Queensland Conservatorium Griffith University

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Exploring the use of laptop-based sound technology to enhance percussion performance

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Abstract

The combination of percussion and electronic sound provides new possibilities, growing with ever changing and advancing technological capabilities of human interfaces with computers. The purpose of the research is to broaden my performance capability using digital sound technology. My knowledge and experience of this technology will be expanded through preparing works that incorporate it within live performance. This research aims to provide useful insights to other percussionists seeking to develop their abilities through approaching and performing works for percussion and electronics.

Statement of Originality

This work has not previously been submitted for a degree or diploma in any university. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made in the thesis itself.

Date...

Acknowledgements

I wish to thank my Principal Supervisor, Vanessa Tomlinson, for her imagination, support, and patience in seeing my research through to fruition. I also would like to thank Dr. Stephen Emmerson for supporting my project from the start, and his help in pushing me forward even when things felt like they were impossible. Peter Neville has been of extraordinary support as my principal percussion teacher throughout the duration of this study, and throughout my three years studying performance at the Australian National Academy of Music (ANAM). I am extremely grateful to all the staff at ANAM and in particular I would like to thank Alistair McLean for his technical support and wizardry even with the most complicated technical requirements in my recitals. Finally, I would like to thank my parents, for supporting my music making from the very start.

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1 Introduction

The interaction between percussion and electronic sound continually provides a catalyst for new sonic possibilities, growing with ever changing and advancing technological capabilities of human interfaces with computers. The accessibility to powerful computer software and hardware allows an increasing number of compositions incorporating electronics to be prepared and performed by individuals, with a minimal need for the support of a dedicated sound technician.

The purpose of this research project is to improve my percussion performance capability using laptop-based sound technology. Working with this technology will expand my knowledge and experience through incorporating different software into my performance practice. The outcome – an analysis examining performance issues arising from this expanded practice - will provide useful insights for other percussionists seeking to develop their ability to work with technology to approach these compositions, as well as other similar pieces. In addition, interviews with the composers of some of these works will give perspective on sonic exploration from the creator's perspectives.

The research presented here explores the following research questions:

> **Primary Research Question:** What personal, technological, practical, and musical challenges arise for a percussionist while extending their instrumental practice through learning to work with interactive laptop-based digital technologies?
>
> **Secondary Research Question:**
>
> What sort of insights may be offered through interviews with composers to overcome these challenges?

This thesis consists of two parts. The first is this exegesis that will explore the literature surrounding the topic, alongside four case studies that analyze the compositions in line with the research questions. The second part of the thesis is an accompanying DVD containing video footage of the case study performances. The thesis contains chapters that detail each case study. The first chapter includes research methods employed

throughout the thesis, and a literature review. The second chapter accompanies the performance of *Open End* (2007) by Ben Hackbarth. The third chapter supports the performance of *Lyrebird* (2014) by Lindsay Vickery. Chapter four accompanies a marimba arrangement of Steve Reich's *Electric Counterpoint* (1987), and the fifth chapter addresses the performance of *The Boom and the Bap* (2008) by Matthew Fairclough. It is recommended that the works in question are viewed on the accompanying DVD before reading these chapters.

All of these performances took place while I was a Professional Performance Program student at the Australian National Academy of Music (ANAM), and were recorded in the main performance hall at this location.

1.1 Research Methods

This research project focuses on the preparation, performance and recording of four works for electronics and solo percussion. In this context these four compositions are used as case studies to explore difference facets of laptop-based compositional material. For this study, 'Laptop based sound technology' can be defined as the use of software on a laptop that outputs sound as part of a live performance with the percussionist.

These four works were chosen because they provided contrasting opportunities to explore distinct interactions between software[1] and hardware[2], as well as each work being unique in its instrumentation. Performances of the works were audio-visually recorded across two recitals in 2015, and a repeat performance of *Open End* was recorded on May 26th, 2016.

The first recital on June 4th 2015 included *Open End*, a work for vibraphone and multi-channel electronics by Ben Hackbarth. Preparing this work required focus on combining software and hardware to control a progression of spatialized[3] sounds while performing on the vibraphone.

Lyrebird, a laptop-based sonographic[4] score devised by Lindsay Vickery was realized through the interpretation of the scrolling graphic score using Max Runtime[5]. It required the capture of a field recording, and improvisation with a combination of sounds, including sounds referenced to or found at the location of the field recording.

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[1] Software refers to the computer programs installed on a laptop to instruct sound events

[2] Hardware in this case refers to objects that are plugged into computers to convert analogue information into a digital format that can trigger an event, or be modified and played back from a laptop using the software patch specific to that piece.

[3] Spatialized sound is also known as panning, and involves the movement of sound between different speakers. This movement is automated using digital software and converted to multiple analogue signals to be redirected to multiple output channels to create the desired effect within an acoustic space.

[4] A sonographic score is the result of the conversion of a sound file into a visualized graphic form.

[5] Max Runtime is a version of Miller Puckette's Max for live software, in this case used to run patches from composers containing audio and/or visual information to be used in live performance.

The second recital on October 29th included *The Boom and the Bap*, a composition for drumset and live signal processing in Max. Contact microphones were affixed to different parts of the drumset, and the Max patch[6] shifted through cue states that altered the type of signal processing occurring at different times throughout the piece.

Electric Counterpoint (1987) by Steve Reich involved the creation of a self-recorded backing track with which a live solo part could be performed. This required laptop-based recording software Logic Pro X[7], two condenser microphones, as well as basic mixing and mastering skills to overlay up to 19 tracks.

Interviews were conducted with the composers of three out of the four works. These interviews provided a wealth of support material to further expand my understanding of the compositional process, and learn about each composer's approach to working with electronics. Ethical clearance was gained prior to the interviews under Griffith University research number 2015/842.

I wrote a personal journal outlining and reflecting on issues that were encountered during the preparation of the case studies. Extracts from the interviews and journals are cited throughout the thesis body.

[6] A Max patch is a way of loading objects together in Max to automate sound or video material. In the case of this research, patches were sent from composers, and the patches contained information to organize, process, and trigger sound information for their individual compositions.
[7] Logic Pro X is a computer software program used for digital audio recording.

Synthesising my performance skills with the methodology of action research allowed me to conduct in-depth explorations into specific interactive relationships between the percussionist, laptop music software, personal reflections from interactions with the composers of the works, and the compositions themselves. In *Ethnography, phenomenology and action research in music education,* Bresler (1995) pertinently describes action research as:

> Action research is based on the close interaction between *practice, theory, and change*. The objects of action research - the things that action researchers study and aim to improve - are their own educational practices, their understanding of these practices and the institutions in which they operate (pp. 10-11).

Autoethnography was a valuable methodology in providing insight in to the process of interpretation through the self-examination of the process of working towards performances with electronics. The personal dimension of this approach characterized the reflections in my practice, using my unique voice. Gergen & Gergen (2002) elaborate on this autoethnographic approach in *Ethnographically speaking: Autoethnography, literature, and aesthetics*:

> Autoethnography represents a significant expansion in both ethnographic form and relational potential. In using oneself as an ethnographic exemplar, the researcher is freed from the traditional conventions of writing. One's unique voicing – complete with colloquialisms, reverberations from multiple relationships and emotional expressiveness – is honoured. In this way the reader gains a sense of the writer as a full human being (p. 14).

Much in the way Gergen & Gergen describe, this methodology provides a direct 'line of sight' to a reader of the exegesis, who will identify with a performer's human perspective on grasping a perhaps unfamiliar and daunting practice.

Furthermore, autoethnography can reveal many facets of a performance preparation, as described by Holman Jones, S., Adams, T. and Ellis, C., (2013):

> Artists often find themselves in the midst of performances or creative moments...and face the challenging task of understanding and communicating the

> personal, creative, embodied, and cultural processes at play in such an experience (p. 43).

I have critically examined findings against other knowledge, while keeping the previously mentioned personal journal of the preparation process. Through this examination and documentation, it has become possible to better understand the numerous personal, technological, practical and musical challenges of working with laptop-based sound technology.

1.2 Literature Review

Since the turn of the century, percussionists and composers have contributed to numerous literary sources, greatly increasing the body of work available to performers looking to enhance their practice through the incorporation of digital sound technology. This is also true of the compositions that explore computer-based percussion performance practice. This literature consists of books, commissions, videos, and theses published in the field of percussion. My research aims to build on the knowledge contained within the literature, from the position of a soloist overcoming personal, technological, musical and practical challenges.

Steven Schick (2006) refers to percussion and electronics in his landmark book, *The Percussionist's Art : Same Bed, Different Dreams:*

> Creating a more flexible interface between electronics and performers through real-time music technology allows the electronic part to "listen to" and engage with the live performer as a real duo partner (p. 72).

The ideology proposed by Schick provides impetus for my research, and for the progression towards interactive and meaningful relationships between performers and laptop based electronics.

Alexander Wier (2015) has published a Doctor of Musical Arts thesis titled *Performer and Electronic-Activated Acoustics: Three New Works for Solo Percussion and Live Electronics.* Wier's research uses the commission of three new pieces to explore and highlight new techniques for solo percussion. *Hysteresis*, one of three commissions from Wier's research, uses Puredata[8] and a speaker placed beneath the vibraphone to create microtonal interactions between acoustic and electronic sound, in an identical configuration to the speaker setup and software used in *Open End*, a composition I explore as a case study.

[8] Puredata is a visual programming language for creating interactive computer music and multimedia works. It works in a similar way to Max, running patches that organise sound events to be triggered through interfaces by performers.

In the thesis *Digitally processed music creation*, Han (2011) investigates digitally processed compositional approaches through an examination of the process and effects of using computer software. His methodology includes interviews with six musicians who integrated digital technology into their compositions. Similar elements used in my research mirror Han's research methods, with a focus on interviews with performers instead of composers.

Hansen (2014) has conducted extensive research into solo percussion and electronics work, in a Doctoral dissertation entitled *An Introduction to Interactive Music for Percussion and Computers.* Hansen's research centres around three performances of interactive percussion works. The specific role of the laptop is identified in the context of each of Hansen's works as a performer, conductor, and composer:

> Interactive music systems require performers and computers to adopt unique, often shifting roles. Cort Lippe defines these roles, "The computer can be given the role of instrument, performer, conductor, and/or composer... A performer is already a performer, and already plays an instrument; therefore, a composer can assign the role of conductor and composer to a performer." The computer as "instrument" can involve software instruments or signal processing. The computer as a "performer" encompasses sound production through playback of fixed media or computer-generated sounds. When algorithmic composition is applied the computer may be a "composer," and when the computer triggers or cues specific events it may "conduct." The human performer can "conduct" by triggering events using some sort of physical interface such as a MIDI keyboard, computer keyboard or a pedal (p. 18).

