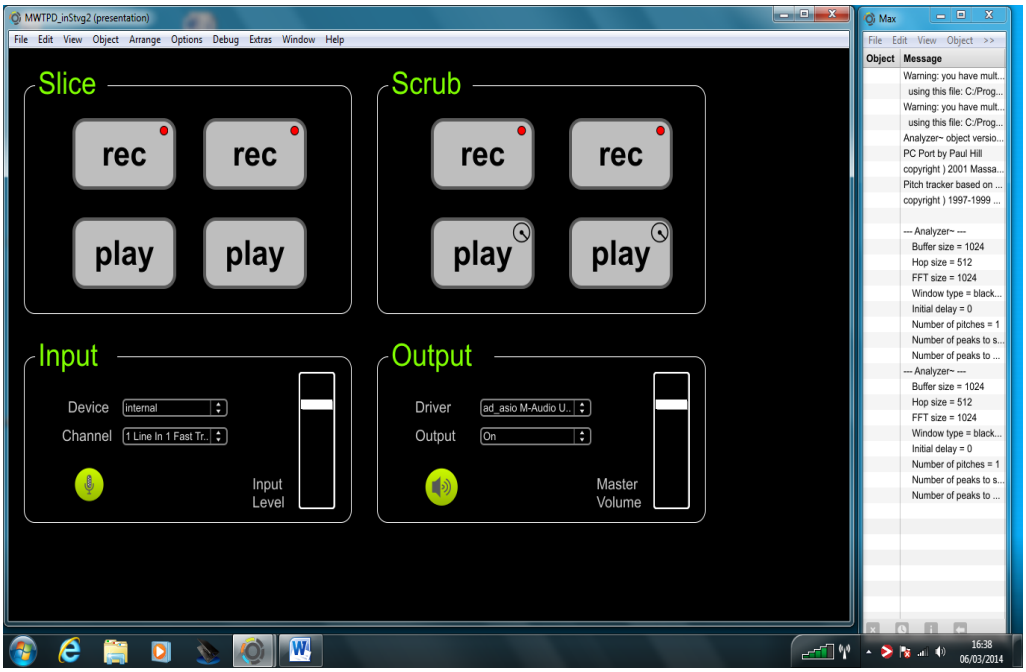


Figure 8. *Stavpatch* presentation view

### 3.3 Control interfaces

#### 3.3.a Volume Pedal

Early in my studies of improvising musicians (during the late nineteen-seventies) I observed Derek Bailey (electric guitar), Barry Guy (amplified double bass) and Tony Oxley (amplified percussion) all using volume pedals, and I recognized its potential for freeing up the hands, while simultaneously giving access to control volume in a nuanced way. Not only does this unassuming tool allow for overall volume control, but perhaps more significantly, fades, swells and complete or near silence as required.

Fading and swelling add extra dimensions to sculpting sound. They are subtle effects and ones that I wished to have at my disposal. However, I had not foreseen how much I would grow to value the muting possibilities of the volume pedal when used with the voluble and, at times overbearing output of the Max patch. The pedal gives me the option to allow the patch to run continuously for protracted periods while being muted and periodically swelling it to audibility. I position the volume pedal immediately adjacent to my hi-hat pedal where it is convenient to move my foot between the two pedals as required.

In describing the 1968 recording *Karyobin* by the Spontaneous Music Ensemble, double bassist Dominic Lash accurately pinpoints Derek Bailey's use of the volume pedal.[61]

> Bailey seems to focus mainly on denaturing the guitar by using his volume pedal either to swell the sounds in (removing the attack - often using minor seconds or other close intervals to obtain a distinctive shimmering sound) or to remove any sustain, also muting the strings, so as to negate the pitch content of the sound. In this way he subverts the basic nature of the guitar - that it is plucked string with a firm attack and fairly rapid decay.

Lash refers to 'removing the attack' and this is the key phrase here. By doing this in my own practice, the sounds seem to appear unexpectedly, as if they are floating in the ether waiting to be revealed and their origins are rendered nebulous. While improvising with the volume pedal I discovered that it can facilitate a way of 'trading breaks', to use jazz parlance. That is, alternating unaccompanied phrases which sound like a call and response. Examples of the pedal being used to mute and swell the *MWTPD* patch occur repeatedly during Audio File 2. *Breaks.* The section at 1:01 – 2:10 is a clear example. The interesting part of this method is the unpredictability of the patch, so I could fade it up to play and have only a vague notion of what the patch would be playing. This is a good example of when the blurred distinction between my self-image as a soloist or a duettist became conflated. Despite being fully aware that I was the controller of the pedal which initiated and faded out the patch's 'break', the detail of its playing was sufficiently unpredictable to make me react spontaneously.

[61] Dominic Lash, *Force of Circumstance* blog, 2015.

Figure 9. Volume pedal next to hi-hat. Huddersfield home studio, 2013.

An unforeseen issue of using the pedal is that its use can go unnoticed by an audience and, in some circumstances it can appear that I am doing nothing, when I am in fact using my feet to control the music. In video V.4 my use of the volume pedal can be observed on occasions throughout the piece. Unfortunately, in videos V.5 and V.6 only my upper body is visible and the use of the pedal towards the end of the latter is audible but unseen, making it appear that I have stopped playing.

### 3.3.b Practice pad trigger

The practice pad trigger was a home-made device consisting of a wooden practice pad with a contact microphone taped to the hard rubber playing surface. It was created specifically for use with the delay patch (see section 3.2.a, p. 36) and although some satisfying results can be heard on the video, its shortcomings are all too apparent; principally the makeshift method of mounting which prevented the snare drum or Chinese tom being played together. With hindsight it would have been more effective either to devise an isolated mount for the pad or to purchase a commercially available trigger that could have been set on a stand, but time and financial constraints prevented this. Despite its shortcomings and in the spirit of improvisation, I exploited

the affordances that were available to me to give a performance at the iFIMPaC Conference in 2012 which can be seen on video V.3 (p. 84).

### 3.3.c Akai LPD8 laptop controller

From first using *MWTPD* I determined to find a way of triggering the sample and playback functions from my normal playing position without turning aside to use the laptop keyboard. The LPD8 seemed eminently suitable as it was designed to bypass the computer keyboard for music production and is small, lightweight and inexpensive. It has eight velocity-sensitive pads to send note or programme changes and eight knobs for controlling parameters.

I initially configured the LPD8 to start/stop sampling and start/stop playback by pressing one of two pads and assigned one knob as a master volume control. When first working with the LPD8 I attached it to a short piece of wood with cable ties and mounted the assembly on a cymbal stand positioned within the kit for easy access. This proved to be too cumbersome, so prior to departing for Norway, I attached a threaded holder to the back with epoxy glue so that it could be screwed to a cymbal stand without the additional bulk of the timber support.

Figure 10. Stavanger studio view with Akai LPD8 laptop controller (mid left)

With the expanded possibilities of the *Stavpatch*, Dag Egil configured the LPD8 to be able to start/stop sampling and playback on two channels with four touch pads and allotted two more to trigger spectral freezing and phasing. Two knobs were set to control the pitch of the freezing and the intensity of the phasing.

### 3.3.d Local amplification

When playing in concert halls configured for performances of acousmatic music, usually with loudspeakers arranged around the periphery to surround the audience, I became frustrated with the dislocation of the sound away from my primary sound-sources of percussion. The iFIMPaC performance exploited the loudspeaker positioning spatially, but my chief concern there was to keep two of the elevated loudspeakers close to my playing position, so that I could react without hesitation to the electronic output. I determined that I would avail myself of a powered monitor that I could position as a part of my instrumentation to give me complete control of volume and tonal settings and to integrate the amplification as a part of the electroacoustic whole.

Simon Emmerson[62] cites F. Richard Moore (1988) to describe 'the notion of *control intimacy'* and he stresses the need for

> …greater performer control over mobility and directionality of original and modified source sounds. This 'local' control by the human instrumentalist demands locally focused sources of sound: in other words loudspeakers in the close vicinity of the source…Loudspeakers, like acoustic instruments, are directional and a similar set of skills to those developed by members of a string quartet but adapted to local electroacoustic projection needs to be developed.

## 3.4 Analogue technology B - *Plankophone*, signal generator and octave divider

While in Norway in 2014 I worked with both *MWTPD* and *Stavpatch* daily and upon my return to the UK I felt that I needed to consider some other approaches to electroacoustic music. I had a renewed interest in the more primitive, analogue technologies and Tony Oxley recommended that I should separate my electronics from the acoustic percussion to fully explore its potential, prior to recombining the two. Early in 2015 I constructed a crude hybrid string/percussion instrument which I called the *Plankophone*. This is a robust piece of timber to which I attached three guitar machine-heads (tuners), an adjustable guitar bridge, one single-coil electric guitar

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[62] Simon Emmerson *Living Electronic Music* (Aldershot: Ashgate, 2007), pp. 94, 96.

pickup connected to an output socket, a bass guitar tailpiece and two electric guitar strings. At one end I attached two inverted cymbals and a contact microphone. The *Plankophone* strings can be plucked, bowed or struck and the cymbals bowed or struck. The outputs from the pickup and contact mic were routed into the analogue effects units.

Alongside the *Plankophone* I made use of a signal generator that my partner had inherited. This is a hand-made unit with a frequency range from 10 Hz – 100kHz and an amplitude range from 5mV – 5V. It fulfilled a desire to turn knobs to elicit electronic sounds, but it was limited to a sine wave and its output was underwhelming. I also acquired an octave divider to augment the ring modulator and echo machine which gave good results, but the loud 'click' of the on/off footswitch proved to be obtrusive in use. Considerations such as quiet switching seem to have been overlooked for devices that were designed principally for use by loud rock musicians. I found that I could circumvent the switching by having it permanently set to 'on' and having the control knobs set to 'zero' until the effect was required, which was initiated by turning the 'Rate' and 'Intensity' knobs.

Figure 11. *Plankophone*

I combined using the *Plankophone* with all the analogue effects, including my recently acquired octave divider and the signal generator and set aside the acoustic percussion temporarily. After an intense period of working with these low-tech devices I had some passable outcomes, but I decided that I was departing too far from my identity as a drummer; playing the

*Plankophone* made me into a crude string player which seemed an irrelevant diversion. I gave up using it after four months and returned to concentrate on the drum set as my primary focus.

### 3.5 Digital technology B - Roland SPD-SX Sampler

Later in 2015, having abandoned the previous experiments with the *Plankophone* for the reasons outlined above, I chose to explore a completely different technology and acquired a Roland SPD-SX percussion sampler to use alongside the kit as part of a hybrid set-up. This was driven by a degree of frustration with the previous use of low-tech equipment and its limitations and a desire to explore the possibilities of a digital tool designed specifically for drummers. I had a desire to keep my identity as a drummer foremost and to be able to maintain my proprioceptive conditioning while using electronics, and as events are triggered on the SPD-SX by striking rubber pads, it seemed like a good solution.

The sampler had nine rubber pads each set to trigger one of a group of sampled drum/percussion sounds as part of a numbered 'kit', each using all nine pads. The sounds are largely standard drum samples and personalised sound libraries can be loaded by the user. I decided to ignore most of the standard samples and load my own, creating several new 'kits'. I approached it initially as a way of sampling much of my acoustic percussion so that I could route it through the effects units as a way of updating the use of Dexion frames by Oxley and Lytton to a smaller, digital device. I duplicated a 'kit' of gong, bell and cymbal samples – the duplicate being looped to give limitless sustain. I also had 'kits' of short sounds – woodblocks and drums; church bells; a selection of North Indian samples; spoken word samples from films and samples of my use of hand and power tools.

Figure 12. Hybrid kit - Chairworks Studio, Castleford 2015

I used the sampler from 2015 to 2017, but have since sold it to a younger drummer, as it fell short of my expectations. Its principal drawback being the intrusive, acoustic sound when sticks hit the rubber playing surfaces. This is another example of electronic technology being principally designed for use in high volume settings, where incidental noise goes unnoticed. This drawback was obviated particularly when I used the sampler as part of a hybrid kit at the third Chairworks Studio recording session with Ewan Stefani in 2015. I had the option to either play the sampler in a separate chamber to isolate the incidental noise (which was impractical for effective duo improvisation) or use it in the main studio and accept the noise as a part of the soundscape. I chose the latter and although the incidental noises can be detected from time to time in Audio Files 9, 12, 17 and 22, the quality of the music is undiminished.

### 3.6 Analogue technology C – Oxley-style frame

My final technological intervention brought me full-circle back to the earliest techniques: I used a ‘Traps’ drum frame modified with a Dexion cross-bar fitted over the bass drum to support small bells and cymbals with two contact mics taped to the supporting bar. This was inspired by Oxley’s use of Dexion as part of his acoustic kit and is distinct from the electroacoustic frame that he positioned to his left.

Figure 13. Oxley-style Dexion frame with contact mics taped to top bar.

My motivation was to try playing the kit with live electronics in a trio situation with a double bass player and saxophonist. The outputs from the frame were combined with that from the trigger attached to the snare drum and all were fed through the ring modulator, echo machine, octave divider and volume pedal. The frame was integrated into the standard kit so that I could not only strike the drums and cymbals in the (un)usual ways, but also strike or bow the bells and cymbals on the frame and modulate the output with my left hand and volume pedal. It worked well during legato or sparse, slow passages played by the trio, but whenever the music became fast and frenetic, which was quite often, I could not manipulate the equipment effectively. I was reminded of conversations I had with Tony Oxley when he described his use of electronics within small improvising groups as being most effective in solo passages.

**Summary of Technological Interventions**

Both *MWTPD* and *Stavpatch* proved to be the most important technologies used in my research along with the analogue effects units. I used them almost daily in both the UK and Norway from 2012 to 2014, usually with the analogue effects connected to the computer interface output prior to the volume pedal. In doing so, from 2013 onwards I had my surrogate playing partner that created sounds to which I could add hands-on effects. Occasionally I positioned devices directly on the snare drum and 'played' them – turning the knobs and controlling the parameters manually; satisfying my instinct for hands-on control of electronics.