The role of the laptop in each of the four compositions is elaborated on in detail through each of the four case studies in the forthcoming chapters of my thesis.

Exploring performative interactions between electronics and acoustic instruments is not solely the domain of the percussionist. Jean Penny is a flautist whose practice explores how integrating electronic technology into concerts can affect the performer. She has published a Doctorate of Musical Arts thesis entitled *The Extended Flautist* (2009) that details her findings. Her use of case-study interpretations of compositions provides deep

insight into how a performer integrates working with technology into their performance, and is directly related to my findings when discussing Hackbarth's *Open End* in chapter 2.5.

Yoder (2010) explores the performance practice of interactive compositions for clarinet and computer, since the development of interactive music software in the 1980s:

> Performance practice commonly refers to interpretation of a written score, but the technology involved in interactive music requires a broader definition of performance practice; one that also addresses computer software, coordination between the performer and computer system, and technology such as microphones and pedals (p. 3).

Similarly to the processes of Yoder, the pieces selected for my research address the trichotomy of performer, computer, and their connecting interfaces.

Large-scale performance projects have also been the site for research around percussion and electronics. *Audiotechnics: Composing for Percussion and Electronics* (2014) is the title of British composer Matthew Fairclough's compositions of new works for percussion and electronics. The aim of these compositions is to provide performers with new skills and enhance their profiles as performers of works with electronics, as well as engaging and educating a broader audience to the genre. Fairclough's research has resulted in several new works, including *The Boom and the Bap* (2008), a piece that is explored in more detail as a case study in chapter five of this thesis. Fairclough is the sound designer in the collaborative multimedia trio 'Powerplant', with percussionist Joby Burgess, and visual artist Kathy Hinde. Burgess is an active advocate for the commission and performance of works for electronics and percussion, and his working relationship with Fairclough provided a platform for the creative process behind *The Boom and the Bap*.

Vanessa Tomlinson's *8 Hits* concert presented in November 2014 featured performances of eight new Australian works for percussion and electronics (Tomlinson, 2015). Tomlinson is at the forefront of Australian contemporary percussion music, and specifically used this project to premiere new Australian works, including one of her own compositions. To

preserve this work beyond its broadcast, the concert was video-recorded and is accessible on Vimeo as a valuable audio-visual resource. Of particular interest to my project are the works from *8 Hits* that explore percussive approaches through the use of technology, *Make Them Dance* (Knight, 2014), *Semantics of Redaction* (Vickery, 2014) and *Lyrebird* (Vickery, 2013). Examining the *8 Hits* website allowed me to discover these composers, including Lindsay Vickery and his work *Lyrebird*, which I chose to prepare and perform as a case study.

My interest in working with laptop-based electronics was inspired by Svet Stoyanov's professionally released multi-track recording of Steve Reich's *Electric Counterpoint* arranged for marimbas and vibraphones (Stoyanov, 2008). Further research revealed that Louise Devenish has performed her own version of Reich's score (Devenish, 2012) and Kuniko Kato from Japan has also multi-tracked a version for a broader variety of percussion instruments, including steel-pan drums (Kato, 2011).

My aim is to add to the sources acknowledged through this literature review, through the process of examining the compositional and performative aspects of four works for solo percussion and laptop based sound technology. This research does not aim to provide intricate detail about the programming or inner workings of software and hardware; instead the holistic process of rehearsing and performing each piece provides the depth of the study. Working on a varied and challenging repertoire for this project will unpack specific solutions based on my resources, and it is my hope that reading about these challenges can provide pertinant information for others to explore this exciting and ever-evolving repertoire base. My approach to four unique compositions in a case study format provides a contrasting perspective to prior research by examining existing repertoire, instead of commissions, through a personal lens.

2 Ben Hackbarth – *Open End* (2007)

2.1 Background

Open End is a composition for Vibraphone and Multi-channel electronics by British composer Ben Hackbarth. The composer used *Puredata* to program a software patch for use in a live performance. The patch enables the performer to control the progression of sonic events as the piece is being performed, and manipulate output levels to the headphone click-track and multiple-channel surround speakers.

An interview with Hackbarth on the 24th of November 2015 revealed valuable information about *Open End's* compositional process. Hackbarth worked with several percussionists on the development of *Open End* while undertaking graduate studies at the University of San Diego (UCSD). During this interview, Hackbarth referred specifically to Greg Stuart, a percussionist whose practice focuses on experimental music, electronics and improvisation (Stuart, 2016). Although I was unable to source Stuart's recording as a reference during my preparation for performance, I referred to his colleague Brian Archinal's video recording of *Open End* (2010). Hackbarth collaborated with Stuart while the two artists were graduate students at the University of California San Diego, and *Open End* was the resulting composition. Hackbarth elaborated on Stuart's influence on the composition of *Open End*:

> …so it came out of working with him, and working with a percussionist who's really interested in sounds, in a way that I think a lot of musicians aren't, you know, interested in the phenomenology of sounds, interested in simple things about timbre and colour and contrast, which are not necessarily part of the normal contemporary music pitch-based way of thinking… (Excerpt from interview transcript, Hackbarth 2015).

Hackbarth understands the challenges for the performer in realising his compositions.

> …these things are always a balance of trying to make sure your pieces are playable, because they're not too hard to put on, not too hard to figure out, and also trying to make your pieces flexible so that they do what you want…(Ibid.).

Simplicity and clarity in the software and hardware design also help further performances by performers around the globe, as Hackbarth reveals:

> In general if you keep the technology relatively simple they're pretty easy to mount, they're pretty easy to put on. Part of the reason I use this kind of simple synthesis things, where I'm playing back sound files, and there's click tracks sometimes not other time is because there's are a couple of moments where I want really precise coordination, and there's moments where it can be freer, and it's kind of a simple solution, that has a simple elegance to it that isn't technically that savvy. (Ibid.).

2.2 The interaction between computer and performer

The phenomenological expression of sound is at the core of the composer's conception of *Open End*. The first gesture, a single F# note struck with a mallet[9], is unsettled by the electronics. Acoustic beating[10] is created between the frequencies of the bar, and the playback of a pre-recorded sine tone fractionally adjusted to be out of phase with the vibraphone's pitch. From this simple interaction stems an increasingly complex sequence of sonic events. The electronics ghost the vibraphone, adding faint swelling to the pitches played by the performer, again slightly out of phase with its pitch, developing the initial F# beating motive. Pre-recorded sounds are sent more frequently to the four surround sound channels, and move between the speakers in a circular motion to create a circular effect around the audience.

The exploration of pitch and texture becomes increasingly more complex. Single vibraphone notes are added to with grace notes before and after the principal pitch, and eventually extend into full tremolos. These tremolos then build into multiple chromatically related notes played in succession, creating swarms of sustained resonance. The beating effect develops into the vibraphone's mechanics, when the motors are activated to oscillate at the same rate as the electronics.

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[9] https://soundcloud.com/hamish-upton/first-note-open-end

[10] Acoustic beating occurs when two pitches are played back out of phase with one another. As the two pitches intersect, they oscillate and create a 'beating' effect.

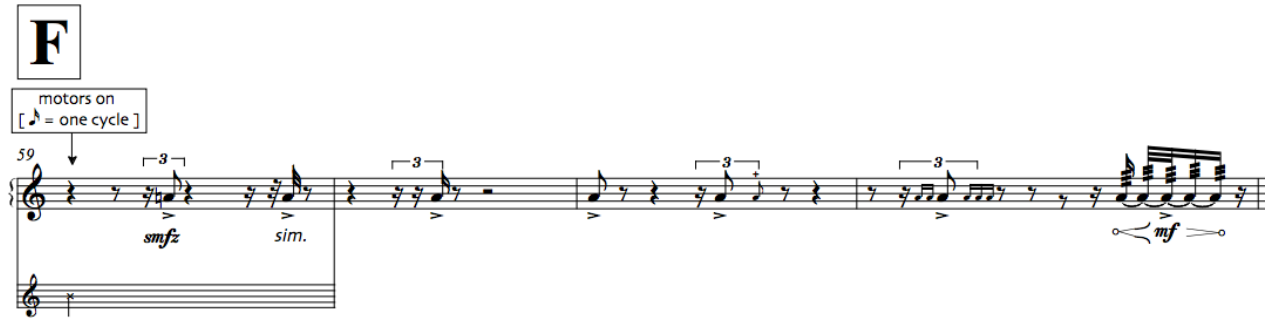


Figure 1: *Open End* - The evolution of a single note into a tremolo. Listen to this process here[11].

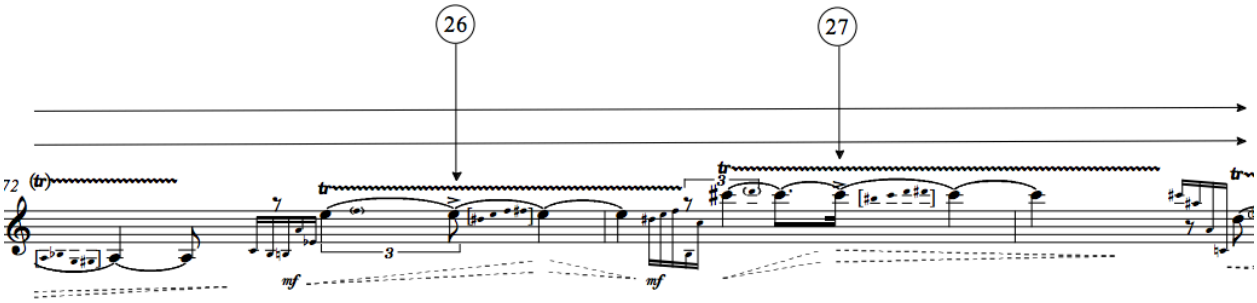


Figure 2: *Open End*: A single note expands to a tremolo, with the addition of chromatically adjacent pitches around a single note to create a 'resonant swarm'. An example of how this sounds can be found here[12].