After returning to the UK I felt that I needed to distance myself from the Max patches and engage with other technologies. Some gave good results for a limited time (Roland sampler), the *Plankophone* felt like a move too far away from percussion and the Oxley-style frame seemed to have limited potential.

**3.7 Beaters and bows**

The tools with which I obtain the sounds from the kit range from my hands and fingers, through conventional sticks and orchestral beaters to knitting needles and violin and 'cello bows.
I have taken inspiration from many hand-drumming traditions and borrow techniques widely from Latin bongo drummers, Indian tabla and Turkish derabucca players. I use my hands and fingers particularly on the snare drum (with snares off) and by exploiting the whole of the playing surface and using a combination of strikes, exerting pressure on the head to modulate the pitch and muting the surface a wide range of sounds can be created.
Please listen to Audio File 5 (8:18 – 8:35) for an instance of hand and/or finger drumming.

**Sticks**

I use Regal Tip 9A drum sticks with a wood tip. Many drummers use nylon tipped sticks for their tonal characteristics and often for the fact that they last longer than wood tips, but they are not as adaptable as a traditional stick. I often slide the tip of the stick (held perpendicularly) along the grooves of cymbals to elicit a high-pitched squeal and this relies on the friction created by the wood tip when rubbed against the bronze of the cymbal. I also strike the edge of cymbals with the shoulder of the stick as well as playing cymbals in a standard manner. Another interesting sonic detail can be accessed by striking a cymbal, particularly at the bell (the raised

boss where the cymbal is suspended) and immediately after striking using the flat of the hand to bounce the sound from the cymbal – the resulting attenuation can be compared to a wah-wah effect. Examples of cymbal squeals and cymbal edges and bells being played can be heard on Audio Files 18 and 20, but there are also numerous other examples throughout the folio.

I hold the sticks in several ways varying from a traditional grip with the left-hand palm-upwards to a matched grip, as used by timpanists and most rock drummers. Both ends of the stick are used – the tapered end for a tight, focused stroke and the butt end for volume and brashness, particularly on cymbals. The combination of the sticks with the drum heads and rims offers scope to play varying sonorities from different combinations which can include rim shots (simultaneous drum hoop and drum head strike), rim taps (butt end on head, stick shoulder on hoop), hoop and head singly or combined, sticks struck together, sticks rubbed together with one butt end on drum head and one stick overhanging the drum (butt end on head) while second stick strikes the overhang. By varying the length of stick overhanging the drum hoop while it is – struck a range of pitches can be exploited.

Please listen to Audio File 19 for examples of sticks being struck together and playing of drum rims (hoops).

**Wire brushes**

The traditional wire brushes used by jazz drummers have evolved into a range of unorthodox beaters, in some cases designed for rock drummers to play more quietly (often in so-called ‘unplugged sessions’). I use a slight variation in that my choice is for brushes with plastic replacing the wire filaments, but with a similar weight to the traditional brushes. I have at times used the brushes for time-keeping in the traditional jazz style, with an accented swishing motion, but for free playing I use them in the same way as sticks — held in a matched grip. This gives a quality to the sound of the struck heads that contrasts markedly with the stick sound; it is quieter but also slightly more nuanced. An additional use of the brushes is to vibrate them back-and-forth, rapidly in mid-air to create a ‘swishing’ sound.

Please listen to Audio Files 2 and 5 for examples of the use of brushes.

**Tympani beaters**

I use soft orchestral beaters that are designed for playing timpani to play the tom-toms, snare drum (snares off) and cymbals. As with sticks, I sometimes play pressure-induced glissandi on a drum using the combination of one beater with the other hand exerting pressure on the drum head.

Please listen to Audio Files 1, 4 and 5 to hear examples of pressure-induced pitch changes on drums.

**Knitting needles**

During this research period I discovered that Tony Oxley used knitting needles to play his kit while recording with pianist Howard Riley and double bassist Barry Guy and I determined to try doing the same. I use thin, aluminium needles and these produce, as might be expected, a metallic 'ping' from a cymbal and a thinner, very staccato sound from drums. They do not have the rebound that a conventional stick has on a drum, which the player uses to their advantage, so repeated strokes rely entirely on muscular effort.

**Violin and 'cello bows**

I was drawn to bowing cymbals after reading about this practice in Western art music many years ago[63] and I now use a variety of bows ranging from a 'cello bow to a child's ¼ size violin bow. I approximate violinists' methods by applying rosin to the bows and exert a light hold on the boss of the cymbal with one hand, while bowing the edge with the other hand. By varying the pressure and contact angle of the bow I can obtain several pitches from one cymbal. On the Oxley-style Dexion frame several small cymbals are secured vertically to the frame to facilitate bowing with one hand without the need for a second, steadying hand.

Please listen to Audio Files 3, 7 and 14 to hear intermittent examples of bowed cymbals.

[63] Reginald Smith Brindle. *Contemporary Percussion.* (Oxford: Oxford University Press, 1970).

Figure 14. Bowing a small, secured cymbal on Oxley-style Dexion frame.

# Chapter 4. The Music

Each recording is a document of a unique encounter between myself and the materials described. It is the opposite of composed music when a predetermined form, having been conceived in advance is imposed on the material; this music reveals itself during the act of playing. My analyses, which range from brief overviews to in-depth, phenomenological analyses reveal specific ideas suggested by *a posteriori* listening. In nineteen cases, out of a total of twenty-three, I have chosen to describe the pieces as being 'Solo' as I was the only human participant, but this is a moot point and in many cases I felt that I was in fact playing in a duo with the computer. The Huddersfield recordings were significant, as it was while playing these pieces that my assumptions about my control over the technology was overturned and I was forced to consider *MWTPD* as having a degree of agency that challenged my security as the controlling influence.

All the Huddersfield audio recordings (Works 1 – 5) were played using a hybrid kit of snare drum, small tom, floor tom and shallow bass drum and tom with a stainless-steel gong, crude cymbal, 10" hi-hats and woodblocks and temple block. Max MSP patch *Max Wants To Play Drums (MWTPD*) was used throughout. The level of the patch playback was controlled by a volume pedal positioned adjacent to the hi-hat pedal. In these five pieces no analogue effects were used - only the laptop running Max used with percussion.

**1. *Depth of Field* 3:46 Solo** Rec. 2013 Huddersfield home studio

I played a hand-held tambour with an animal skin head throughout this piece as an adjunct to the kit. It is positioned between snare drum and floor tom and sometimes picked up to be played with one stick while I exerted pressure with the other hand to vary the pitch. Similar pitch variation is used on all the drums which blend together, including the snare drum with snares off. An almost conversational motif is played on the tambour from 0:26 until the patch (*MWTPD*), which was sampling from the start, is switched to playback and joins in at 0:30. The tambour is used like a talking drum at several points while the patch plays in the background until 2:10, when the patch fulfils the soloist role, while I play an accompanying background figure until 2:38. From this point I engage with the patch equally and both play at a similar level. From 2:57 I briefly play an accompanying figure on tambour. The interplay ebbs and flows with both

sharing back and foreground roles. At 3:35 I play the sticks together prior to three cymbal strikes at 3:37, 38 and 39, the last of which is the final sound of the piece and sustains until the close at 3:46. Other than the high-pitched 10" hi-hat cymbals that are used periodically throughout, there are only four cymbal strikes – at 1:21 and the three strikes at the close of the piece. They have a greater impact from being played sparingly.

This piece is conversational in nature and is an early example of the psychological challenge of treating the patch as an equal contributor; allowing it to feature in the foreground and my taking an occasional backing role. The concept of depth of field is borrowed from film and photography and describes an area that can be in front of and behind the camera's focal point and still be clearly defined. My use of visual metaphors reveals my concern with the concept of the positioning of sounds within an apparently three-dimensional, musical landscape. Schenkerian analysis refers to such structural levels: 'Form is "an energy-transformation — a transformation of the forces which flow from the background to the foreground through the structural levels'[64] In this piece, the foreground and background roles are closer to the positions musicians often adopt in jazz ensembles; where a soloist occupies the foreground with background support from other players. In this instance I played repeated motifs as an accompaniment to the computer soloist.

**2. *Breaks* 7:57 Solo** Rec. 2013 Huddersfield home studio

This piece opens with the patch playing sampled temple block and woodblocks to be joined by my playing of a brush on the snare drum followed by stick bounces on various drums. The sampled temple/wood blocks change pitch repeatedly and give a foretaste of the subsequent creature sounds to be heard in the following piece *Bullfrogs*. I play single stroke rolls on drums and rims, stick rubs (stick against stick held on drum head for resonance). Mainly staccato drumming including on a dampened small cymbal on snare head.

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[64] Heinrich Schenker quoted by Charles J. Smith, 'Musical Form and Fundamental Structure: An Investigation of Schenker's 'Formenlehre' *Music Analysis,* Vol. 15, No. 2/3 (1996), 191-297 (p. 20)
<http://www.jstor.org/stable/854065>
[Accessed: 9 March 2018]

At 0:52 – 1:01 there is a brief silence followed by the sampled, modulated woodblocks with the first of several ‘breaks’ played alternately between the patch and myself. This sampled section suggests a conversation between robotic creatures.

From 1:01 until 2:10 there are a sequence of breaks played by the patch and myself. At 1:28 I played a gentle stroke on a gong with a stick which sustains underneath the subsequent patch break until 1:40. At that point I squeaked a cymbal followed by a patch break until 2:10. From this point the playing overlaps and becomes more of an interplay. At 2:52 I play a break on brushes until 3:09. The patch then plays a motoric sequence until 3:31.

At 3:32 I play spaciously with brushes including a pitch modulation on a tambour followed by waving the brushes in the air (swishing sound) from 3:43 which continues beneath the patch’s foregrounded playing until 4:03. From 4:10 the brushes are played more conventionally including ‘sweeping’ across the snare drum head. Both the patch and myself interact and there is a gentle gong strike at 5:08 with a long sustain and the drumming becomes more assertive.

At 5:30 the patch plays five metallic sounds across my playing which caused me to react at 5:32 and to reverse my grip on the brushes to use the butt-end to play repeated, accelerating single strokes on snare drum. At 5:44 I reverted to playing with the brushes conventionally — still playing fast single stroke rolls.

At 6:02 I put down the brushes to clap my hands rhythmically as a reaction to the patch’s output, followed by playing with my hands and fingers including rubbing a finger across a drum head to elicit a brief ‘groan’ sound.

The patch and myself continue playing breaks until a fast interaction at 7:07. At 7:36 I struck the gong which sustained underneath the patch ‘s playing through the fade-out to the end of the piece at 7:57.

By defining the alternating sections played by myself and the patch as breaks, I am drawing attention to my thought processes while I was playing this piece. As I was the initiator of both the patch (by depressing the volume pedal) and my own playing; I took a psychological stance that the patch had a degree of agency and a capacity to surprise which was suggestive of ‘trading breaks’ in a jazz context. Certainly, this is a free interpretation of ‘trading breaks’, particularly as the lengths of the breaks were unequal - in a standard jazz context the breaks would be of a similar bar length, such as four or eight bars, but these exchanges were breaks insofar as each was a reaction to its immediate predecessor.

**3. *Bullfrogs* 8:42 Solo** Rec. 2013 Huddersfield home studio

Ferrara states that 'Many if not most theoretical systems of musical analysis break down when an attempt is made to apply them to atonal and electronic music.' This is a phenomenological analysis based upon his analysis of *Poème électronique* (1957–58) by Edgard Varèse, which he offers as a 'practical and transferable application of phenomenological method'.[65]

*Reflection 1:* This piece has no easily discernible form, melodies, rhythms or other conventional elements. On first listening it appears to be a combination of indefinable, arhythmic drumming coupled with sounds of unknown origin. It is not clear which sounds are acoustically created or of electroacoustic origin.

*Reflection 2:* The piece opens with staccato drumming on muted percussion and woodblocks. There are noticeable silences, which appear to be a conscious part of the structural plan. The staccato drumming is punctuated by a gently-struck gong, followed by rubbed woodblocks (0:34). Sampled/electroacoustic sounds are heard for the first time (0:36), combined with the foreground drumming (1:52). The sampled sounds fade in and out of prominence. As the sampled sounds become more noticeable, pitch changes occur and mechanical sounds; evocative of a ticking clock come and go. After two minutes (2:10) there is a noticeable change in mood as an intriguing rasping sound starts – bullfrogs or pond life spring to mind. As the piece is a third of the way through, it sounds like a duet for a drummer and microscopic creatures/plant life living in a pond recorded with a hydrophone (2:20 – 3:00).

There is a mood change when the (staccato) drumming stops and a sustained, bowed cymbal plays in combination with the pond life sounds (3:18). At the half-way point, a low partial can be heard from the gently bowed cymbal, which is now taking an accompanying role to the pond life in the foreground (4:18). The sustained low pitch could be a distant aircraft. The pond life sounds as if it is engaged in frenetic activity – perhaps evocative of the short, highly active lives of miniscule creatures. This section sustains for a couple of minutes before being interrupted by a struck gong (6:50), which was sampled and played back immediately. The sampled gong sounds, which are in a state of flux (varying in pitch, duration and attack) play alone. This is another clear change of mood within the piece. A bell is played occasionally over

[65] Ferrara, 1984, pp. 358, 359, 362.

the sampled gong sounds and the gong is struck, contrasting with the sampled version (7:08). A bell is struck, sampled and played back over the gong sounds (7:42). The electroacoustic sounds end abruptly as a woodblock is played in an abstract, staccato manner. A sampled version of the woodblock playing commences with a gently struck gong (8:11). The gong assumes more prominence until it is truncated with a sudden ending (8:42).

*Reflection 3:* The piece was listened to with the intention of identifying distinct structural sections. Changes in mood are evident and these are identified in Figure 15.

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| | | |
|---|---|---|
| 1 Staccato Sounds (Woodblock/Muted Drums)<br>0:00 – 0:28 | 2 Sustained Cymbal/Gong<br>0:29 | 3 Max patch plays…<br>0:36 |
| 4 Staccato percussion<br>0:50 | 5 Max patch to foreground<br>0:58 | 6 Patch plays 'mechanical' sounds<br>1:08 |
| 7 Silence<br>1:42 | 8 Max patch plus Staccato perc.<br>1:44 – 2:10 | 9 Bullfrog/Pondlife sounds<br>MOOD CHANGE<br>2:11 – 3:00 |
| 10 …with Staccato percussion<br>3:00 – 3:17 | 11 Bowed cymbal with pondlife<br>MOOD CHANGE<br>3:18 | 12 Bowed cymbal/pondlife (Cont.)<br>Low partial from cymbal 4:18 |
| 13 Struck gong w. samples played on Max. Pondlife stops.<br>6:50 | 14 Small bells/Max + woodblocks<br>7:08 – 8:01 | 15 Gong continues until abrupt ending<br>8:11 – 8:42 |

Figure 15. Structural sections in *Bullfrogs* solo

*Reflection 4:* On this occasion I was listening for textural form — syntax, as defined by Ferrara:

> Syntactical listenings start at a more fundamental level than the level of musical form. Before one hears music intellectually as sound in form, one can hear sound as such. To do so requires a bracketing out of one's formal training.[66]

[66] Ferrara, 1984, p. 359.

Similarly, Ian Biddle characterizes Pierre Schaeffer's 'reduced listening' as:

> a kind of listening, which, though largely coterminous with *structural hearing* […] involves a different kind of discipline, where coherent sound objects are indexed according to raw sonic qualities disassociated from their putative origins and/or cultural meanings.[67]

With these approaches in mind, I used the sections delineated in Figure 14 as the basis for this listening. The contrasts between the staccato drumming and sustaining gong/cymbal sounds contrast with the electroacoustic sampled (Max patch) sounds. Changes in mood, which define the separation of the sections, reference Stockhausen's *Moment form* approach and the character of the sections, particularly the 'pond life' sections are apparent.

> A piece is in moment form when it is built out of a collection of musical 'blocks'—or 'moments'—which follow certain conditions. The first is that they are independent: every moment must count for itself, irrespective of those which surround it; sections which function purely as 'transitions' are therefore excluded.[68]

*Reflection 5:* This final 'Reflection' is a wholly personal one. When listening to the recording I recalled the sensations of playing the piece which include the silent activity of pressing the record button on the controller to sample my playing for later playback. This is an element of the playing procedure that adds a layer of pre-planning and anticipation, as does the detail of my playing when devised specifically for its anticipated playback.

The piece starts with the (silent) switching on of the sampling patch followed by staccato drumming on muted cymbal on snare head, woodblock and Traps drum. A momentary silence at 0:17 is followed by a bell strike, a stroked cymbal edge at 0:27 and a rubbed woodblock. These sounds are the 'raw material' to be modulated by the patch.

0:36 Sampled opening section plays with continuing staccato drumming. This develops organically with a dynamic exchange between myself and the patch.

1:00 Playback plays pitch-changed drums and the playing is being influenced by the sampled output with clear evidence of interaction.

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[67] Ian Biddle in *Music and Consciousness*, 1970, p. 70.

[68] Mark Hutchinson, 'Snapshots in Sound: Mystère de l'instant and the Legacy of Moment Form', *Contemporary Music Review*, 29:5, (2010), 497-512 (p.498) <DOI: 10.1080/07494467.2010.589127>.

1:05 – 1:32 At this point I was not *playing* in the true sense – I was trying out the Oxley single strike – which is a stroke which hits multiple surfaces in one movement. He sets up his kit so that this can be facilitated, with successive components overlapping each other.

1:41 Spacious playing using the patch intermittently

1:52 Stroked woodblock /Sampled

Replayed almost immediately

2:05 Patch off. Playing staccato on woodblock/kit

2:10 Patch playing introduced. Pitch shifted woodblock plays back in a dense sequence that evokes a natural environment populated by creatures calling to each other

2:15 Gong/hi-hat strikes over sampled, pitch-shifted woodblock creates a complex texture.

2:20 I discovered a rasp effect by scraping the stick along a serrated part of the set, which gave a pleasing bullfrog type effect when replayed at a faster speed.

For this section, I am letting the patch run, with its bullfrog sounds and finding contrasting timbres to play against it.

3:00 At this point I am playing similar staccato sounds to the patch and there is a good tension created by its accelerando/decelerando. I am allowing the patch to set the tempo of the piece.

3:11 A bell is struck which creates a change in mood. The patch plays on alone…

3:18 Introduction of a bowed cymbal. There is a complete contrast between the bowed cymbal and the frenetic chirruping of the 'bullfrogs'

6:50 Single gong strike (being sampled for later use) signals a change of mood.

6:52 The sampled gong is played back by the patch almost immediately and is subjected to rapid pitch changes

7:08 A bell and the gong are played over the sampled gong sounds

7:42 Bell is played/sampled and played back immediately

7:53 Staccato woodblocks played without patch

8:01 Patch plays pitch-shifted woodblocks

Gong/cymbals are played over the patch, in a spacious manner, until the (sudden) ending at 8:42.

**4. *Practice Pad* 5:08 Solo** Rec. 2013 Huddersfield home studio

This piece is unusual in that the principal item of percussion played for most of the piece is a practice pad. It consists of a painted wood disk 14" in diameter with an attached 12" rubber disk in the centre. It sits snugly on the playing surface of the snare drum. In 'normal' use the rubber disk would be the only surface to be played, but on several occasions during the piece the outer, wooden section is struck. The sounds elicited from this device are a muted, dull thud on the rubber surface and a harsher, staccato crack on the wood. As the scope for sonic nuance is severely limited by such a primitive and un-resonant device (I hesitate to refer to it as an instrument), the piece has a comparatively narrow dynamic range while the pad is being used.

This is an unconventional use of what was designed as a practice aid for developing and maintaining control, dexterity and fluency with sticking patterns. It is most often used for practicing the twenty-six standard drum rudiments that grew from military snare drumming and that form the basis of much of the drumming heard in Western music traditions. I often use the practice pad to warm up prior to actual playing and, on this occasion, as the recording device was running, the initial warm-up developed into playing using the first consistently effective Max patch (*MWTPD*).

At a structural level, if the sound of the practice pad is relegated and designated as a background sound and only actual instrumental sounds are perceived to occupy the foreground, then the percussion sounds – particularly those of the metal instruments take on heightened prominence and their positions can be mapped clearly (Figure 17, p. 67). The visual concept of depth of field again comes to mind when considering the relative positions of the practice pad, the playback of the patch and the acoustic percussion within the sonic landscape. To continue the visual analogy, the sounds can be said to come into focus when given levels of prominence and particularly when brought to the foreground.

The metal instruments throughout this piece – cymbals, small bell-cymbals and gong are played minimally, other than the closed hi-hat 'flurry' at 04:22 – 04:30, each of the sustaining metals are only ever struck once and, in most cases, allowed to resonate freely. The sparing use of the metal instruments and their uncluttered orientation within the piece render them significant. There are thirteen clearly struck or scraped impacts on metal in the piece, excluding the hi-hat 'flurry'.

**Structural demarcation (A)**

There are three solo practice pad sections and three Max patch solos and these are used here to define the piece into five sections (Figure 18, p. 67).

**Section 1**

00:00 Practice pad solo 1 to (end of) Practice pad solo 2 (00:48 – 01:10)

The piece opens with a loose double-stroke roll being played on the practice pad. Although this is unaccompanied, it feels more like an introduction than a solo *per se*. (I am choosing to describe all such unaccompanied interludes by practice pad or patch as being solos for the purposes of orientation).

The practice pad is joined by its sampled version swelling to audibility at 00:14. This adds colour and depth with pitch variance and textural richness and a musical dialogue is immediately underway. The use of the dull-sounding practice pad confounds the usual expectations when a human player's contribution would be expected to be more dynamic than that of the computer driven agent. At 00:23 a temple block is struck once to be immediately followed by two beats on the bass drum and a further temple block stroke. The snare drum rim is played fleetingly. The playing is cautiously expanding to include additional parts of the acoustic kit. The improvisation is ongoing and two emphatic accents by the patch at 00:33 are incorporated into what is now developing into an intertwined percussive exchange.

Further double strokes on the bass drum between 00:35 – 00:38 and rim playing lead to a single-stroke roll on the drum rim at 00:46/47 which leads directly in to Practice pad solo 2 from 00:48. This is a faster single-stroke roll with accents and it is much more assertive and dynamic than at the beginning. There is a brief 'break' by the patch at 00:54, but the practice pad solo continues until a decelerando to the transition to Section 2 at 01:10. In this first section the acoustic component is played entirely on pad, single-headed drums and temple block. All these sound-sources give a minimal or almost non-existent sustain. No metals are struck during this section.

**Section 2**

01:10 Tutti - Patch solo 1 (01:58 - 02:04)

The Practice pad solo 2 ends at 01:10 as the patch swells back in to become the featured voice in the duo – very much to the fore until it fades slightly at 01:17. At 01:34 there is a brief

percussion 'break' which leads to the first strike on metal – a muted bell at 01:39. This is significant and immediately noticeable as a new timbre.

From 01:41 – 01:46 there is a 'break' by the patch (I am not classifying *breaks* as solos, as they are brief, transitory links within the ongoing development). This sounds like an animated conversation taking place as the percussion and patch exchange phrases. The break is answered by repeated flams on practice pad which accelerate as the patch swells back in at 01:50.

At 01:52 the first cymbal strike is heard which sustains until 01:57. This adds depth to the enlarged sound-world being explored by this piece. The sustain carries under the ensuing play on drums and temple block until patch solo 1 runs from 01:58 until the solo is abruptly ended by a single, declamatory strike on a temple block at 02:04.

**Section 3**

02:04 (End of) Patch solo 1 to Practice pad/percussion solo 3 (02:29 – 02:41)

After the clear punctuation of the temple block at 02:04 there is a brief (1 second) break on bass drum and tom followed by single strokes played on the practice pad that double in speed at 02:12 and the raised intensity is augmented with the swelling of the patch at 02:15. This is followed by an intricate area of interaction with the playing of the pad almost matching the patch beat-for-beat until 02:24.

The practice pad/percussion solo begins at 02:29, moving from practice pad to rim and then temple block. Emphatic single-stroke rolls being played on the temple block varying in intensity and timbre by being played on different parts of the block (with an incidental double stroke on the bass drum to finish) from 02:31 – 02:41. The playing at this point is (as well as being practice pad/percussion solo 3) being sampled anew and its staccato, forceful nature and tonal and dynamic qualities were no small consideration for its suitability as 'raw material' for sampling.

**Section 4**

02:42 to (end of) Patch solo 2 (03:05 – 03:18)

Section 4 starts with the playback of the freshly sampled preceding pad/percussion solo along with the live percussion playing. The sample is more declamatory than its antecedent and more otherworldly. It occasionally sounds like bullfrogs or pond-life – a characteristic that has been noted in several other pieces.

This opening is a lively duo passage with the patch being the lead voice – my playing at this stage was more spacious to give the patch free reign. This is taken to the logical next step by leaving the patch to play (a quite frenzied) solo at 03:05 – 03:18. The new sampled material (patch) has an additional sub-layer of a shifting melodic line playing along with the randomised percussion which is not unlike human humming.

**Section 5**

03:18 to Patch solo 3 (04:27) to end (05:08)

This final section develops from the preceding patch solo into a dynamic interchange between the patch and percussion. The patch sounds like small, indefinable creatures busily ruminating and the drumming has become both relaxed and confident. The humming of the patch is particularly evocative and it gives the ensuing passages a unique, animated quality. Use of the volume pedal throughout this section adds subtlety to the patch and gives it an ebb and flow that informs the dialogue with the percussion.

The practice pad is heard being discarded at 03:43 and the introduction of the snare drum (snares off) at this point adds colour and heft to the percussion. This is a key point in the piece – see below. A single cymbal strike occurs at 03:51 and later at 04:11. At no point during this piece is the cymbal struck more than once. This is unusually restrained use of the cymbal giving its use greater impact, particularly as the sound sustains and decays naturally. Between these two cymbal strikes, from 04:00 the percussion becomes louder and more insistent.

At 04:18 – 04:22 the patch plays a break which leads to hi-hat cymbals played with sticks in a quasi-swing style from 04:22 – 04:27. This is followed by patch solo 3 at 04:27 – 04:33. As the patch is playing throughout this whole section with the volume pedal determining the dynamic detail, the two patch breaks could be redefined as the solo with a hi-hat cymbal break in the middle. The improvisation is fast-moving and the dialogue between patch and percussion is highly detailed. The intertwined lines move towards the ending and the patch is faded to leave the percussion to play a final break at 04:57 – 05:05 before the patch re-joins for the closing moments at 05:08.

**Structural demarcation (B)**

By using the pad/patch solos as pivotal events I have identified five sections to be considered (Fig. 18), but another simpler, structural view separates the piece into just two sections: the playing of the practice pad from the start until it is discarded at 03:43 and the playing of the

snare drum (snares off) from that point until the end at 05:08 (Fig. 16). This is a simple 'before and after' situation, but the change is the most significant event in the whole piece. At risk of anthropomorphizing the snare drum (and as I frequently ascribe human qualities to the Max patch, it seems only fair) — the drum is being subjugated by the practice pad. Particularly as the pad's position on the snare drum batter head causes the (released) snare wires underneath the drum to vibrate (un)sympathetically, adding a faint audible *protest*. As the pad is supplanted by the snare drum the latter is *liberated* as it is finally emancipated from its undynamic surrogate.