The relationship between the electronics and vibraphone reaches its climax at figure H in the written score, where the electronic sounds diverge from the pure pitch of the vibraphone. After hearing sounds primarily inspired by the pure tone of the vibraphone, the application of aluminium foil to the F4 bar draws the vibraphone from its pitch-centred role in the piece to the earth-like, noise-based world of the electronics. The earth-like sounds are texturally removed from all previous material. Hackbarth elaborated on the aesthetic of these sounds:

> …What I'd tried to do which ended up being really hard was take samples of the tinfoil-wrapped F… I'd tried to remove the pitch from it to just try to get the metallic noisiness of the sound, and I'd tried to get rid of the F, all of the F and its overtones

[11] https://soundcloud.com/hamish-upton/single-note-growth
[12] https://soundcloud.com/hamish-upton/swarms

> just to have this kind of metallicness, so there's kind of parts towards the beginning of that transition which are like that kind of sizzly, noisy sound that you get from the tinfoil, then I kind of gradually transition to these sound which are kind of more material and metal and stone, so kind of moving away from everything being about vibraphone materials, everything being about vibraphone metal wrapped in other metal to being about all kind of earthly material. (Excerpt from interview transcript, Hackbarth 2015).

After an eight bar playback of 'earthly material' between figure H and I, four-note vibraphone chords are struck as blocks, but disintegrate note by note until a full ascending arpeggio is spelt. The top note of this arpeggio is bowed while playback of oscillating sine tones occurs, referring to the opening gesture of the work.

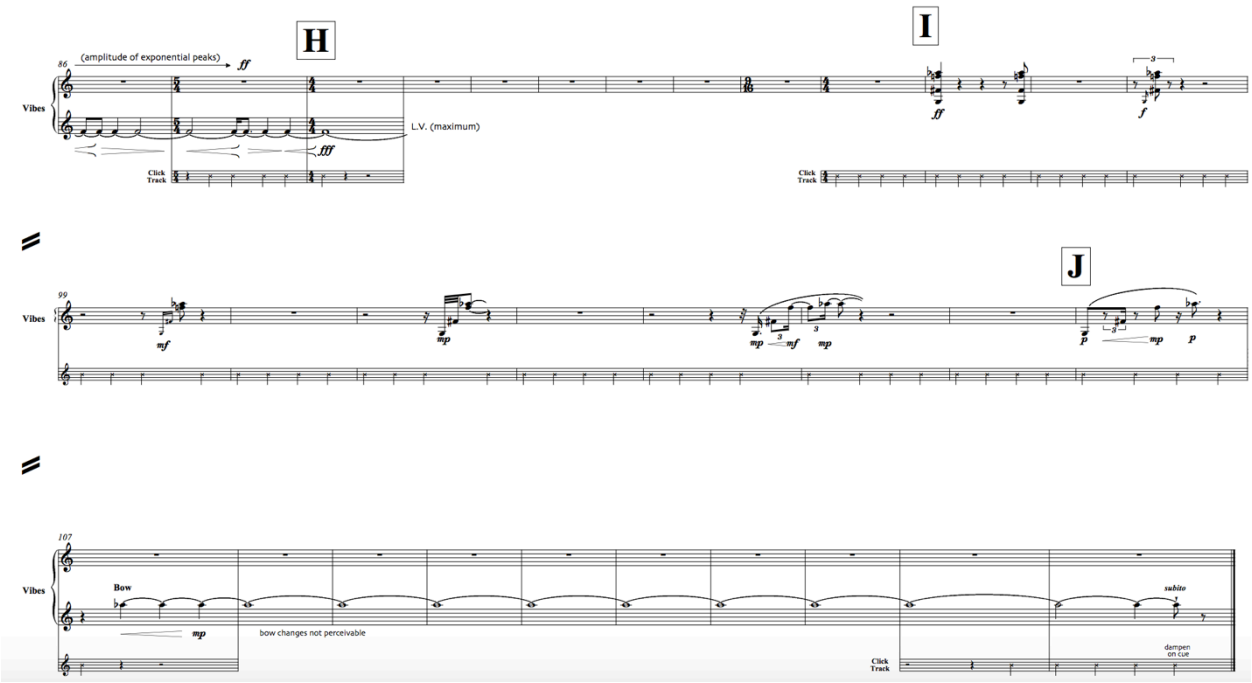


Figure 3: *Open End* - The moment at letter H where the electronics break free from the vibraphone's sound world. Note the chords at letter I disintegrating into single pitches before merging back into a single bowed note at J. Listen to this disintegration process here[13].

The close relationship between the electronic and acoustic sound is the strongest compositional element in *Open End*. The electronics are not used to add a separate dimension to the performance; instead they merge with the sound of the vibraphone to

[13] https://soundcloud.com/hamish-upton/disintegration-of-chord

create a unique amalgam, a synergy of sound that neither the electronics nor vibraphone could solely achieve. Although the performer knows when the instrument or computer is leading a sonic gesture, it is not always clear to the listener. Hackbarth claims:

> …there's the speaker underneath the instrument that creates really similar frequencies to those that you're playing, and you mix together in acoustical space and physical space and create these patterns of beating … (the) electronics are not simply just sounding like the instrument or accompanying the instrument or occupying a similar sonic world to the instrument, but actually the intersection of the two physically in acoustic space, acoustic waves creating these hidden patterns…(Excerpt from interview transcript, Hackbarth 2015).

2.3 Personal, technological, practical and musical preparations for performance

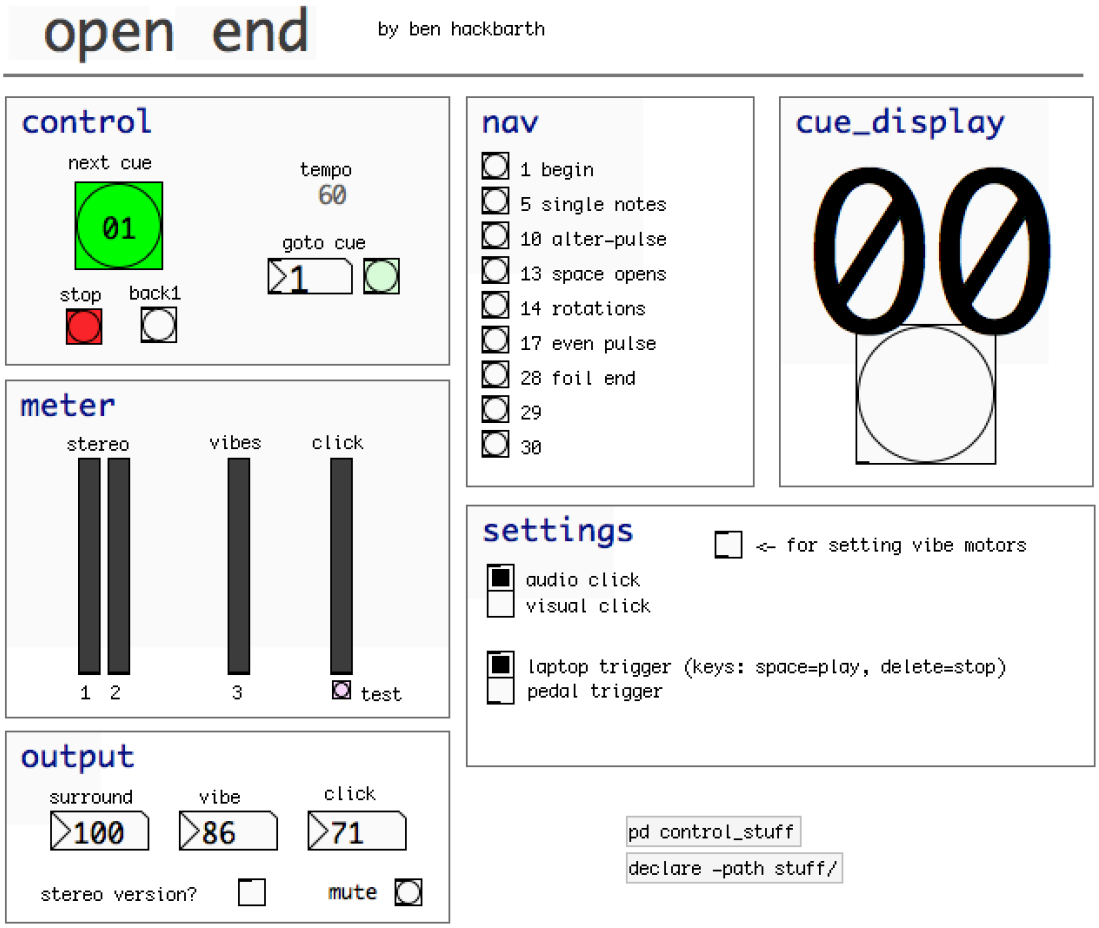


Figure 4: *Open End* - A screen grab from the Puredata software patch.

Puredata software makes the piece accessible to any performer with an adequately powerful Apple or Windows computer, as it is free to download and use. Although the technical requirements are not specified for the patch, a computer built within the last five years will be capable of running the software. I performed with four-speakers spaced around the audience, however a two-channel version can be requested from the composer. Sound is routed to six channels through an audio interface. One of the channels is solely for the click track to play back cue information through the performer's headphones, keeping them aligned with specific moments throughout the piece. A single speaker is positioned underneath the vibraphone, outputting oscillating sine tones that create the previously mentioned beating effects due to its close proximity to its bars. The remaining four channels are routed to a 4-channel surround sound system with two speakers at the front left and right of the stage, and two surround speakers placed at the rear left and right sides of the audience, much like a movie theatre configuration.