A.4. #4 Hudds solo ***Practice Pad*** 5:08

Figure 16. Stereo Waveforms

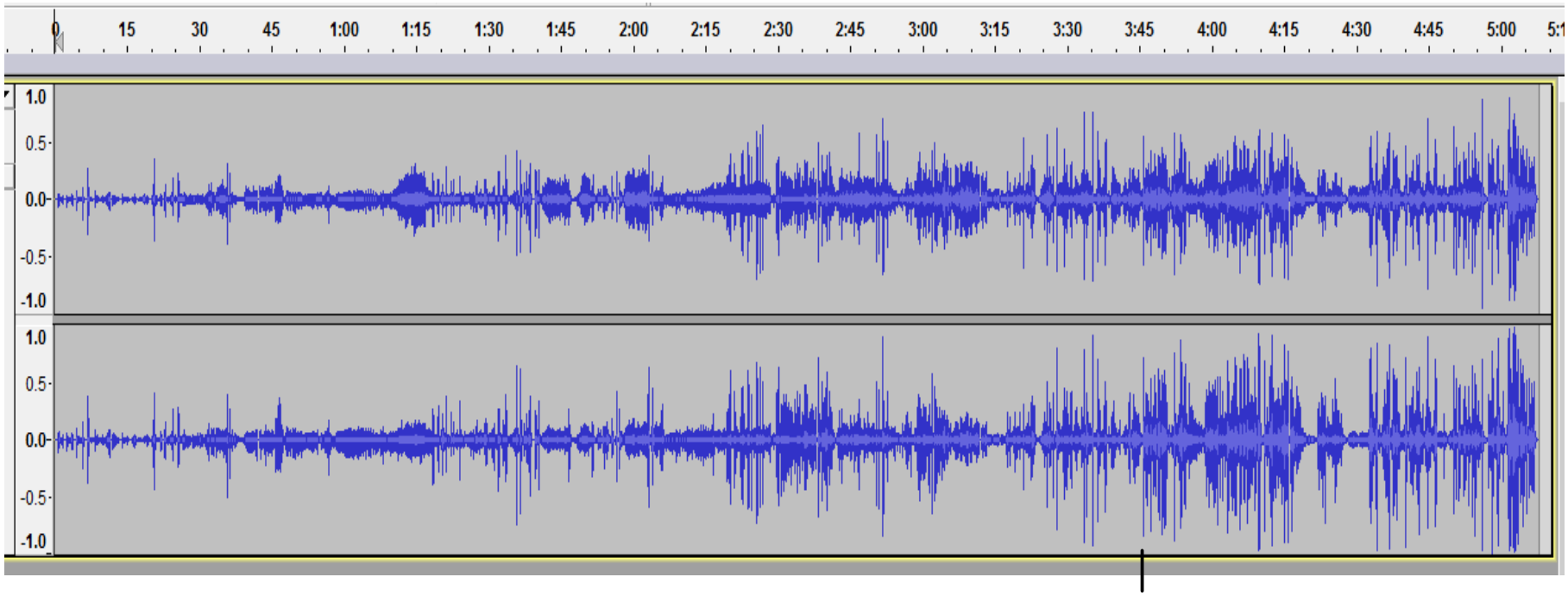


Figure 17. Metal – Cymbals, bells and gong

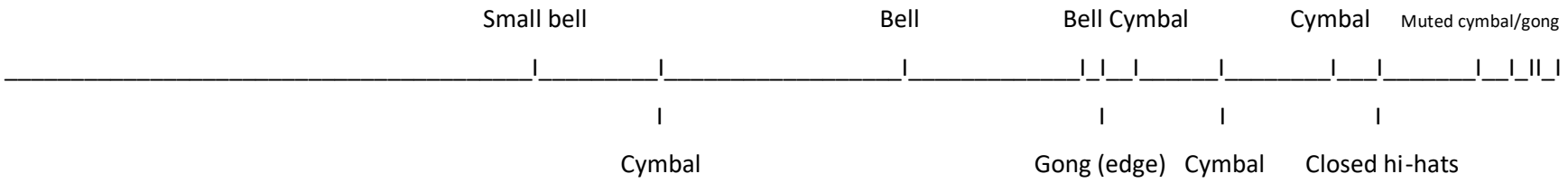
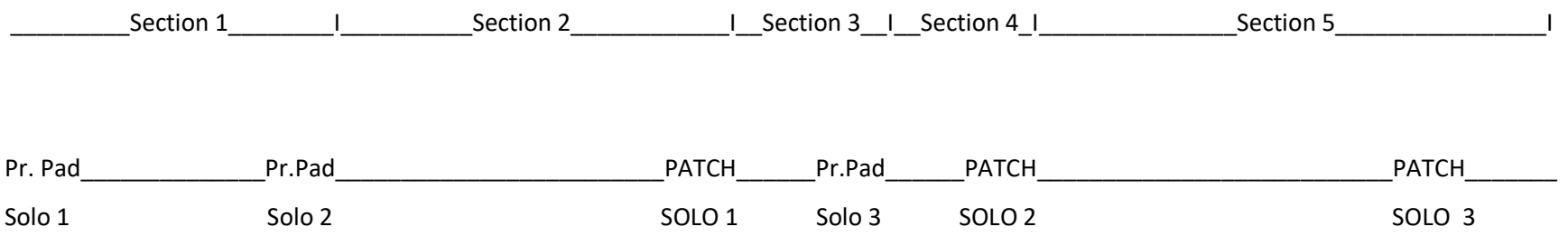



Figure 18. Sections defined by practice pad & Max patch Solo



**5. *Max wants to play melodically* 9:21 Solo** Rec. 2013 Huddersfield home studio

This piece demonstrates the *MWTPD* patch's capacity for creating a complex outcome. The piece begins with brushes being used to play the kit while sampling and replaying in quick succession. I repeat this on-the-fly sampling early and the patch initially plays a quiet background role. From 1:55 I change from brushes to sticks and simulate a 'talking drum' by playing pitch modulations on a Traps drum. I play cymbal and gong squeaks (using friction of a perpendicular stick against the metal), occasionally whistle a single note and bow a sizzle cymbal at 2:50. I make occasional use of the pedal-tuned floor tom to play glissandi. I play a duet with the patch throughout and repeat the single-note whistle several times and play with my fingers from 8:18 – 8:35.

The most notable characteristic of this piece is the strange, background melody played by the patch from 1:51 until the end of the piece at 9:21. It varies constantly and the patch plays additional complex passages simultaneously, for example at 6:27 where there is an intricate wood/temple block modulated sample to which I contribute an additional layer of wood block play.

**6. *Nja* 14:28 Duo w Ewan Stefani** Rec. 2012 at Chairworks Studio, Castleford

*Nja* is a single piece selected from the Hession-Stefani duo's second recording session at Chairworks, when I played a reduced kit – snare and bass drum, hi-hat and ride cymbal plus three gongs, woodblocks and small bell cymbals with ring modulator, echo machine and volume pedal. A condenser microphone on the snare drum was positioned to record the small percussion played while positioned on the snare head. Separate microphones were placed for the bass drum, hi-hat and gongs.

This piece is very different in character to the preceding Huddersfield recordings as it is a duo in the conventional sense and I made use of analogue effects only with the percussion. This allowed me to play percussion with one hand and simultaneously modulate the sounds with the ring modulator and echo machine with the other while using the volume pedal with my left foot. As in the preceding recordings my foot controlled both the hi-hat and volume pedals.

Stefani's 'live digital processing and synthesis' plays a ruminative undercurrent throughout *Nja* of modulated samples, occasionally bordering on melodicism while I play in a sparser manner than the previous pieces. Much of my contribution is staccato in nature as I

played cymbals laid on the muted snare head and the exposed parts of the head itself as well as stick-on-stick and closed hi-hats. I accessed sustain by playing the three gongs both with and without electronic modulation. Stefani's almost continuous playing varies in character throughout – often evoking industrious activity and incorporating muted sections and, from just beyond the half-way point dramatic pauses. He stops playing at 13:18 leaving me to conclude the piece by playing the gongs with modulation in a quasi-meditative manner until the end at 14:28.

**7. *Ceremonial Industry* 17:13 Solo** Rec. 2013 EMS 1, University of Leeds

This piece was played on a reduced kit with wood block, small bells and cymbals interacting with *MWTPD*. It begins with bowed cymbals being sampled and re-played almost simultaneously. The first samples are vague in character due to the gentle attack of the bowed sounds. It is a gradual, quasi-ceremonial beginning using cymbals and bells. The mood is broken by interjections from the patch from 1:47 until I play (while sampling) woodblocks from 2:43 – 2:51 and switch to playback at 2:52. The change from actual blocks being played to sampled and replayed ones is seamless and difficult to detect and I only became aware of it upon repeated, close listening.

On-the-fly sampling with subsequent playback takes place at 5:30 and *MWTPD* is again playing simultaneous lines of cymbal and woodblock samples. Real-time sampling/playback reoccurs at 7:30. At this stage the mood of the piece has evolved from the ceremonial opening to one of industrious activity. At 8:49 brushes are used with the patch faded to the background before coming to the fore at 9:20 with fast sampled patterns. A period of fast interplay between myself and the patch occurs and at 13:40 the patch swells forward with a multi-layered sample. Both the patch and my own playing fade and swell until 14:50. 'We' are playing breaks once again (with the volume pedal) until the patch is silenced simultaneously with a dramatic strike on the inverted Zilbel at 15:15. This sustains until 15:26 with the patch swelled to the foreground. The Zilbel is struck again at 15:27, 15:36, 15:46 and 15:55. The patch and I interact until an unequivocal ending signalled by a simultaneous drum and cymbal strike at 17:08.

**8. *Homage to F.C. Judd* 6:31 Solo** Rec. 2014 at Bjergsted campus, Univ. Stavanger

This is the first recording where I play electronics almost exclusively without any real-time percussion, except for two, gentle strikes on a temple block at 2:37. It was edited from a longer improvisation and the rhythmic placement of the sounds is a combination of my original improvisation and its randomisation by the Stavpatch. I made use of the two sampler/playback channels and replayed them either simultaneously or individually and modulated the sounds with the ring modulator, echo machine and volume pedal. The brief use of the temple block is another detail that passed me by on first listening, as it does not disturb the overall dynamic level. The same cannot be said of the echo machine sweeps that begin at 5:59 and continue until a shockingly loud sweep at 6:08. An almost continuous background soundscape plays throughout this piece, with a few brief pauses, that is highly reminiscent of the city of the future soundscape created by F.C. Judd for the television series *Space Patrol* (1963).[69]

**9. *Rindade Insult* 2:50 Duo w. Ewan Stefani** Rec. 2015 at Chairworks Studio, Castleford

This is the first use of a hybrid kit in these recordings consisting of a Roland percussion sampler, two Roland trigger pads, snare drum, pedal-tuneable floor tom, sizzle cymbal, hi-hat, ring modulator, echo machine and volume pedal. It is an integrated electronic/acoustic set-up although I only make use of the conventional, acoustic elements in this piece. There is rapid interplay throughout between my acoustic drumming and Stefani's keyboard-triggered samples. I play brushes at the start and invert them to use the butt-end to play the kit prior to exchanging them for sticks. This is also the first use of the snare drum with the snares on and my playing is conventional compared to much of my other output, although the piece itself is not. Stefani makes use of a varied range of samples including Steel Pans and it is fast-moving and dynamic incorporating momentary sporadic silences. It is pithy and to the point. The title reflects my later-life interest in swimming and is an Estonian translation of 'breast stroke'.

[69] Please view Space Patrol on Youtube <https://www.youtube.com/watch?v=PdtoSpX9ngE>

**10. *Belt-driven Drone* 17:27 Solo** Rec. 2014 at Bjergsted campus, Univ. Stavanger

This piece starts with a drone played on the spectral freeze channel on Stavpatch. It is a pitch-changed sizzle cymbal sample and I think of it as being akin to a wash on a watercolour painting. This continues throughout the entire piece with slight pitch adjustments and occasional, momentary disruption. A bowed cymbal plays several times from 0:11 until the last bow sustains until 0:48, when a cymbal is struck while being sampled and immediately replayed and overlapped by rolls played on a sizzle cymbal from 0:57, which is sampled until replay from 1:05. The Stavpatch playback repeatedly changes the pitch of the sizzle cymbal and truncates the sound at unexpected points. Drums are introduced briefly from 1:13, playing over the laminations of cymbal drone and cymbal sample replays. Most of the activity at this point is the background cymbal sample drone, additional layers of Stavpatch randomised cymbal samples, occasional struck inverted bells on drums and cymbal squeaks.

At 3:16 a bell is struck while being sampled, immediately replayed; sounding like an alarm clock. The sampled cymbals are pitch modulated manually using the spectral freeze control on the LPD8 before a repeat of the struck bell sample with immediate playback at 4:05. Further pitch modulation leads to a high register section from 4:52 – 5:12 which suggests a dentist's drill. From 5:30 – 5:55 the drone stops while two inverted bells are struck on the pedal-tuneable floor tom which is used to create glissandi with the sustaining tones. The drone restarts at 5:56 along with the sampled cymbals. It is noticeable that, apart from the brief section of drums being played at 1:13 – 1:32, the sounds utilised in this piece are all metallophones (cymbals and bells), being sampled and replayed and much of my playing activity is using the LPD8 to mix and modulate samples rather than real-time percussion. The echo machine is used as a flanger from 7:05 – 7:29 culminating in a dramatic sweep where all the samples stop suddenly to leave a brief silence which is broken by a ruler being twanged manually on a desk edge. These alternating samples and manual twangs are repeated twice until the samples resume from 7:41.

There are dramatic pitch modulations from 8:14 and flanging is reintroduced from 8:37. These are a combination of the LPD8 spectral freeze pitch control and the echo machine used as a flanger. There are brief momentary silences at 9:18, 9:24 and 9:26 – the latter with a finger click and hand claps. These were sampled and replayed from 9:31. From 10:15 the kit is introduced; playing staccato on rims, damped drums and cymbals on drums until a declamatory

woodblock strike at 11:08. The layers of activity here are drumming over sampled finger clicks and hand claps and the underlying drone.

Rolls are played with sticks on a woodblock with a single strike on a bell 11:30. This section was sampled and replayed from 11:31 and is joined by a bowed cymbal from 11:42 – 12:05. The sampled woodblock and bell is being pitch modulated continuously and includes a randomised, lower register strike that suggests a mechanical, belt-driven process in a Victorian mill. The echo machine is used to create swooping pitch ascents and descents from 12:24 with dramatic lower pitches from 13:07 until 15:58. The woodblock/bell samples occupy the foreground from this point until ceasing at 16:55. The drone plays alone from this point with minor pitch modulation taking place prior to a fade-out to end at 17:25.

**11. *Intervallic* 3:30 Solo** Rec.2014 at Bjergsted campus, Univ. Stavanger

This piece opens with loosely propulsive playing on the kit until 0:11. This was sampled for playback from that point and is manually pitch changed by the echo machine from 0:29 – 1:29. The Stavpatch plays muted, sampled kit until I played dramatic, unison drum and choked-cymbal strikes at 1:44 and 1:48. I used the echo machine to introduce pitch modulation from 1:56 – 2:55 and the sampled drumming continues with added flanging from 3:08 until dropping out at 3:19 leaving the echo machine's sustaining pitches until the end at 3:30. I chose the title *Intervallic* to reflect the fast intervals between acoustic playing, sampling and replaying. I took a deliberately quick-fire approach to this piece; acting and reacting instinctively without pausing for even momentary reflection.

**12. *Balbuzie* 6:02 Duo w. Ewan Stefani** Rec. 2015 at Chairworks Studio, Castleford

*Balbuzie* is a collage of sounds consisting of samples of a bowed string on the *Plankophone*, a twanged taut spring on a floor lamp, a twanged ruler, a blown cardboard tube and a wooden ratchet played on the Roland sampler as part of the hybrid kit and modulation of these by the echo machine and ring modulator and sampled piano keyboard and strings, ping pong balls and assorted kitchen percussion played by Stefani on a keyboard. The only acoustic percussion sounds are, ironically, the incidental Roland trigger pad sounds being struck by the sticks (See

Chapter 3.5, p. 47). It is a sampler duet throughout with triggering by, in my case, striking pads and Stefani's use of a keyboard.

It opens with repeated bowed strings which is joined at 0:06 by Stefani's sampled strings and piano and a low-pitched sound of uncertain provenance. The first of several blown cardboard tube samples occurs at 0:23 and the ring modulator is heard from 0:43 – 1:36. I play a quieter backing role for much of this piece with Stefani's busy samples occupying the foreground. At 1:41 the piano makes a shocking entrance in a faux Spaghetti Western bar-room style. The activity from this point is a dense, collision of stroked strings, piano keys and struck strings, kitchen percussion and occasional ping pong balls with ratchet and ring modulator accompaniment until a mood change at 4:26 when the piano drops out and the sounds become more spacious. The piano re-joins quietly at 4:42 with an increasingly insistent twanged ruler modulated with a low-pitch partial heard from here until 5:28. The low partial ceases but the twanging continues in a lighter mood until a sample that evokes a gurgling drain is heard from 5:37 – 5:41. The piece is winding down with rolling, background twangs and stroked strings with a final flourish of strings at 5:54 before the fade-out. *Balbuzie* translates as stuttering in Italian.

**13. *Gong Drone* 6:33 Solo** Rec. 2014 at Bjergsted campus, Univ. Stavanger

This solo begins with a small cymbal positioned on muted snare drum (snares off) being struck in a random, staccato manner while being sampled by the *Stavpatch* and replayed almost immediately. The *Stavpatch* modulates the pitch of the cymbal, continues the random spacing of the strikes and varies the dynamics to give a three-dimensional effect. A saw tooth waveform is heard at 0:13 played on the echo machine contrasting with the spacious, staccato muted cymbal. The randomised cymbal strikes have an accompanying sub-layer: a low frequency harmonic creating an abstract, bass melody. I twanged a ruler on a table edge at 0:20 as a foil to the electronic sounds and the echo machine is used again at 0:23.

This improvisation could be described as a *klangfarbenmelodie*: using the contrasting sounds as building blocks. A further ruler twang at 1:02 is sampled, replayed and modulated with the echo machine changing from a pithy, acoustic twang to a loud, electronic swoop within a few seconds developing into a sustained high-pitched tone from 1:15. This is held and augmented with the spectral freeze pitch control on the LPD8 giving me low and high tones manipulated by 'knob twiddling'. This is my favoured way of controlling electronic sounds as it feels direct and

unmediated. A drone develops from 1:23 that varies in pitch as it continues and the sounds gradually fall away to leave minimal sampled material from 2:30 that evolves into a spacious, slower, randomised version of the original muted cymbal. Acoustic percussion is reintroduced at 3:00 over the muted cymbal sample with three rapid strikes on a hand-held gong followed by a sizzle cymbal, Zilbel, bell plate, ride cymbal and gong. These sounds sustain until a gong is sampled before being replayed from 3:53 with pitch modulation. I then modulate the sampled gong and accompanying drone on the *Stavpatch* with the echo machine and spectral freeze pitch control until the abrupt ending at 6:33.

**14. *Choral* 10:21 Solo** Rec.2014 at Bjergsted campus, Univ. Stavanger

This is a rare example, in this group of recordings, where the sampled material is that of my voice rather than percussion. I sang a wobbly-pitched tone in the direction of the microphone while sat at the kit, sampling it for immediate playback and the early stages of this piece are my voice; two sampled versions and a drone with the same origin. The drone is a pitch-lowered version of the voice and this continues through the entire piece. After the initial vocal utterances I 'play' the electronics (the LPD8 controlling the sample playback and drone and the echo machine on the samples) making increasingly radical changes to the vocal samples. The echo machine is here used to make swooping ascending and descending pitch changes with the origin of the sounds often being completely masked.

At 6:10 the sound of a bowed cymbal is heard over the voice and drone samples and this is repeated until, having been sampled itself, is played back from 7:41. The sampled voice is heard for the last time at 7:23 and only the sampled bowed cymbal, high-pitched echo machine sounds and distant drone remains until a cymbal is struck at 9:21. This is the pre-amble to the introduction of the drum set at 9:27 which plays forcefully until 9:56, ending with a sustaining sizzle cymbal fading into the remaining sounds of echo machine and drone.

Choral begins with a slightly inane vocal utterance that is modulated by the *Stavpatch* and analogue effects until the first bowed cymbal at 6:10. This is the first real mood change in the piece and the almost pure, acoustic quality of the cymbal comes as a tonic to the ears. As this is followed by the drums and eventually only electronics; the piece undergoes a radical evolution. By singing into the *Stavpatch* I was exploiting the affordances available to me, particularly with the presence of a microphone. In common with all the other works presented

here, no pre-planning took place; I was exploring the materials at hand in a playful manner and, in this case, perhaps subconsciously harking back to my early experiences as a choirboy.

**15. *Stapler (Melodic Armature)* 14:11 Solo** Rec. 2014 at Bjergsted campus, Univ. Stavanger My playing of a fragmented phrase of staccato, muted cymbals played on the snare drum, a brief vocal 'Oy!' and a final sustaining bell within the first ten seconds are the essence of much of this piece. They were sampled by the *Stavpatch* and played from 0:11; the bell having been transmuted into a meandering melody which continues, except for a few breaks, until 8:40 and the muted cymbals creating a mechanical pattern that evokes the enthusiastic use of a stapler.

I improvise on the kit; phrasing with the meandering melody and interacting with the mechanical sounds. At 0:55 a single stroke is made on the temple block, which having been sampled, is immediately played followed by a tense silence in to which I played an accelerando on muted cymbal, Chinese animal skin drum and bass drum leading to the tentative reappearance of the meandering melody at 1:04. The activity picks up speed and the increasingly frantic drumming is punctuated by sporadic stapling until another vocal 'Oy!' at 3:07. This marked a transition as the previous samples cease and I configured the *Stavpatch* to sample anew; playing muted percussion from 3:10 – 3:19. The new sample is heard from 3:20, along with the earlier stapler/melody samples. The former sounds more spacious but evokes a similarly industrial scene: rattling metal sounds could be sheet metal being beaten into shape at a workbench.

Dramatic strikes on cymbal and gong take place at 3:42 and 3:44 and the frenetic activity continues, including the meandering melody, before letting up at 8:40. Here the background sample becomes increasingly distorted during a woodblock interlude from 8:45 – 9:06. The block is played with sticks before being rubbed – its resonant body making the rubbing audible. The sound-world at this juncture is more abstracted than the earlier 'workshop' sections, but it continues to evoke a manufacturing process. For most of this piece there are layers of activity that, for this listener, suggest several people working simultaneously but at different tasks going at different speeds. The meandering melody (sampled Zilbel) restarts at 11:19, here swelling to dominate the audio landscape by occupying the foreground until fading at 11:43. This volume boost was initiated by the *Stavpatch*, not the volume pedal. I played the inverted Zilbel to match sounds with the sample and to add to the density of activity.

From 11:55 a sustaining single pitch was triggered on the spectral freeze control on the LPD8 dropping to settle on a lower pitch at 11:58 and held until 12:10. This interlude leads into the re-emergence of the stapler with the meandering melody and my interaction on the kit. I play a flurry on the closed hi-hat cymbals at 13:48 followed by three strikes on a Traps single-headed tom ending at 13:55 and a final sizzle cymbal strike at 13:56 that sustains until 14:04. The meandering melody and stapler continue until an abrupt end at 14:09.

While listening to *Stapler* I see images of manual labour taking place in a workshop and I almost expect to see a finished product when the piece ends. I imagine panel beating, riveting, welding, cutting, filing, brazing, polishing, wiring and assembly taking place and, of course, heavy-duty stapling. The character of this piece was determined entirely by serendipity: my playing a flurry of muted percussion and the resulting sampling by the *Stavpatch*. The reference in the title to a *Melodic Armature* is the meandering melody running throughout most of the piece.

**16. *Truncated Loquacity* 5:43 Solo** Rec. 2014 at Bjergsted campus, Univ. Stavanger

This is very much a kit-led piece, although the patch is present from the start. The interaction is a fast bouncing of ideas back and forth with rapid changes between the patch and my contribution. Before the first minute is up, the patch becomes increasingly abstract with mostly lowered pitch changes, delay effects and another almost-Stapler effect from 1:07 – 1:16. Many of the samples here have a sci-fi character and some are reminiscent of *Space Patrol*, for example at 1:46 and there is a hint of *The Clangers*[70] at 2:04.

There are uses of silence between 2:25 – 2:50 that punctuate the drumming phrases and there is a cymbal interlude involving both acoustic and sampled cymbals played from 3:01 – 3:47 with a darker accompanying sample of abstracted percussion. The drumming is rapid and loquacious with truncated *Stavpatch* activity including recurring silences and a fleeting example of mimicry at 5:03 – 05 as rapidly-struck sticks play both in real time and on the sample. At 5:21 – 5:26 a sampled unison drum and cymbal stroke is modulated suggesting *The Clangers* for a

[70] *The Clangers* was a British stop-motion science fiction television series about creatures living on a hollow planet who communicated by whistling. The Swanee whistle being the principal sound source for their dialogue. It was broadcast on BBC1 from 1969-72 and 1974.

second time and this stroke is repeated in the closing seconds with a low-pitched cymbal squeak and indistinct *Stavpatch* activity.

**17. *Oldingi Mash Torting* 4:38 Solo** Rec. 2015 Chairworks Studio, Castleford

This is the only solo piece played using a hybrid kit of Traps bass drum, snare drum, pedal-tuned floor tom, two Roland trigger pads, Roland SPD-SX sampler, hi-hat and sizzle cymbal. The output from the sampler was connected to the ring modulator, echo machine and volume pedal. It opens with a succession of samples played on the Roland SPD-SX: a large gong with a long sustain followed by sampled bells with infinite (looped) sustain. This is another quasi-ceremonial opening, but the mood is changed with samples of Arthur Askey saying his catchphrase 'I thang yow' and Sid James' 'I've had no complaints so far', complete with his leery laugh, playing over the looped bell.

Additional looped bell sounds are played on the pads of the SPD-SX and the sounds of the sticks striking the rubber sampler pads are here glaringly apparent from 0:12 – 0:19. The sizzle cymbal is struck at 0:20 and the combined sustain of the cymbal and the sampled bells creates a wash on to which further sounds are added. Sampled 'twangs' are played prior to the acoustic drums making an entrance at 0:30. The kit was set up with sampler pads being integrated with the acoustic drums and cymbals and the resultant playing is a collage of acoustic and sampled sounds. The pedal-tuned floor tom is heard playing glissandi from an initial roll from 0:52 – 0:55. A sample of a church bell can be heard at 0:59 and 1:17 and later, along with further 'twangs', a reversed looped bell sample and a power drill; the first of several DIY tools at 2:00.

The drumming gradually becomes more insistent, building in intensity while encompassing both acoustic and sampled elements alongside the sounds of shovelled soil, footsteps on gravel, a trowel rubbed on a step and a ratchet. From 3:52 – 4:10 I made use of sampled tablas – this was the only use of pre-sets on the sampler. The drumming slows down until a simultaneous drum and (sampled) gong strike at 4:24 creates a false ending – a mood-shattering outburst on the ring modulator at 4:30 – 4:33 pulls the rug from under the listener's feet.

The title relates to my (recent) interest in swimming and is an Uzbek expression for the front crawl (or free-style stroke).

**18. *The Final Flourish* 8:08 Solo** Rec. 2014 at Bjergsted campus, Univ. Stavanger

This is another drum-led piece, but here interacting with the earlier *MWTPD* patch, which exhibits its tendency to transform rapid, staccato playing into interesting outcomes. An almost conventional, open, free jazz introduction is joined by *MWTPD*'s modulated version that is reminiscent of the earlier Huddersfield recordings. There is a hint of the sounds of creatures, such as are heard in audio file 3. *Bullfrogs*. This piece is unusual in that the snare drum is played with the snare wires set in the 'on' position. This contributes to the sense of conventional drumming albeit in an open, improvisational manner. There are recurrent snare drum rolls coexisting with twanging, abstract samples in fast alternating, overlapping phrases. The music is created rapidly with ideas tumbling over each other with occasional silences punctuating the melee.