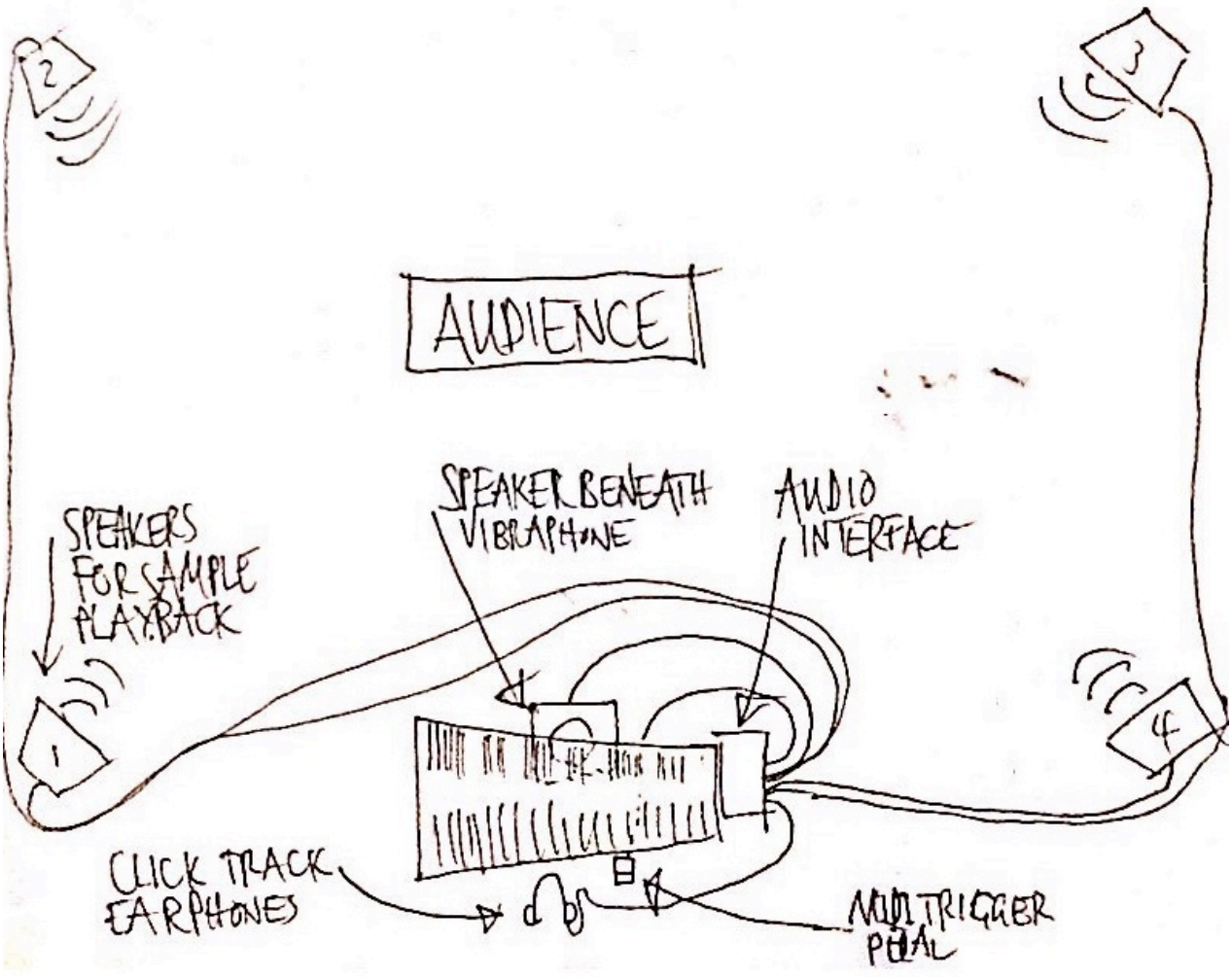


Figure 5: *Open End*: A self-drawn sketch showing the layout of the instrument and electronics in a performance setting. The laptop is positioned next to the audio interface.

Open End is scored in conventional stave notation, with the addition of twenty-eight numbered arrow points to synchronize the performer with the electronic sounds, using a MIDI[14] trigger pedal. The arrows in the score line up with individual notes to be struck or bowed by the performer, and the pedal is to be pushed at the same time the vibraphone note is struck or bowed. At certain intervals, click track playback is notated in the score with cross head notation, and the performer will aurally hear the click track to enable precise synchronization of the start and end of events.

[14] MIDI is short for *Musical Input, Digital Interface* and is a means of communicating signals between instruments and computers. See https://en.wikipedia.org/wiki/MIDI for a detailed overview.

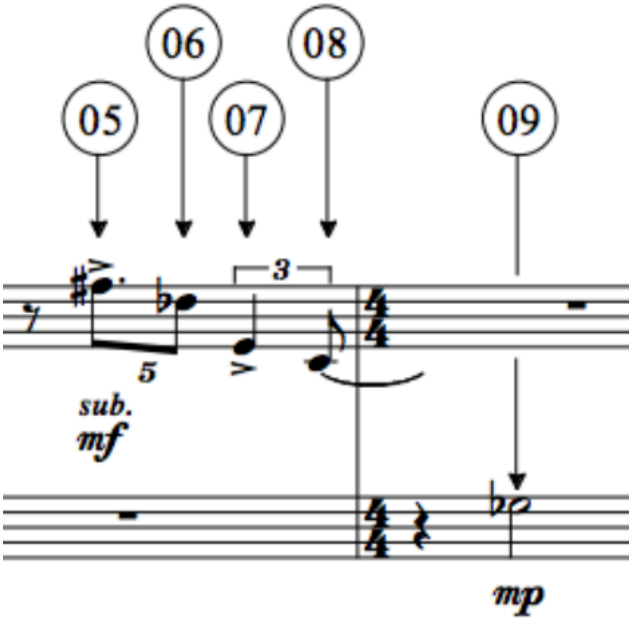


Figure 6: *Open End* – Numbers and arrows indicate where to pedal notes in the manuscript

As indicated in the background section of this chapter, the F4 note of the vibraphone is prepared with tin foil prior to the performance, and is bowed to create a sizzling effect in the transition to the final stage of the piece. After referring to Archinal's video recording (Archinal, 2010) I followed his example of putting the foil onto the bar during the performance just before bowing it. This is a safe way to avoid accidently bumping the foil and giving away the effect early.

I corresponded with Hackbarth several months before the performance to load the patch file, and to work through issues of compatibility and usability. As soon as the score for this piece arrived on March 3rd 2015 it became apparent that I needed to work with a complete setup wherever possible. This meant building the complete "Instrument" from the start, vibraphone, speakers, headphones, and interactive *Puredata* patch. The first version of the patch that I was sent did not function correctly due to file corruption that occurred when it was compressed and emailed to my inbox. This was the first technical problem I encountered, and the first time I had used *Puredata* software, so I had limited troubleshooting knowledge. The best solution based on my limited experience was to see if the patch worked on another computer, and when this did not work I emailed Hackbarth for a solution. This example underlines one of the recurring practical challenges when working with new technologies, most typically what to do when the equipment or software

does not work or respond as expected. It is essential to develop trouble-shooting skills in this field and time can be wasted if some degree of expert guidance is not accessible. In this case, having direct contact with Hackbarth enabled me to solve the problem relatively easily, but it may have prevented the performance happening otherwise.

Once the patch was functioning correctly, I worked with the click track and speaker under the vibraphone from an early stage in the learning process. In the patch settings, I routed the audio from the left and right channels of the interface to the headphone output, which enabled me to listen to how the whole piece fit together in a two-channel format while I was learning the notes. In addition, beyond the familiar process of learning notes on the instrument, I had to adapt to the new physicality of using my foot to trigger a pedal. My solution was to rehearse by tapping my foot with the cues while practising, if limited practise time meant that I could not set up the technological components.

It is possible to become very engrossed in the technological side of the piece, and overlook musical concerns. Working with my teacher Peter Neville on the piece revealed his professional perspective on how gesture and intention from the performer can enhance the relationship between the instrumental and electronic sounds. Neville's extensive experience of performing contemporary music scores offered a narrative to the notes on the page, and helped me to understand the structure and trajectory of the musical argument through his perspective.

During the first performance of the work on 4th June 2015, numerous personal, technological, practical and musical challenges needed to be solved. The headphone cable was very tangled when I went to put the earpiece in, providing the first practical distraction of the performance. Following this, I hit the first note of the piece only to discover that the speaker underneath the vibraphone had not been connected. This was a practical issue that nonetheless broke the flow of the performance and required the piece to stop and start over again. Some guidelines derived from the lessons I learnt during the process of preparing and performing *Open End* are reflected on in the next passage, as well as how I adopted knowledge from these reflections in a second performance. Several

of these points are pertinent to any performance, but are particularly important when preparing a work with laptop-based sound technology.

On the 27th of May 2015, one week prior to the first performance, I had an allocated technical rehearsal time to set up and test equipment in the South Melbourne town hall, the location for all performances conducted as part of the research. I did not have the experience to plan this time carefully, and to think through the main issues to address of balance between the electronic and acoustic sound in the hall. Two days before the recital, I gave a performance of the piece with a single speaker in the percussion studio for my classmates, although this environment did not have the 4-speaker system, and the spatial sensibility that the piece required.

Many performances involve degrees of compromise based on other repertoire in the program and limitations of the equipment available. In this instance the speaker used underneath the vibraphone had to be moved right before the performance of *Open End*. It was used at first as a monitor speaker for a pianist. Due to the restricted rehearsal time available in the hall, it was not possible to move through all the technical changes from start to finish. It is clearly advisable that electronic elements are like percussion instruments, and if possible it is ideal to avoid moving key equipment during a recital. This experience highlighted to me the importance of setting up the entire piece for a public performance well in advance, wherever possible.

2.4 Second Performance

On May 26th 2016, almost exactly a year after the first recital, I gave a second performance of *Open End* in the same hall. The purpose of this was to approach the piece with new knowledge gained from my experiences during the first performance.

The sound technology in the recording studio had been significantly upgraded since the previous performance, and an iPad mixer replaced the analog desk, allowing balance adjustments while standing at any position in the room. ANAM had also bought a new set of speakers that matched the front facing pair in the hall, much larger than the small

monitors used for the rear channels during the first performance. My previous experience taught me that a vital part of preparation was to set up the quad speaker system in advance, which I did two days prior to the recital. It was also necessary to listen to sounds from the Puredata patch through this speaker system from the audience perspective, without playing the vibraphone part.

> Today I set up the quad PA in the hall. The new speakers had a big impact on the sound, and ANAM now have a much more performance friendly desk for managing levels in the space. Instead of a fixed analogue desk, all levels can be balanced from anywhere in the space using an iPad based mixing tool. It was great to separate the playing from the playback, and hear the electronic sound played back in the space (Personal journal entry from 24 May 2016).

I analysed the video of both performances, and discovered significant differences in the recorded material. The second performance is ten seconds shorter than the first, and the time in question was lost in the first two minutes of the performance. In the first performance my concentration was compromised by the distraction of forgetting to plug the speaker in under the vibraphone. This was apparent visually and aurally in the hesitancy of my playing, and the sound of a bow hitting the music stand as I moved it to one of the accidental bars at the front of the vibraphone. In the first performance, the earpiece was not sitting well as I had hurried to re insert it after the distraction of the cable being tangled. There were at least two instances where I reached to adjust it in the video. Dynamic contours were also not as varied or organic as they were in the second performance. I took care in programming the piece to be the first in the program for its second performance, which eliminated a large percentage of the risk of a technical fault. I also hung the bass bow from a hook on the vibraphone, which made picking up and putting down the mallets and bow much easier, as well as carefully pre-coiling the headphone cable to avoid tangles.

2.5 Conclusion

Open End introduced me to an entirely new set of personal, technological, practical and musical challenges during its preparation and performance. Through discovering and using *Puredata* I was able to discover a free piece of powerful software, and interact with it using pedals and spatialized sound. I discovered effective ways to handle musical material, after learning about the piece through an interview with Hackbarth. This interview revealed a musician's perspective on developing a deeper understanding of sound and its relationship to space. A lesson with Peter Neville helped to cement these ideas and convey them effectively through the second performance.