At 4:50 – 5:06 the patch plays (almost) alone with my minimal cymbal edge and rim taps prior to the patch being silenced with the volume pedal before I play a 'break' from 5:07 – 5:28. At this point the patch is swelled back to audibility with the volume pedal and we both (*MWTPD* and I) play at an equal volume until a sudden stop at 6:01. The patch plays from 6:02 with a modified, muted timbre which contrasts with its earlier self. Please note: I am here ascribing agency to the patch and do so without doubt or hesitation. The *MWTPD* patch is heard here modulating pitch, timbre and dynamics to which I added analogue effects (echo machine and ring modulator) briefly from 6:30 until re-entering with the kit at 6:54. Again, the snare sound is prominent as a defining characteristic and I interact with the roiling, turbulent sounds of the patch until a sudden change in character at 7:40. From here both the acoustic and sampled sounds take on a mechanistic, clockwork quality culminating in a final flourish by the patch at 8:07.

**19. *A Game of Two Halves* 8:16 Solo** Rec. 2014 at Bjergsted campus, Univ. Stavanger

This piece opens with a chilling, windswept effect that evolved from an earlier *Stavpatch* piece, along with the sound of a mechanised process that could be clockwork on a large scale. I imagine a factory in a wintry landscape, open to the elements with large cogs and gear-wheels turning, enmeshed in an embrace that could crush an unwary bystander if s/he stood too close. This activity sets a moderate pace for my improvising on the extended kit that commences from 0:13 and continues until the half-way point. The mechanistic sounds were stopped at 3:10 with the

LPD8 controls leaving my drumming alone within the windswept atmosphere. The piece has some odd characteristics: aside from the chilly mood and the hint of a mechanised process there is a brief jazzy interval at 2:32 – 2:40 when I almost played swing. I quickly moved away from this as it does not sit too comfortably with my solo free improvising approach. However, the greatest shock is yet to come as the piece undergoes a complete character change from close to the half-way point.

From a final strike on a cymbal at 4:03, I jettisoned the sticks and moved on to controlling the analogue effects and LPD8 for the second half as the wind effect takes on a ribald, squidgy character from 4:38 that evolves into a low drone at 5:55. I was taking great pleasure here from manipulating potentiometers – a method that I feel is the closest I can get to the electronic music that inspired me as a child. This hands-on method feels right to me and it helps that it evokes images of boffins creating otherworldly sounds from mysterious devices. At 6:42 the first of several sequences of clock chimes effects are heard which lead to the reintroduction of the mechanised process sounds that become increasingly hysterical. From here alarms, chimes, circular sawing, bells, high-pitched almost human sounds are heard until the mechanism ceases its infernal activity suddenly at 8:14.

**20.** ***Acoustic - Membranes and Metals*** **5:25 Solo** Rec. 2014 at Bjergsted campus, Stavanger

This was an unpremeditated acoustic solo that happened as I sat down to play, as I did every day, in the Bjergsted studio having switched on the electronics ready for sampling. I found that I was taking such pleasure from playing acoustically that I felt no need to use the *Stavpatch* and I saw the process through to its logical conclusion as a complete improvisation without any further mediation. The piece begins with an unhurried exploration of percussion timbres – accelerandi played on drums with overlapping cymbal sustains; metallophones and membranophones juxtaposed, punctuated by spaces (silences) allowing the sounds to 'breathe'. The section at 1:14 – 1:45 is close to a Western Art music 'multi-percussion' solo - interlocking ostinato played on toms which I have consciously developed as a contrasting approach to the unified, co-ordinated independent jazz method which layers the activity of the limbs with cymbals as time-keeping devices.

A brief interlude of stick rubbing (stick-on-stick) occurs from 1:57 – 2:24 leading to glissandi played both stick-on-stick and stick on pressure-modulated drum head. Much of the

latter section of this piece is played on metals – cymbals are played with sticks alone from 3:03 until they are bowed at 3:23 – 4:21, when an inverted Zilbel on the floor tom head is struck. This has a long, natural sustain that is further modulated by use of the pedal-tuning system on the drum at 4:50 – 5:09. The piece ends with a single cymbal squeak at 5:13 that sustains until fading out at 5:22.

**21. *Thus Spoke*… 3:27 Solo** Rec. 2014 at Bjergsted campus, Univ. Stavanger

This is another unusual piece insofar as it is played entirely by alternating 'button pushing' contrasting with the earlier 'knob twiddling'. These are the two hands-on methods that I am most comfortable using to manipulate electronic sounds, as the tactile nature of the interface is analogous to playing an instrument in the traditional sense.

The raw material consists of two channels of sampled material on *Stavpatch* that are being modulated by the patch, including being time-stretched and pitch shifted. I played the acoustic material at an earlier stage and chose to edit it out to leave the modulated results alone. My control is exerted by the timing of the change-overs from channel to channel. The raw materials were drums, muted cymbals, drum rims, temple block, practice pad and a vocal 'Oy!'. 'Oys!' have featured in other pieces, noticeably Track 15. *Stapler* and it seems to be a routine outburst made when I am involved in the business of improvising – particularly when the piece being played suggests industrious activity and early life experience of the hustle and bustle of manual labouring informed and influenced these outbursts. The rattle of bicycle wheel spokes, when passing against a stick or metal tongue, is invoked several times in this piece and a rapid example is heard as the final sound, brings it to an unceremonious halt at 3:24.

**22. *La Taaban Karo* 4:46 Duo w. Ewan Stefani** Rec. 2015 at Chairworks Studio, Castleford

This is a duo with Ewan Stefani playing keyboard-controlled samples and myself on the hybrid kit described earlier (Track 9. *Rindade Insult*). It has a dramatic opening with snare drum (snares off) and sizzle cymbal being enmeshed with unidentifiable samples creating an atmospheric mood. The piece moves at an unhurried pace and both acoustic and sampled percussion are frequently juxtaposed. The obtrusive sounds of the sticks on the pads of the Roland SPD-SX can

be heard and this can alert the attentive listener to the percussion being sampled.[71] An example at 0:33 is a sampled cymbal being played using a rapid single-stroke roll on the pad. The roll can be heard on the pad prior to the cymbal sample being made audible by the volume pedal. This has a distinctive quality, as the same effect could not have been created by playing the cymbal acoustically – the pad gave the sticks a fast rebound and the resulting sound is a hybrid drum/cymbal.

A single, unison drum and cymbal strike at 0:57 punctuates the music and the resulting sustain from the cymbal carries through until a further strike at 1:03. A strike on a tom with a momentary pitch drop is part of a percussive flurry that leads to insistent, repeated single strokes on the bass drum accompanying dark, atmospheric sounds from Stefani. A double-stroke roll on snare drum (snares off) at 1:44 segues into the same on a trigger pad at 1:48 that plays a sampled twanged spring that swells to audibility by volume pedal.

A brief pause at 2:51 marks a change from swirling, electronic sounds to a crisp drum introduction (snares on) at 2:52. The tempo increases from this point as the percussion and keyboard samples take a more combative approach; the players overlapping and cajoling each other. The pedal-tuned floor tom is used from 4:12, playing short glissandi until the end of the piece at 4:26. *La Taaban Karo* translates as *concrete* in Somali.

**23. *Saturation* 5:36 Solo** Rec. 2017 York home studio

This was played by manipulating the controls on the Roland sampler to replay pre-recorded samples of bowed single strings and a brief passage of Indian sitar music. The sounds are fragmentary and are interspersed to overlap making the sounds difficult to identify retrospectively. I took great pleasure from using a phaser with the ring modulator and echo machine connected to the output of the sampler to create a saturated, electronic sound.

The first use of acoustic percussion occurs at 4:45 with the sound of a stick sliding over a cymbal edge. There are further unhurried strikes on cymbals and bells and a single struck tom-tom at 5:06 followed by more metallophones until the final sustain fades at 5:15. Acoustic percussion features only briefly in this piece which is predominantly an overt exercise in knob twiddling. By turning knobs one becomes familiar with the available range of frequencies or

[71] See section 3.5, p. 47.

degree of effect-saturation and, as I have stated in previous analyses, this satisfies my desire for a direct user interface that gives proprioceptive feedback in the same way as a conventional instrument.

**Video files**

The video files are not finished works, as I do not possess the skills required for sophisticated film-making. They are documentary evidence of some of the ways I have been working with percussion and electronics. The Huddersfield recordings were made in my home studio in 2013 and show informal experiments with analogue electronics (V.1) and digital and analogue devices combined (V.2). The iFIMPaC recording (V.3) documents a developmental stage of my research using a home-made trigger pad. The Stavanger solo piece V.4 is unedited and includes extraneous noises, as it is an example of my informal approach to the daily recording process, but it demonstrates the whole sampling and playback process which should give the viewer/listener some valuable insights. The final two duo recordings (V.5 and 6) with Dag Egil Njaa were filmed at Tou Scene, Stavanger and demonstrate a pre-concert run-through followed by the actual concert.

**Solo and Duo works England and Norway**

**V.1 Huddersfield home studio 1:21**

During this brief video I made use of a contact microphone taped to an old, battered cymbal combined with a condenser microphone over the whole kit. These were connected to the ring modulator and echo machine via a mixer and a volume pedal prior to the amplifier.
I was experimenting with this set-up to assess its efficacy and listening for sounds that could be used constructively; such as the timbral changes played on the tom-tom at 0:31 – 0:39 and the temple block at 0:58 – 1:17. There is a balance between acoustic and electronic sounds throughout that is intrinsic to my approach to using electronic augmentation and it is very much a hands-on approach; proprioceptive feedback from the manipulation of sticks and control knobs being essential to the activity.

**V.2 Huddersfield home studio 5:47**

This is a longer video in which I made use of a slightly larger kit with combined analogue and digital electronics. An inverted steel spade with an attached contact microphone is seen to the left, positioned over the Akai LPD8 laptop controller. There was a single condenser microphone positioned to the front of the kit and both this and the contact mic were routed to the laptop running the *MWTPD* patch. The combined output went to the ring modulator (positioned on the snare drum throughout), the volume pedal and amplifier. A gong was positioned to my right, off-camera.

The piece starts with brushes on open hi-hat, inverted shovel, cymbal, toms and gong and the sound of a brush being waved in the air; the whole being sampled by the patch and I can be seen to jump as playback begins suddenly at 0:27. I triggered the playback directly from the laptop at 0:18 – 0:20 bypassing the LPD8 controller, which was temporarily inoperative due to configuration difficulties. The gong strike sustains until the patch's entry at 0:27. I made extensive use of the ring modulator during this piece, often eschewing beaters to control it with one or both hands and it effectively replaced the snare drum; which was literally reduced to a supporting role.

Sticks were used first from 1:42 to interact with the patch with ring modulation throughout. At 2:20 alternating volume pedal swells and Traps drum rolls are played and the sampled brush wave can be recognised on the playback at 2:33. At 2:37 an ascending glissando on the patch is truncated by a simultaneous cut on the volume pedal and a unison strike on gong and Traps tom. Again, the gong sustains well beyond the strike, overlapping the patch which is again playing recognisable samples of brush waving and strikes on the inverted shovel while being pitch changed and ring modulated.

The sticks are replaced by brushes at 3:35 which are inverted to play with the butt ends at 3:53 before being set aside at 4:16. A soft tympani beater is selected at 4:33 to play a single strike on the shovel at 4:35. From here until the end of the piece at 5:47 the beaters remain unused as I concentrated on manipulating the ring modulator on *MWTPD*'s output. This video has three features that determine its character: the recognisable brush waving and shovel sounds during the patch playback and the extensive use of ring modulation. It occurred to me retrospectively that by supplanting the snare drum with the ring modulator the kit became a

radically different instrument and the piece had a unique character with an even distribution of acoustic (percussive) and electronic sounds.

**V.3 iFIMPaC Leeds College of Music 9:56**

This is documentation of a performance at a conference at Leeds College of Music in 2012 where I used a reduced kit – the tom toms being replaced with a single Chinese animal-skin (Jīngjù) drum, a single cymbal (plus hi-hats) and a practice pad with an attached contact microphone used as a triggering device for a delay patch. Please see sections 3.2.a (p. 36) and 3.3.b (p. 43) for more detailed descriptions of the delay patch and the practice pad trigger.

A delay rate was set by the time elapsed between strikes on the pad and a delay had been initiated in advance during the setting up period prior to the concert. Consequently, the first strike on the pad at 1:10 set a new rate. There were sixteen subsequent strikes on the pad up to 3:32 using sticks and brushes followed by the pad being physically moved from sitting on top of the Chinese drum to the snare drum at 3:36. By siting the pad on the Chinese drum or snare drum the trigger pad was positioned conveniently, but it prevented either drum being played and should, in retrospect, have been positioned separately; apart from the drums. The act of moving the pad also triggered a delay rate change.

When I first moved the pad to the snare drum I played the Chinese drum from 2:36 – 3:35 and its warm, animal-skin sound contrasts with the starker, metallic sounds from the snare rim and cymbal. While playing this drum I interspersed single strikes, a double at 3:15 and a triple strike at 3:22 on the trigger pad before lifting it off the snare and replacing it on the Chinese drum at 3:37. Again, the act of lifting caused a delay rate change. From 3:37 until 5:07 I made twenty-three delay rate changes using sticks, tympani beater and fingertips before bowing the cymbal at 5:08. I regretted my choice of a riveted, sizzle cymbal as the sustaining sizzle dominated the sound and the installed rivets prevented it from vibrating effectively when bowed. My choice of a small bow which did not exert enough pressure to fully excite the cymbal contributed to the underwhelming output.