During my work on *Open End,* I discovered that Penny (2009) succinctly summarizes many of the adaptations required to perform a work with electronics through her findings in *The Extended Flautist*:

> The introduction of electronic technology to the flautist's performance practice has created a practice characterized by change. Adapting to the use of devices such as microphones or foot pedals, to highly expanded sounds and diffusion, to new relationships to instruments and colleagues, and to ever changing computer innovations demands a fluid and open approach, a preparedness to change identity image, and to renew and re-evaluate core musical concepts (p. 19).

Open End requires the performer to be adaptable in their learning and performance approach. I was presented with technical challenges during its performance, but my experience enabled me to remain calm and problem-solve until each issue was resolved.

3 Lindsay Vickery - *Lyrebird* (2014)

3.1 Background

Vanessa Tomlinson commissioned and premiered *Lyrebird* in 2014 as part of her 8 Hits concert in Brisbane (Tomlinson, 2015). The timeline of its technical development began in 1995 when Lindsay Vickery received a Churchill fellowship to travel to the Centre for New Music and Audio Technologies (CNMAT) at the University of California Berkeley to work with Max software (Andrews, 2016). Vickery developed his work with Max software on another study trip to Harvestworks in New York, a not-for-profit organization to help artists present creative work through the use of technology (Harvestworks, 2006). Vickery is a member of the Decibel New Music[15] ensemble and technology provided the key to solve musical problems as a part of the group:

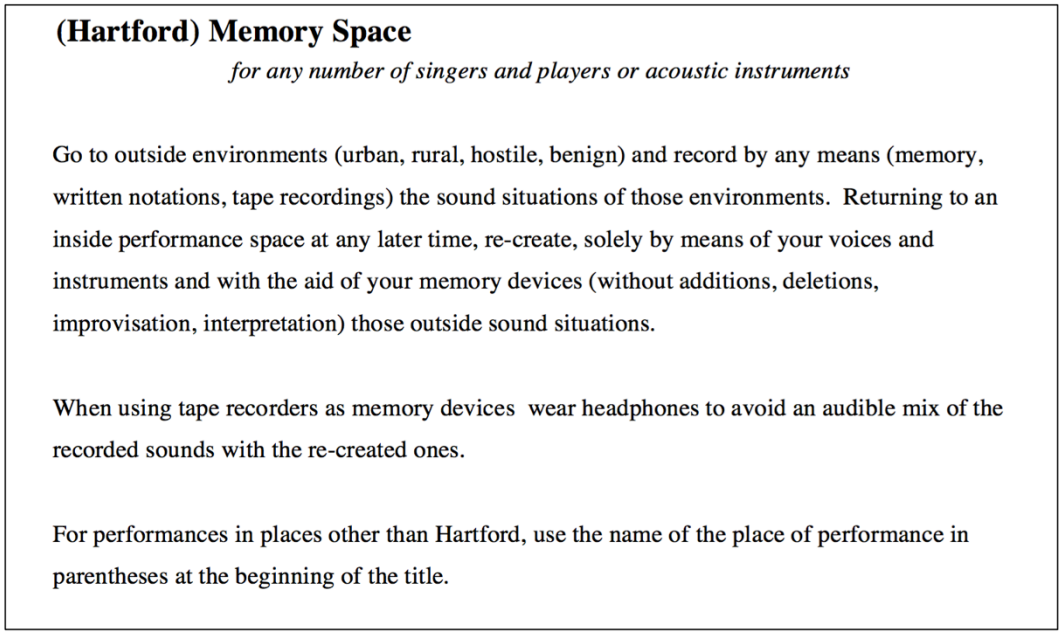
> Decibel starting to put scores onto, you know, a scrolling screen, and it happened because… Cat Hope brought along this very very long … literally physically long piece made up of … ten A3 pages in colour and … with lots of glissandi … all the glissandi were measured against a grid and we tried to play it using stopwatches, and you could kind of do it but it wasn't accurate… (Excerpt from interview with Vickery, 2016)

The exploration of scrolling scores advanced beyond inserting existing manuscripts into a score player, towards a search for a generative 'real-time' score:

> I'd been kind of interested in … a generative score … like making scores where the notation is generated in real-time and I'd done that by pre-creating … images or like taking a score and chopping it up into lots of little bits and then importing the images in … indeterminate fashion onto the screen and developing timing structures which would allow the elements which were being … picked up at any particular time to be co-ordinated with for example a click track or audio processing or something so there was a kind of a meaningful connection between the … actual thing that the person was playing and the way it was being processed or the tempo that it was going… (Ibid.)

[15] Decibel New Music Ensemble is a Perth-based contemporary music group.

The visual representation of a field recording pays homage to the composition *(Hartford) Memory Space* (1970) by Alvin Lucier, where the performer captures an outside environment through memory recollection, manuscript notation or tape recording.



(Hartford) Memory Space

for any number of singers and players or acoustic instruments

Go to outside environments (urban, rural, hostile, benign) and record by any means (memory, written notations, tape recordings) the sound situations of those environments. Returning to an inside performance space at any later time, re-create, solely by means of your voices and instruments and with the aid of your memory devices (without additions, deletions, improvisation, interpretation) those outside sound situations.

When using tape recorders as memory devices wear headphones to avoid an audible mix of the recorded sounds with the re-created ones.

For performances in places other than Hartford, use the name of the place of performance in parentheses at the beginning of the title.

Figure 7: *(Hartford) Memory Space* by Alvin Lucier from Vickery's presentation notes (Vickery, 2014).

3.2 The interaction between computer and performer

A 'meaningful connection' is at the core of *Lyrebird's* compositional strategy. The performer chooses where and when to create his or her field recording. The field recording is imported into Max Runtime, generating a scrolling visualization of the piece. The score scrolls at 1.2 centimetres per second, from right to left, allowing the performer to see 12 seconds into the future of the work at any given point during the performance (See figure eight below). As the scrolling information reaches the line on the left hand side of the screen, the audio occurring at that moment is played back in real-time. The performer is encouraged to collect sounds from the environment in which the recording was made, and use these as a means to improvise with the score player (Vickery, 2014).

Figure 8: *Lyrebird* From *Improvising with the Sonic Environment* presentation notes (Vickery, 2014)

Technological advancements mean that we can visualize more than just the frequency and amplitude of sounds in a composition such as *Lyrebird*. Vickery is conducting extensive research into how human perception can enable people to associate certain hues and colour values to sound. Vickery uses a 'notional colour spectrum' to represent timbre in *Lyrebird* using CIELab Colourspace, and Bruce MacEvoy's Artist's Value Wheel, but also acknowledges how idiosyncrasies in human vision can complicate conclusive objective outcomes (Ibid.). It is worth noting that I have minor colourblindness, and the patch enables the selection of different colour spectrums so I could find the correct one with colours that I responded to best while improvising.

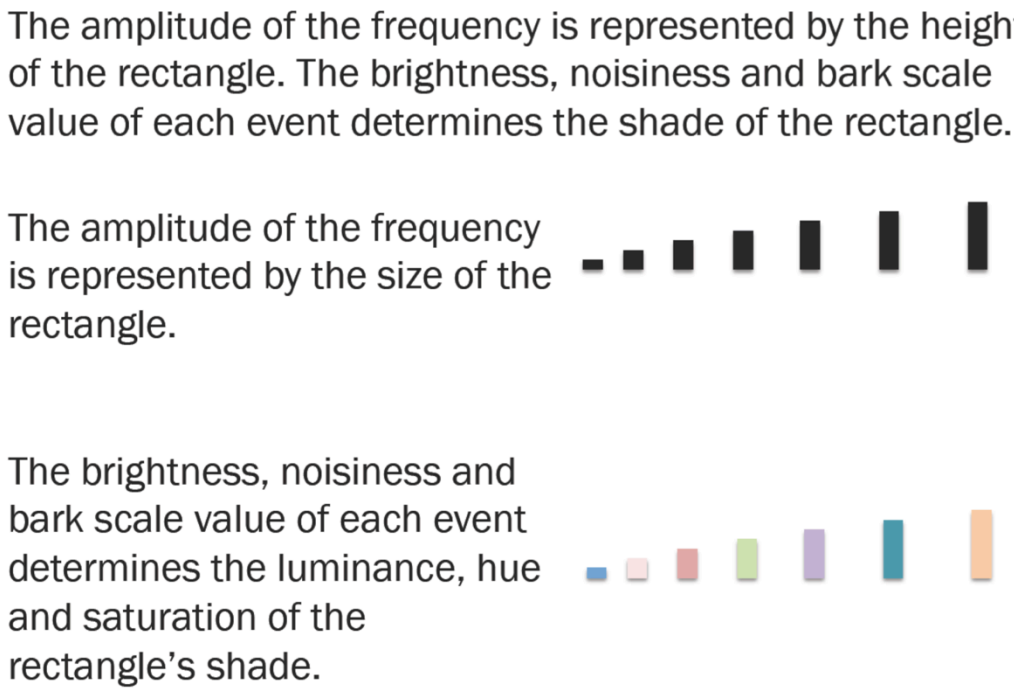


Figure 9: *Lyrebird* – Explanation of colour and shape systems in the scrolling score. Excerpt taken from *Improvising with the Sonic Environment* (Ibid.).

Figure 9 demonstrates how Lindsay assigns visual cues to sonic information. The amplitude (volume) of a frequency influences the size of the rectangle. The 'brightness' of a sound is represented by the hue of the rectangle. 'Noisiness' is the shade of the rectangle, and 'Bark scale' is the luminosity. It is an ongoing challenge for the performer to discover how these colours correlate with the characteristics of the sound in the recording, and how this can influence the sounds created during its interpretation.

A variety of parameters can be adjusted in the patch to accommodate the characteristics of the field recording, and to 'zoom in' on certain frequencies and levels.

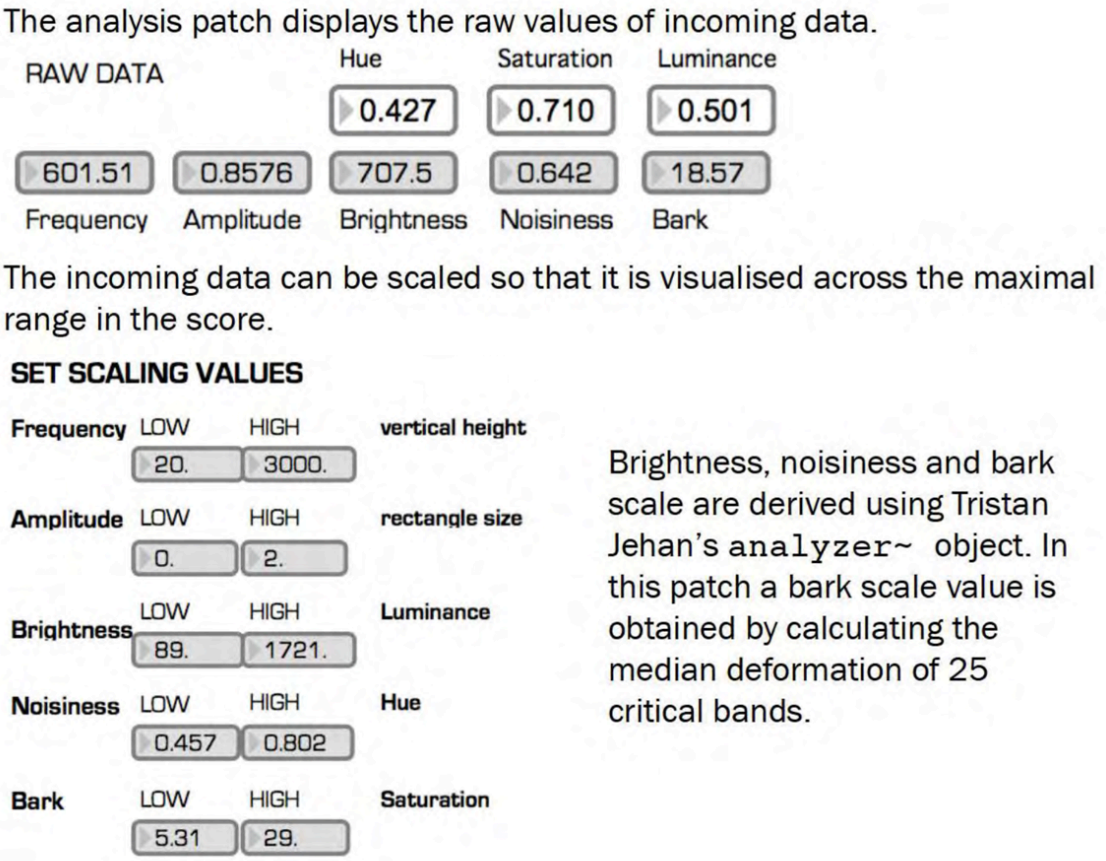


Figure 10: *Lyrebird* – Parameter screen grab From *Improvising with the Sonic Environment* (Ibid.).

3.3 Personal, technological, practical and musical preparations for performance

As indicated by Vickery in his presentation notes from *Improvising with the Sonic Environment* (2014), the practice of interpreting *Lyrebird* is situated between composition, improvisation, and the natural sonic environment.

ANAM is situated close to the South Melbourne Market, which I frequently visit on Sunday afternoons at the time when the stalls are abuzz with competing storeowners desperate to sell their last stock for the week. I took my portable recorder to the market on the afternoon of Sunday the 31st May 2015. I bought some Japanese food at a local vendor, and sat at a bench, listening and observing as the recording happened. Listening back to the recording, I heard clear footsteps on the pavement, voices of families and friends in conversation, announcements over the public address system, and the sound of a

Salvation Army donation tin being shaken. A rainstorm passed briefly, creating a bright white noise on the corrugated iron roof.

The preparation of my interpretation of this piece involved working with Peter Neville to try to represent the scrolling colours and shapes in rattling of plastic, retuning of radio dials, and popping of bubble wrap. I argue that this interpretation brought my rendition of the work closer to a realization of Alvin Lucier's *(Hartford) Memory Space*, but with Vickery's score I was able to more accurately improvise with the soundscape, and shape the performance to create a minimalist but I believe, an effective result.

The creation of a spreadsheet was useful to work out my ideas before a performance, and to clarify the intent of each musical gesture while I was experimenting with the scrolling score to formulate new creative ideas and document the process.

Object	**Performance Objective**	**Execution of improvisation and perceived outcome**
Bubble wrap	To mix with the sounds of footsteps heard in the field recording.	Moving the bubble wrap while popping it around the microphones blended with the movement of pedestrians walking past the microphones.
Plastic Tray from Japanese food eaten at the time the recording was made	To bring an object from the time of recording into the performance space, and use it in an abstract way to improvise with spoken voices.	Scraping and moving the tray in the air added an extra dimension to the spoken voice in the track, rather than directly imitating a sound.

Object	Performance Objective	Execution of improvisation and perceived outcome
Marbles in a bowl	To imitate the shaking of a tin of coins in the recording, and played in unison with the wind sounds in the microphone.	Mixed effectively with the bright textures in the resultant performance.
Portable radio	To imitate spoken words in the recording.	Lines in the scrolling score determined how I manipulated the volume dial, creating a dialogue between the voices mixed with static on the radio and spoken word in the backing track.

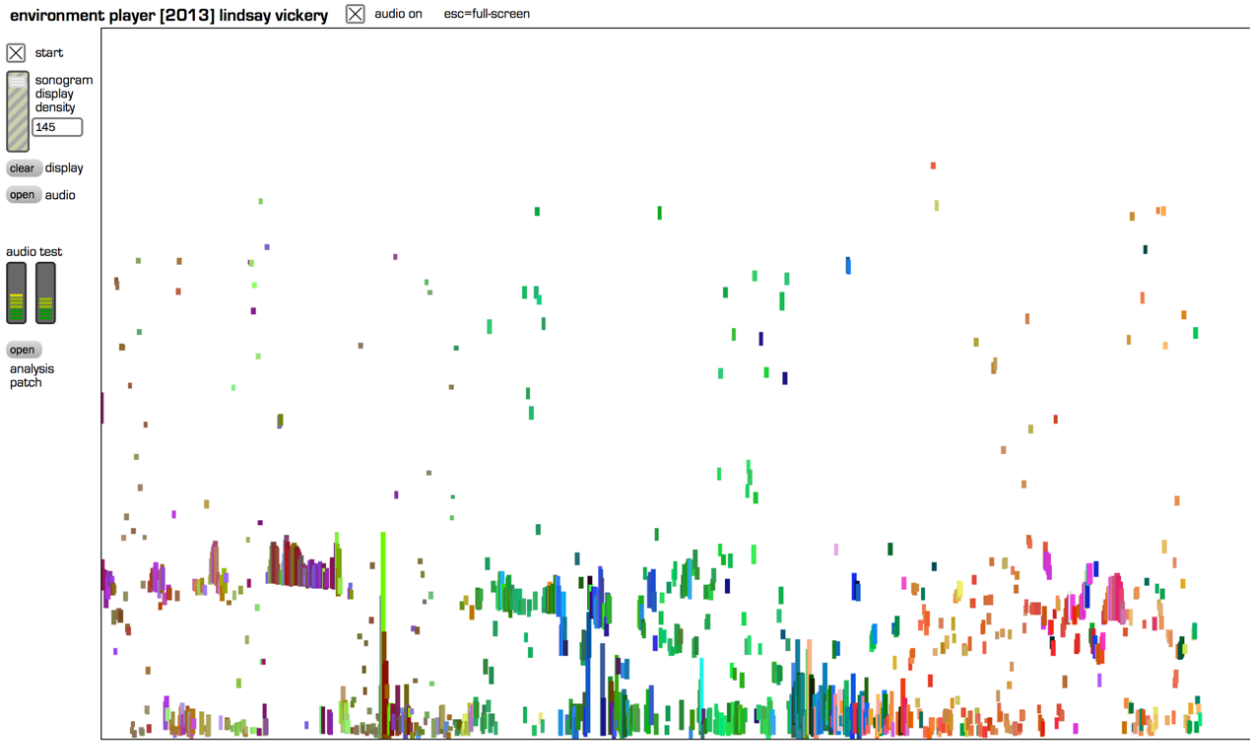


Figure 11: *Lyrebird* - A screen grab from my South Melbourne Market scrolling score in Max.

A suggestion from Peter Neville in the lesson was to use the vertical axis of the score-player to translate into a vertical axis for improvising with the found material instruments in front of me. As objects scrolled across the screen, their changing amplitude would cause them to grow taller and shorter as can be seen in Figure 11. I would make taller and shorter gestures with my materials in front of the microphones. This provided an extra spatial and dynamic interest as objects were moved closer and further away from the microphones.

The performance setup comprised of my laptop atop a percussion stick tray to create a visualization of the score, and an audio feed from this laptop to a two-channel speaker system in the hall. This table took the role of a music stand, and I was seated in front of a table of sounds to improvise with. The audio from the laptop was mixed in the front of house speaker system with a live audio feed from two microphones placed over this table of sounds.

On reviewing the recording, the live audio amplification expanded the tiny sounds of bubbles popping into larger sounds that merged into the market sounds, enhancing the

overall effectiveness of the piece. A short excerpt of this sound can be found here[16]. Retuning the radio dial in time with voice announcements represented on the scrolling score also produced an interesting sonic blend, as can be heard in this short excerpt[17]. Marbles in a metal bowl were chosen as an abstract improvisation tool. The decision to use them was to create a sonic connection to the sound of coins in the can held by a Salvation Army donations collector. The crunching sound was used in the performance to blend with the sound of wind passing through the microphones, as can be heard here[18].

The interpretation of *Lyrebird* can be approached in a variety of ways, dependent on the background and playing style of each performer. Creating abstract and tangential improvisation strategies, in performing *Lyrebird* is consistent with Vickery's intentions in the interpretation of the work, as he describes in this excerpt from the interview:

> …It's very interesting to see what people take out of the score and what they leave, and how they respond to different kinds of environments, so for example there's one which has a recording where the kind of main feature is these bullfrogs, and the pianist who played with it has perfect pitch, which is invaluable, the pianist chose to just focus completely on the Bullfrogs, he just plays exactly what they're doing on the piano, for six minutes or something, like really really it's so precise, it's crazy. And whereas Vanessa (Tomlinson) tends to play quite free, she does things like, which is what I had kind of expected as well, that you know you can see in the score there's crickets you know you can hear them and you can also see where they're going to stop and she kind of takes over from there once they've stopped and that sort of thing, so she's kind of interacting with it … so the idea of like interacting with it… (Excerpt from interview transcript, Vickery 2016).

At the point of the first performance, I had not discovered a large percentage of the available information on the interpretation of *Lyrebird*. I had worked how to open the patch in Max, load a recording into it, and adjust certain parameters, but aside from that I was encountering entirely new material and experiences. The process of creating a deeper, informed performance of *Lyrebird* is as much about finding the extensive research behind

[16] https://soundcloud.com/hamish-upton/bubble-wrap-popping
[17] https://soundcloud.com/hamish-upton/radio-and-voice
[18] https://soundcloud.com/hamish-upton/marbles-in-bowl

the piece, as it is making the software work. My interview with Vickery, as well as referring to the resources on his website including presentation notes (2014) led me to the discovery of different perspectives on the interaction with the score, and how nature can influence how we think about music and improvisation.