I followed the bowing with repeated strikes of the bow tip to activate delay-rate changes on the pad before taking up a single stick at 6:00 and making a minimum of eleven rate changes before playing a five-stroke roll and an accented roll between 6:53 and 6:56. Following this my playing became more enlivened with repeated delay rate changes played until a roll at 7:20 and

repositioning of the pad to the snare drum at 7:22. Between 7:25 and 8:19 my overenthusiasm got the better of me and I played the pad as if it was the snare drum, with many strikes and accented rolls and followed this with repeated strikes at approximate two-second intervals until I lowered the volume of the patch to inaudibility at 9:36. This was prior to my adoption of a separate laptop controller or volume pedal so that I had to physically turn to control the laptop manually. Awkward, time-consuming operations such as this hastened my need to find effective ways of controlling switching and volume variance without having to break away from playing activity. This led directly to my later adoption of a volume pedal and a laptop controller. The remaining section until the end at 9:48 is entirely acoustic.

**V.4 Solo Stavanger Bjergsted 12:31** Rec. 2014 Bjergsted campus, Univ. Stavanger

This is an unedited video of an improvised piece played in a practice room at Stavanger School of Music and Dance, UiS, Norway in 2014. The room had no acoustic treatment and it had been constructed as an office. Its acoustic characteristics were that it was too reverberant and not ideally suited to playing percussion instruments. It was also not soundproof and external sounds could occasionally be heard. It was, however, given to me to use as a work-space for a period of six months, as I received an Yggdrasil research bursary from the University of Stavanger (January to June 2014).

This video demonstrates the sequence of events that I use to interact with a Max patch that was originally devised by myself and Chris O'Connor at The School of Music, University of Leeds. The first version of this patch was called *Max Wants To Play Drums (MWTPD).* It had a sample/playback facility and it was designed to randomise the sampled material during playback. I worked with a Norwegian colleague, Dag Egil Njaa, who modified the patch by adding a second sampler/playback facility. This allows me to play either or both channels simultaneously or to sample on one while playing back the other channel. In practice I exploit all available options, including muting the playback completely. I refer to this later version as *Stavpatch.*

Due to the unpredictable nature of the patch, it does not lend itself easily to group improvisation settings and, as my original experiments with live electronics were motivated by a desire to access an enlarged sonic palette for solo performance, this is not a major drawback.

I have selected four sections of activity within the piece:

1. 00:02 – 00:36 Sampling ‘raw material’.
2. 00:36 – 02:24 Interact with sample playback with electronic control intervention
3. 02:37 – 07:39 “ “ “ “ without electronic intervention
4. 07:40 – 12:16 “ “ “ “ plus analogue/digital intervention

**Section 1. 00:02 – 00:36**

**Loading ‘raw material’**

This is the preliminary stage of working with the *Stavpatch* and it involves pressing the sample buttons and playing material to be modulated by the patch. I refer to it as ‘raw material’ as I have become familiar with the sounds that work best for playback and this is the prime consideration while making musical decisions for this process.

00:02 – 00:26 Load Sampler #1. I played a sparse selection of staccato strikes on small cymbals placed on snare drum (snares off), tom-tom, single-headed Traps drum and woodblocks. Repeated strokes on a woodblock, rubbing on another woodblock and a single strike on a Zilbel. This is the first sustaining, pitched sound. Further terse tom-tom strokes are followed by a struck bell plate; the second sustaining, pitched sound, which I allowed to decay naturally. Silence is an integral part of the sampling process and its inclusion within these first expressions is deliberate and considered. 00:26 – 00:36 Load Sampler #2. The material played is limited to an almost mechanical motif played between woodblocks and muted metal on snare drum (snares off). Clear strikes with unambiguous attacks being chosen for this sampler.

**Section 2. 00:36 – 02:24**

**Consolidation**

The playback buttons are pressed causing both sampling channels to play. I am playing and interacting with both channels and with the use of the volume pedal to swell and fade them as I select and modify the ongoing development. Use of the volume pedal during this section adds an additional element of chance to the music. By swelling and fading the samples in this way, I only have an approximate idea of what the samples will be playing and the contrast between the modulated sustaining bell sounds and the staccato output increases the degree of unpredictability.

At 01:13 I depressed the volume pedal and the resulting sound is a momentary faint hiss, thus demonstrating that the sampled output played could be between sounds. The hiss suggests a missing sound that implies an absence in a way that silence does not. At 01:16 the bell plate is struck which resonates and blends into the swelled sustain bell sounds on the sample. This lasts until a cymbal scrape (high-pitched squeal) at 01:27; adding punctuation to the narrative. This is followed by activity on both sampled and real woodblocks and temple block. An example of sampled output stimulating an imitative response occurs at 01:30 when I play a single stroke roll on a temple block which imitates the sound which preceded it on the sample (a pitch raised woodblock roll at 01:28). From 01:39 to 01:45 a phrase is played on the kit (with snares on) that is an almost conventional exchange between instruments. In this instance the phrases are traded (in the jazz sense) between the kit and the samplers which are swelled to audibility with the volume pedal. The rhythmic placement of the swelled samples being integral to the character of the ongoing exchange between samplers and drummer.

A spirited pitch-raised burst from the samplers is met with a sustained one-handed roll played on the Chinese drum from 02:02 until it is abruptly curtailed at 02:16 with a single strike to the single-headed Traps drum. The pitch of the Chinese drum is modulated throughout the roll by exerting pressure on the (animal skin) head with the butt of the non-playing drum stick. Motifs such as this gain inspiration from Peking Opera (Jīngjù) and Japanese Kabuki. The abrupt stop at the end of this phrase particularly owes a debt to these traditions. As does the following single stroke roll on the tom-tom followed by another abrupt stop on unison temple block and snare drum from 02:20 – 02:23. A rapid, staccato pitch-raised woodblock on the sample adds to the texture at this point. There is a final swell on the volume pedal at 02:28, which foregrounds a sampled scraped woodblock, followed by a brief snare drum roll before switching off the snare wires at 02:34, while a pitch-lowered woodblock phrase is heard from the sampler. This is the end of the second, transitional section of the piece.

**Section 3. 02:37 – 07:39**

**Interaction**

The movement of my left foot from the volume pedal to the hi-hat pedal at 02:37 signals the start of the third section. This longer section is a period of interaction between acoustic playing and the playback from the samples without any use of the electronic controls. I had decided at this

point that the samplers were giving me a stimulating and varied degree of material to improvise with and to engage with *Stavpatch* as I might a human player. After an insistent galloping rhythm from 02:37 – 02:44 the samplers begin to play a sequence of slowly modulating sustained bell pitches, effectively giving a melodic thread and structural armature in which to develop the improvisation. These sustained pitches continue with occasional pauses until the end of the piece.

All volume swells and fades during this section are controlled by the *Stavpatch*. The samples vary from repetitive, rhythmic sections, such as from 04:35 – 04:40, which has a machine-like quality, to a taut, repeated, almost-clavé sound at 04:43 – 04:48 that nudges me into reacting rhythmically. The playback of pitch-altered wood/temple blocks at 05:01 – 05:15 suggests a clockwork machine. There are instances of imitation and call and response, such as the sampled woodblock at 06:29 – 06:31 being met with a woodblock reply at 06:32 – 06:34 and the snare drum (snares off) reaction to the woodblock playback at 06:39 – 06:43. At 07:12 – 07:19 'The stapler' makes an appearance in the background. This is a tight, mechanical sample of percussion that evokes the sound of a heavy-duty, mechanical stapler being used. This has occurred on at least one other occasion (Audio file 15. *Stapler*) and my ears are immediately drawn to it, as it is so evocative and suggestive of its namesake.

My way of playing during this section is to exploit the silences between the samples, accompany and sometimes imitate the playback and often play in a manner that could be said to react to or answer the declarations of the samples. Here I am improvising with the computer as one might with a fellow human improviser. The programme does not have complete agency, as it relies on my initial input and is limited to a playback role – it cannot react to my playing. However, by making it as unpredictable as we could at the design stage, it continually presents a challenge, although I am sometimes reminded of Dr Frankenstein's monster when considering working with the *Stavpatch* or its progenitor *MWTPD*.

**Section 4. 07:40 – 12:16**

**Analogue electronics and conclusion**

This final section starts with switching between samples and triggering the ring modulator and echo machine from 07:40 – 07:45. These analogue effects are connected in series to the output of the *Stavpatch* which continues to play the sustaining bell sounds that were first heard from 02:44.

From 07:47 – 07:49 a downward pitch glissando followed by an immediate upward sweep is controlled on the echo machine. The ring modulator is then adjusted to a square wave setting and the pitch is modulated further on the same device. The sustaining bell sample continues throughout, but its texture is denser than in the previous section as it is treated by the ring modulator. There are two playbacks running simultaneously – one with the sustaining, melodic motif and the second with stark, percussive interjections.

At 09:22 I lick a finger to rub on the head of the high tom-tom - the resultant friction should elicit a pitch from the drum, but no sound is heard. I do not repeat the attempt, but continue playing conventionally, albeit in an open rhythmically-fragmented manner. The steady, melodic motif now sounds more like 'space age' or science fiction electronic music and I trigger a dramatic upward/downward pitch-change on the ring modulator at 09:37 – 09:39. The sampled woodblocks are, by now, barely recognisable as such and the whole playback has taken on a sci-fi character.

At 09:57 – 10:02 a mechanical sound plays. There are many such moments that evoke mental images of clockwork and other mechanical devices in operation. Another instance occurs at 11:32. I treat the mechanical sound as a spur to join in momentarily with a fractured, mechanistic, rhythm. As these sounds are now going through the ring modulator, the character of the imagined machinery has taken on a more alien character. After a pitch adjustment on ring modulator at 10:36 the penultimate drumming exposition begins and carries on until 11:14. This includes abstract playing on different surfaces and pressure-induced pitch changes to the high tom, the Traps tom and the Chinese tom. At 10:55 a sampled, rapid roll on a hard surface – possibly a drum rim or a woodblock, it is difficult to distinguish in this case, could almost be a short burst on a duck call.

The drumming ends at 11:14 followed by an upward pitch glissando on ring modulator with an immediate slight downward adjustment at 11:17 – 11:20. A final reiteration of drumming occurs from 11:22 – 11:44 ending, as before, with another ring modulated glissando – this time harsher in tone which signals the imminent conclusion of the piece. The final seconds are played by the samples, except for a light strike on a cymbal edge at 12:00 and a faint brush of the bell plate edge at 12:15. The piece ends with the decaying sustain of the bell plate and a simultaneous fade on the volume pedal.

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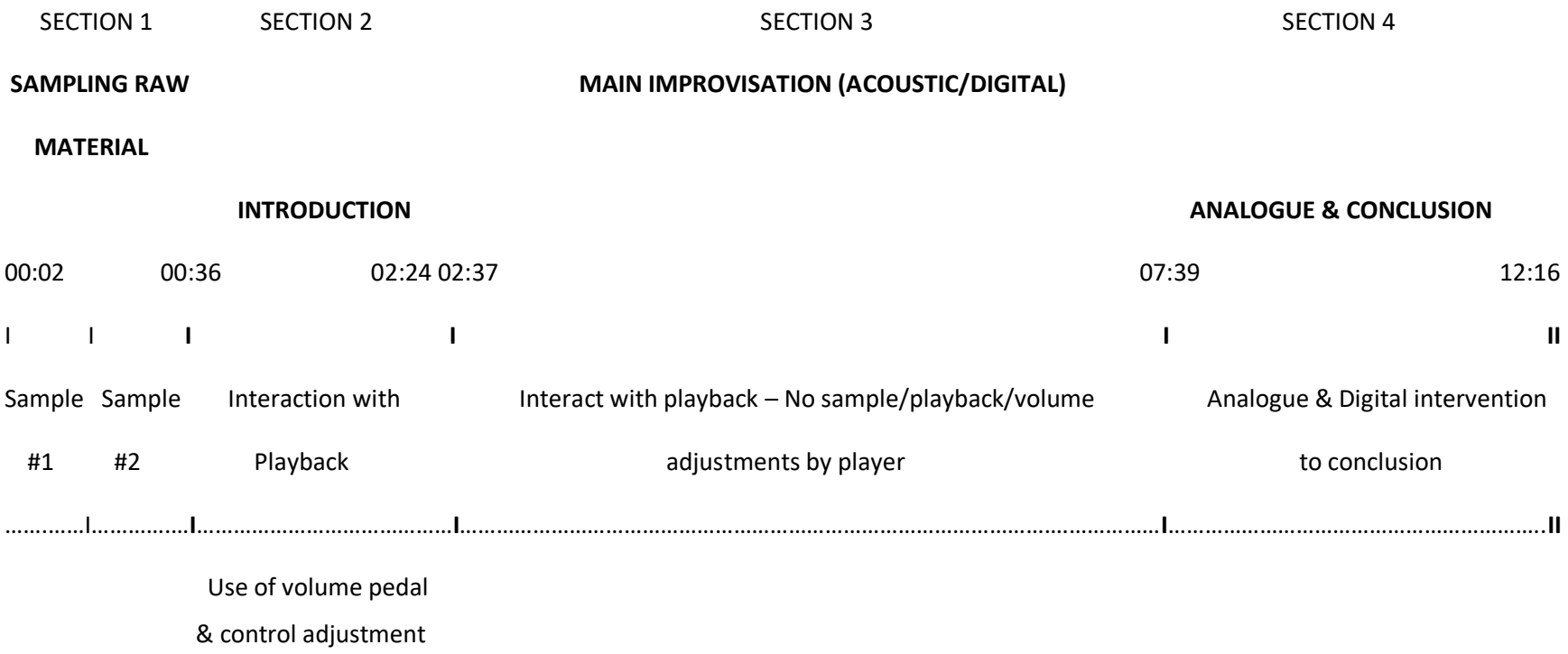
From the start of my working with the two Max patches: *MWTPD* and *Stavpatch*, I established a sequence that often begins with the 'loading of the raw material' into the sampler(s). This has become an almost unconscious preliminary ritual that I considered an essential part of playing with these patches. I have experimented with pre-loading the material as a separate act, prior to commencing playing and I continue to adjust and sample during actual playing, but as a working method, the initial sampling gives the most stimulating results.