During the interview, Vickery discussed his thoughts on the stratification of sounds within the sonic environment:

> …I'm not a field recording expert and I'm sure there's people who would be able to speak with much more authority about this but my experience so far has been that there are kind of frequency bands in field recordings … where activity happens, and areas where not much is happening, so… and my supposition here is that in nature animals evolve to have calls and so on and make noises which occupy a particular frequency band which no one else is occupying which means that they can actually be heard over the din, so suddenly also to do with the size of the animals or whatever, or like in general frogs tend to be one of the lowest kinds of sounds that you encounter in the environment, as far as I can tell and then the large birds like magpies and crows and that kind of thing and then the small kind of twittery birds, and right up the top crickets, which are like really really high frequencies...(Ibid.).

In support of this theory, Krause (2013) made startling discoveries after creating spectrograms of wildlife habitats in Kenya:

> …I first encountered the transparent weave of creature voices not only as a choir but as a cohesive sonic event. No longer a cacophony, it became a partitioned collection of vocal organisms, a highly orchestrated acoustic arrangement of insects, spotted hyenas, eagle owls, African wood-owls, elephants, tree hyrax, distant lions, and several knots of tree frogs and toads. Every distinct voice seemed to fit within is own acoustic bandwidth – each one so carefully placed that it reminded me of Mozart's elegantly structured Symphony no. 41 in C Major, K. 551 (p. 84).

The stratification of distinct voices can be interpreted by humans to understand certain cues in able to enhance their chances of survival. Krause (2013) reinforces this:

> …it turns out that many human groups have likely understood how wild sound is layered since our ancestors first began to hunt and forage for food. The ability to correctly interpret the cues inherent in the biophony[19] was as central to our survival as the cues we received from our other senses (p. 89).

3.4 Conclusion

In my analysis and performance of Vickery's work, I found that *Lyrebird* could effectively communicate my personality and individuality to an audience. A visual representation of my chosen soundscape enabled flexibility in interpretation and instrumentation through developing a 'meaningful connection' with the sonic environment of the South Melbourne Market. Because no significant technological challenges were encountered, I was able to focus primarily on other elements of the performance, and discover a depth of background knowledge through the interview with Vickery. With the help of my teacher, Peter Neville, I developed a unique improvisational interpretation of my soundscape.

Steven Schick (2006) concisely and accurately sums up sonic coherence in solo percussion performance: "For percussionists the goals of individuality, complexity and coherence are as important in the world of gesture as they are in the sonic and interpretive aspects of performance" (p. 141).

[19] According to Krause, *bio* means life and *phon* means sound, and the combination of these Greek suffixes creates *biophony,* the sounds of living organisms.

4 Steve Reich – *Electric Counterpoint* (1987)

4.1 Background

Electric Counterpoint (Reich, 1987) is scored for guitar soloist and twelve guitar parts. The fifteen-minute work weaves a tapestry of overlaid tonal patterns in three contrasting movements. Musical cells are repeated in the style of Reich's earlier works written in the 1970s and 1980s, and are shifted out of phase with one another across several octaves. The accompaniment part can be played live or pre-recorded for a solo performance with backing tape, and renowned guitarist Pat Metheny (1987) recorded the first overdubbed version.

My inspiration to pre-record the parts for percussion came from American Percussionist Svet Stoyanov, who released an arrangement of this work for Marimba and Vibraphone (Stoyanov, 2008). I was drawn in by Stoyanov's precision and sound creation in this recording, and was inspired to create a version for my own live performance as a research project.

4.2 The interaction between computer and performer

A full analysis of the composition is not necessary for the purpose of this research, however a short description of the first movement of *Electric Counterpoint* is elaborated on in the following chapter. The piece begins with repeated quavers across the ensemble, swelling and fading with changing harmonies. As this texture fades, guitar one introduces a four-measure loop, repeated throughout the rest of the movement. On top of this repeated cell, additional four bar loops are successively layered upon one another. Each new loop is introduced by the soloist, and then transferred to one of the guitar parts using a 'cross fading' method. Guitars 1-8 eventually all have unique lines, and the remaining guitars (9-12) later contribute harmonies that swell and fade similarly to the chords at the opening of the movement. Once all the parts are introduced, the solo part plays 'resultant patterns' created by the layering of guitar parts 1-8, another technique employed frequently through Reich's compositions.

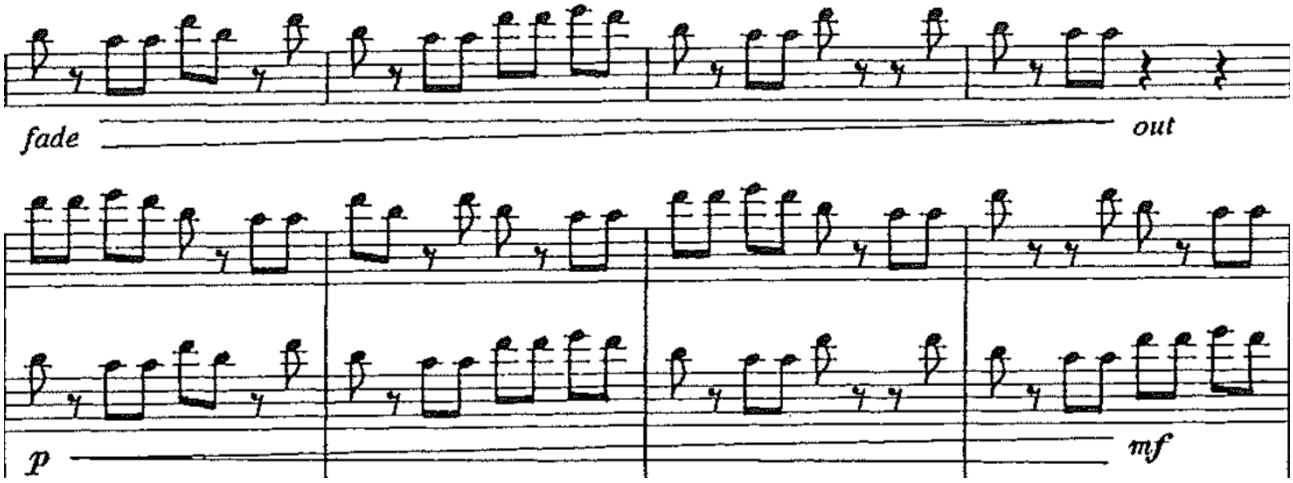


Figure 12: The crossfading of the solo part (top line) into the guitar two part (bottom line) from the full score (Reich, 1987).

When preparing to pre-record twelve separate parts as overdubs, rhythmic precision and musical consistency were of utmost importance. Recording the parts became a lot easier when I approached the piece as one usually approaches the snare drum part in Ravel's *Bolero*. A familiar rhythmic pattern to many, the snare drum part 'conducts' the orchestra, and remains rhythmically exactly the same throughout the entire work. Although simple in principle, the mental focus and endurance required to remain steady in tempo while creating a gradual crescendo across the whole work is deceptively difficult.

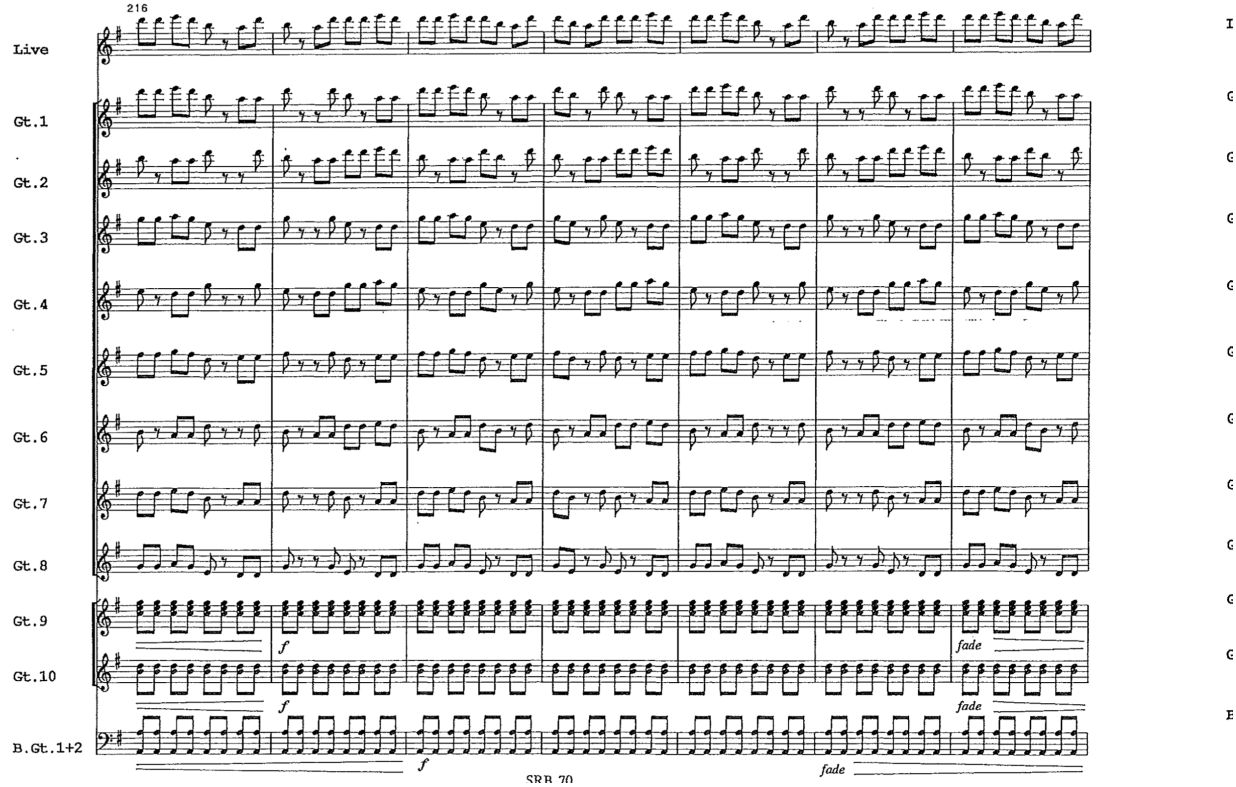


Figure 13: Excerpt from the full score of the first movement, when all parts are active (Ibid.).