This is due to my familiarity with the patch's behaviour and with my knowledge of which sounds give the most satisfying results on playback. As the *Stavpatch* has two samplers that can play/record simultaneously and/or independently I can give each channel contrasting sounds to deal with and this is born in mind during the playing process. As I am playing the 'raw material' I am considering its spatial placement, the use of silence, timbre and attack but I am not in an actual playing mode. I would not normally play as I do during these 'loading' stages. This is a curious condition: to be playing music in an unmusical way for a computer to modulate for playback. I have questioned whether the 'loading' stage is even an actual part of the music. It occurred to me that perhaps it is music, but not music as I have come to understand it.

The piece is improvised and unplanned except for this preparatory ritual. It could be argued that it is a composition and that my continued work with the patches are variations on the same piece. That is broadly the case, but the detail and the character of each piece could not be pre-planned. The piece has so many minute cells of activity (moments) within the continuum and much of the most interesting action takes place spontaneously as I imitate, coincide with or play around suggested melodic or rhythmic motifs that are created by *Stavpatch*. While I use the volume pedal to swell and mute the playback I am allowing chance to decide the resultant outcome. Again, I can predict its behaviour to a certain degree, but as randomness was its *raison d'etre* this can only ever be approximate.

Figure 19. Video Solo Stavanger 12:31 Analysis



**V.5 Duo w. Dag Egil Njaa - *Rehearsal* 7:06** Rec 2014 at Tou Scene, Stavanger, Norway

Although described here as a 'rehearsal', this is really a run-through to check that the technology is working prior to the performance in the evening. For much of this recording it is apparent that I am improvising directly with Dag Egil using the percussion acoustically – as I would with a conventional playing partner. The unusual element is that the origin of the sounds that he manipulates can often be heard being transformed, such as my strike of the Zilbel at 02:57 which is immediately modulated and replayed reminding me of an ice cream van's metallic chimes. I had access to the *Stavpatch* at this point through the LPD8 controller, which is visible on the right of the image and to my left of the hi-hat. The analogue effects and volume pedal were also connected out of camera shot.

These duos involve both myself and Njaa playing the *Stavpatch* using my percussion as the raw material. The guitar functions as a controller; to modulate the patch. It is fitted with two movement sensors: a Wii gyro and an iPhone and all sounds originate from the percussion. Njaa described the technology thus:

> It was all about sampling you, so my only source for sound was from your single overhead microphone. All done in Max. The buffers were constantly cleared and refilled using pedals (via Arduino, so that I could connect several expression pedals without hooking up midi interfaces). The samplers used two different techniques for playback: segmentation based on transients, i.e. wrapping a loop around a single beat, and playing that loop back in different ways (reverse, speeding up/down/scratching, etc) [and] a granular scrub method that allows me to scrub through the recording at different speeds, event stopping (freezing). The playbacks were controlled by string plucking and a Wii gyro placed on the neck of the guitar, so that plucking a string in a certain neck position would play what I intended. Also, the guitar gain envelope controlled the samplers' output gain. In the end, a bunch of effects were added: a spectral delay, a ring modulation and a stutter were all in there, again using the Wii gyro and string plucking to control. I also had the option to control scrubbing in the samplers with the built-in camera on my computer. Also, I could change different settings (playback/control modes) with some of the Wii buttons.[72]

This duo is deceptively radical in that what appears to be a guitar/percussion duo is in fact an extension of my use of randomising software to include an additional participant (Njaa) running a second copy of *Stavpatch* simultaneously to my own, which he controls with an

[72] Dag Egil Njaa email correspondence to the author 2014 reprinted with his permission

electric guitar. None of the sounds originate from the guitar and it functions purely as a control interface for the Max patch.

**V.6 Duo w. Dag Egil Njaa - *Concert* 13:18** Rec 2014 at Tou Scene, Stavanger, Norway

During this concert I once again concentrated mainly on interacting acoustically with Dag Egil and I alternate between playing with sticks and brushes until I dispensed with both at 07:13 to play with my hands and fingers on the drum heads. I recognised my playing being transformed throughout and frequently played approximate matching patterns such as the staccato patterns at 2:00 and the recurring beats from 2:38. At 7:36 I can be seen using the LPD8 fleetingly and my *Stavpatch* is heard playing intermittent staccato sections controlled by the (out of camera shot) volume pedal.

At 11:48 I stopped playing percussion and remained silent until swelling the *Stavpatch* to audibility at 12:12 with the volume pedal and playing it with Dag Egil until the ending at 13:16. It is a curious aspect of this set-up that some of the playing activity, specifically controlling the patch playback with the volume pedal, is not apparent without a full body view and although it may appear that I am not 'playing' from 11:48 onwards. In fact, I was fully engaged with the activity using only my left foot in this final section.

**Summary of interactions between myself and electronics**

- Loading of 'raw material' – initial playing specifically intended for sampling (see V.4 Solo Stavanger, p. 85)
- Exploration of isolated parts of the kit (inspired by Western art music 'multi percussion'), for example, playing metals very sparingly to give greater impact (1. *Depth of Field*, 5. *Practice Pad*)
- Playing unfolding passages on individual metals, wood surfaces, drums with electronics to create *Klangfarbenmelodie* (13. *Gong Drone*)
- Percussion played quietly to give the patch prominence (1. *Depth of Field*) and vice versa (5. *Max wants to play melodically*)
- Use of the volume pedal to swell, fade or silence the electronics. (2. *Breaks*, 18. *The Final Flourish*, V.6 Duo w. Dag Egil Njaa)
- Occasionally taking an accompanying role by, for example, bowing a cymbal (to create a drone) behind a patch 'solo' (3. *Bullfrogs*)
- Use of a staccato rasp to yield dramatic results when sampled and pitch–changed (3. *Bullfrogs*, 18. *The Final Flourish*)
- Terse, unison strikes timed with silences (with volume pedal) to give drama (7. *Ceremonial Industry*, 15. *Stapler*, 22. *La Taaban Karo*)
- Use of bells, cymbals and gongs as sustaining, pitched material for sampling (7. *Ceremonial Industry*, 10. *Belt–driven Drone*, 13. *Gong Drone*)
- Mimesis – mimicry by me of the patch and coincidental instances of the opposite effect (15. *Stapler*, 16. *Truncated Loquacity*)
- Rapid transitions from sampling to playback and interaction (5. *Max wants to play melodically*, 16. *Truncated Loquacity*)
- Use of silences to punctuate the activity (9. *Rindade Insult*, 15. *Stapler*, 16. *Truncated Loquacity*)
- Patch playing alone prior to my subsequent interaction (4. *Practice Pad*, 11. *Intervallic*, 15. *Stapler*)
- Mood changes facilitated by a 'Moment form' approach (3. *Bullfrogs*)

- Use of unconventional, acoustic sound–sources e.g. practice pad (4. *Practice Pad*) and inverted steel shovel (V.2 Huddersfield home studio)
- Repurposing of snare drum as table for ring modulator (V.2) or practice pad (4. *Practice Pad*, V.3 iFIMPaC)
- Vocal utterances – occasional whistles and mouth sounds (5. *Max wants to play melodically*, 14. *Choral*, 15. *Stapler (Melodic Armature)* and *21. Thus Spoke…*)
- Use of patch–created melodic threads as structures around which to build improvisations (4. *Practice Pad*, 5. *Max wants to play melodically* and 15. *Stapler (Melodic Armature)*
- Use of a reduced kit (6. *Nja*, 7. *Ceremonial Industry*)
- Quasi ceremonial approach (7. *Ceremonial Industry*)
- Exploitation of perceived industrial soundscape (7. *Ceremonial Industry*, 10. *Belt–driven Drone*, 15. *Stapler*, 19. *A Game of Two Halves*)
- Use of electronics with little or no acoustic percussion (8. *Homage to F.C. Judd*, 19. *A Game of Two Halves* and 21. *Thus Spoke…*, 23. *Saturation*)
- Potentiometer control of analogue effects for pitch control, flanging, ring modulation and octave division (8. *Homage to F.C. Judd*, 19. *A Game of Two Halves* and 21. *Thus Spoke…*, 23. *Saturation*)
- Use of a hybrid kit with samples (9. *Rindade Insult*, 12. *Balbuzie*, 17. *Oldingi Mash Torting*, 22. *La Taaban Karo*)
- Use of spectral freezing of a cymbal to create a drone (10. *Belt–driven Drone*, 13. *Gong Drone*, 15. *Stapler (Melodic Armature)*
- Use of echo machine as a flanger and for pitch modulation (10. *Belt–driven Drone*, 11. *Intervallic*)
- Rapid alternation and absorption of samples/drumming (11. *Intervallic*)
- In duets with Dag Egil Njaa I interacted with modulated versions of my playing (by Njaa). This was an adaptation of the *Stavpatch* to function with an additional human agent, so that our interactions involved percussion with both players controlling the patch simultaneously. (V.5 & 6 Duos w. Dag Egil Njaa).

# Chapter 5. Conclusions

My analysis of my own recordings is not only highly subjective, it is also intimately informed by my memories and knowledge of the origin of the sounds and the techniques used to create, modulate and intertwine them. Similarly, my listening identifies characteristics that may be opaque to others. Reflecting on both Ferrara's *syntactical listening* and Biddle's précis of Schaeffer's *reduced listening*,[74] then perhaps I am too close to this music to give it a dispassionate analysis. On the other hand, my intimacy with the music means that I am the only listener who can fully elucidate how it was created. This knowledge of the origins of the sounds is unique to me as the creator, but my own belief in the value of this music is put to the test when others hear it. The intention is for the listener to find the connections within the pieces that I consider to be apparent and which, I hope, express an internal logic. The instruments and technology are ultimately irrelevant; my hope is for the music to transcend these origins to connect directly to the listener. Ansuman Biswas, who takes a holistic approach to both life and music-making states that:

> Unlike an abstract, theoretical pursuit…both music and meditation afford techniques for moving beyond mere analysis to social agency. We might posit that all music makes audible the mind of its creator, whether or not that is the conscious intention […] Of all musical forms […] improvisation seems particularly suited for opening up awareness to the dynamic, irrational, embodied mind.[75]

Biswas' statement underscores my own belief in the centrality of improvisation in these works. My encounters with the various technologies were open-ended and unpremeditated. In all cases the music was defined by the affordances peculiar to each of my encounters with the technologies. The electronic technology which has had the most radical effect on my playing has been the digital software Max MSP, accessed using a laptop computer and a digital-to-analogue converter. In using this technology I have been able to move beyond sound modulation to interacting with a programme of my devising which goes some way towards becoming a surrogate playing partner. Psychologically, with this technology I am moving beyond strictly

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[74] Ferrara, *'Phenomenology as a Tool for Musical Analysis'*, p. 359. and Biddle, in *Music and Consciousness*, p. 70.
[75] Biswas, in *Music and Consciousness*, 2011, pp. 108-109.

playing solo into having a relationship with the software 'player' that is closer to improvising with another human being. Studying and considering the implications of this has made the implications of artificial intelligence cogent and the concept of agency relevant to my work with the computer 'improviser'. The possibilities for solo improvising are now greater and the work has implications that go beyond my previous concerns: am I still playing solo? Is it now a duet? Does it matter? In what way has the music changed from being purely acoustic? Issues such as these are now at the forefront of my thinking and working with the electronics has had an unforeseen benefit in that it has made me re-examine my acoustic work and hear it afresh.

At times throughout this study I took an almost quasi-scientific approach to experimenting with different variables: soft sounds, sustaining sounds, terse, staccato sounds, multi-layered approaches, borrowing techniques from 'contemporary classical' music and considering a compositional or pre-planned element to the music. I questioned my belief in free improvisation and almost renounced it at one point. At times, I felt almost like being an adherent to a religion undergoing a crisis of conscience. This may sound like the ramblings of an obsessive, but my confidence and belief in the value of improvisation came close to collapse as I considered the use of composition and its implications. I am aware that composition is as natural as breathing to some musicians, indeed it is often taken to be the only way to approach making music – that there must be an intermediary stage of planning prior to actual playing/performing. This approach means imposing one's will on the material and what will happen when the music starts. If that imagination is inventive and visionary the outcome can be excellent, but too much music falls short and my belief in free improvisation has been reinvigorated by my realisation that the opposite approach: letting the music unfold in real time and the player(s), by being sensitive to the possibilities, the moment and the acoustics of the playing environment and each other (in collective playing) and by making instantaneous decisions during the *flow* of the activity; the outcome can be music rich in subtlety, with an architecture that could not have been imagined by pre-planning.

This is a radical body of work and it is untypical of most percussion music, whether created using purely acoustic means or with varying degrees of electronic input, as there is an almost complete absence of metrical pulse and the ongoing improvisations do not follow a regular, rhythmic compass. While considering the solo/duo question, I am inclined towards a third possible classification that acknowledges the deep integration of the Max patch within my

playing, so that it is not heard as a separate entity. My relationship with the patch is developed so that I can exploit all possible outcomes, as outlined in the Summary of Interactions (p. 94) and I deliberately leave room within the improvisations to play fully acoustically to maximise the impact of the electronics when they are subsequently heard and to lay bare the 'raw material' that the patch goes on to sample and modulate. My discrete use of limited parts of the kit, such as metals, wood or membranes alone reveals a concern for timbral detail, the integrated use of same to play *klangfarbenmelodie* and the use of potentiometers to fully explore spectral detail and fine pitch control, along with the other interactions and approaches outlined above, presents a strong case that these works are musically sophisticated and easily fulfil Young's classification of an 'unimagined music'[76] and therefore constitute a valuable contribution to knowledge.

The periods of activity from which the works are drawn, particularly the Huddersfield sessions from 2013 and the Stavanger sessions from 2014, were intense, protracted daily work-outs which tested my abilities to the limit. I had to let considerable time elapse before I could listen analytically to these recordings and the passing of time reinforces the unique characteristics of these intense sessions. The recordings are unique and completely tied to their time and place of creation. They are all free improvisations. My modus operandi was to enter the studio, press record and engage with the technology at hand. The playing thus became a journey of exploration.

[76] Young, *'NN Music: Improvising with a 'Living' Computer'*, 2007.

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