Two modulations proved to be challenging through the recording of the first movement. The first was from E minor to C minor at bar 250, and the second modulation is back to E minor at 290. A short soundbite of these modulations can be found here[20]. I was able to use the voice-over on the click track to create an accurate system to know exactly when to change. Rather than using additional concentration to count the extensive repetitions of each pattern, I memorized the rehearsal number before each modulation occurred. I did not count any bars until I heard the rehearsal number, and then I counted the number of bars until the key changed. This enabled a type of 'Zen' mind space in which I could comfortably repeat the pattern, focusing on the movements of the mallets around the keyboard and the flow between them, only needing to count for a maximum of ten bars leading up to a key change.

[20] https://soundcloud.com/hamish-upton/electric-counterpoint-modulation

4.3 Personal, technological, practical and musical preparations for performance

I found a space off-site from ANAM to record, as quiet room was needed to avoid unwanted background noise. It was also important that I could leave a permanent setup for consistency of recording. This also involved renting a five-octave marimba to use exclusively for the project. My personal journal allowed me to keep track of the effectiveness of different strategies and approaches during each recording session.

A generous ANAM supporter provided the recording space for me to set up and record the project. I had open access to the space, allowing a great deal of freedom and experimentation in the creative process while I was learning numerous skills to make a smooth recording workflow. This short excerpt from the journal describes the first time I set the marimba up in the studio:

> Travelled to studio. I set up the marimba in a configuration that my rudimental knowledge of acoustics suggested might be ideal for the room. The space has polished concrete floors, and a reasonably low stud. It's small and has a hole in the wall to the kitchen, and several shelves. I opted to set up with the marimba at one end of the room. I also set up the mics and interface and cables (Journal entry from 6th September 2015).

For the technical end of the recording, I asked my colleagues for advice on the best hardware and software to use, including the decision to invest more in the recording interface, or high-quality microphones.

Eventually, I spent a larger amount on the microphones. This was because a pair of Line CM3 cardioid condenser microphones enabled accurate, warm and detailed sonic reproduction of the marimba. Several professional recording options were considered for software. I chose to work with Logic Pro X because it is a downloadable piece of software at a relatively low cost, and it has an intuitive user interface that allowed more time to focus on other aspects of the recording process. I also had basic knowledge of its key

features through learning how to use it in a *Desktop Music Production* University elective I completed during my third year of undergraduate study in 2013.

To keep time and musical orientation while recording, it was necessary to create a click track that matched the tempo and time signatures in the score. Spoken voice cues were added to the click track to make it even easier to stay oriented while layering each take. These spoken cues were the rehearsal numbers as shown in the score. First, I determined which bar numbers corresponded to each figure number in the full score. The time signatures also had to be programmed into Logic. I added markers in the top of the track panel, labelled with their corresponding figure numbers. This made it easy to systematically work through and voice-record the spoken cues at each numbered point in the track, as can be seen in Figure 14.

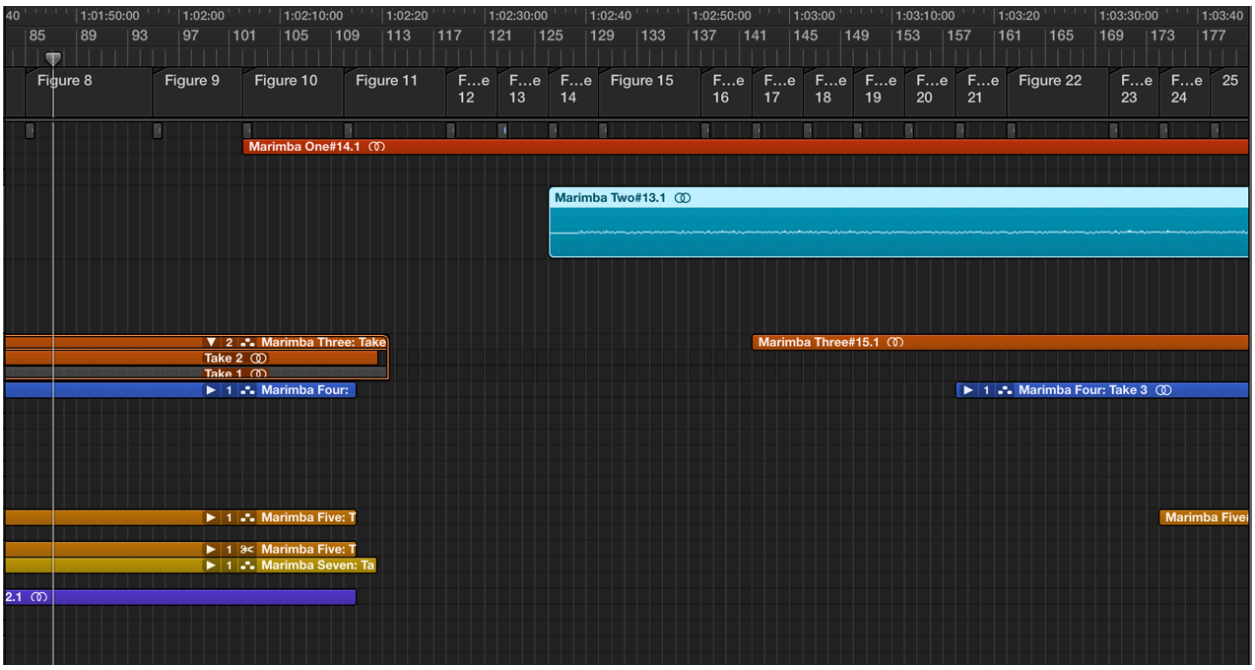


Figure 14: *Electric Counterpoint*: A screenshot from the project in Logic Pro X. The rehearsal figure numbers can be seen along the top of the tracks.

Reference-level open back headphones were worn each time I recorded a take, allowing me to listen to the click, and also the playback of previously recorded parts.

I encountered a cable issue at the start of the recording process, resulting in a loud hissing sound in the recording whenever I tried to track a new part. This was both a personal and

technological challenge, and the journal entry shows that my rudimentary troubleshooting knowledge was inadequate to solve the problem:

> After setting the rig up beforehand at ANAM I thought it would be straight ahead, but for some reason there was a harsh white noise when I attempted to record. This persisted when I tried to turn everything off and on again, and reset the computer. I'll speak to Alistair tomorrow and hopefully there is a solution (Personal journal entry from September 6th, 2015).

The following day, I took the components to Alistair McLean, ANAM's audio-visual recording engineer. We recreated the situation, and we determined it was a faulty USB cable. McLean quickly eliminated variables that could be the cause of the problem, and this experience revealed that a simple practical solution can be easily solved, and valuable skills learnt in the process.

From a practical perspective, I wanted to plan as much of the recording process as possible to streamline the workflow. The optimal solution was to start with the most active parts, so that there was audio material to listen to as each subsequent part was added. Figure 15 shows an excerpt from a spreadsheet I created as an overview of the active and tacet parts through the first movement.

	0	1	2	3	4	5	6	7	8	9
Guitar 1	Tacet	Tacet	Tacet	Tacet	Tacet	Tacet	Tacet	Tacet	Tacet	Tacet
Guitar 2	Tacet	Tacet	Tacet	Tacet	Tacet	Tacet	Tacet	Tacet	Tacet	Tacet
Guitar 3	Active	Active	Active	Active	Active	Active	Active	Active	Active	Active
Guitar 4	Active	Active	Active	Active	Active	Active	Active	Active	Active	Active
Guitar 5	Active	Active	Active	Active	Active	Active	Active	Active	Active	Active
Guitar 6	Active	Active	Active	Active	Active	Active	Active	Active	Active	Active
Guitar 7	Active	Active	Active	Active	Active	Active	Active	Active	Active	Active
Guitar 8	Active	Active	Active	OUT	Tacet	Tacet	Tacet	START	Active	Active
Guitar 9	Tacet	Tacet	Tacet	Tacet	Tacet	Tacet	Tacet	Tacet	Tacet	Tacet
Guitar 10	Tacet	Tacet	Tacet	Tacet	Tacet	Tacet	Tacet	Tacet	Tacet	Tacet
Bass 1	Active	Active	Active	Active	Active	Active	Active	Active	Active	Active
Bass 2	Active	Active	Active	Active	Active	Active	OUT	START	Active	Active

	25	26	27	28	29	30	31	32	33	34
Guitar 1	Active	Active	Active	Active	Active	Active	Active	Active	Active	Active
Guitar 2	Active	Active	Active	Active	Active	Active	Active	Active	Active	Active
Guitar 3	Active	Active	Active	Active	Active	Active	Active	Active	Active	Active
Guitar 4	Active	Active	Active	Active	Active	Active	Active	Active	Active	Active
Guitar 5	Active	Active	Active	Active	Active	Active	Active	Active	Active	Active
Guitar 6	Tacet	Tacet	Tacet	START	Active	Active	Active	Active	Active	Active
Guitar 7	Tacet	Tacet	Tacet	Tacet	Tacet	Tacet	START	Active	Active	Active
Guitar 8	Tacet	Tacet	Tacet	Tacet	START	Active	Active	Active	Active	Active
Guitar 9	Tacet	Tacet	Tacet	Tacet	Tacet	Tacet	Tacet	Tacet	START	Active
Guitar 10	Tacet	Tacet	Tacet	Tacet	Tacet	Tacet	Tacet	Tacet	START	Active
Bass 1	Tacet	Tacet	Tacet	Tacet	Tacet	Tacet	Tacet	Tacet	START	Active
Bass 2	Tacet	Tacet	Tacet	Tacet	Tacet	Tacet	Tacet	Tacet	START	Active

Figure 15: A snapshot of the spreadsheet document for movement one, showing the parts on the left-hand side, and their activity at each rehearsal number as indicated along the top.

Parts 11 and 12 include chords that are easily playable when strummed on a guitar (see figure 13), but are extremely difficult to play at tempo on a marimba with four-mallet technique. The solution to this was to create individual tracks for each note of the triad, and treat these individual notes as single lines that created a chord when overdubbed. This technique would be impossible to execute live without employing extra performers.

To mount the two microphones, I used a stereo bar mounted on a single microphone stand. The bar provided pre-inscribed angle measurements to help lay the microphones out in standard recording configurations.

Speaking to Mclean was the most effective solution for finding the best place to position the marimba in the room, as well as choose how to set up the microphones on the stereo bar. I started with the marimba across one end of the room as pictured below, but at McLean's suggestion rotated it 90 degrees:

> Played back some audio to Alistair at ANAM. He encouraged me to experiment with placement of marimba in the room. Also placement of mics, and their

configuration. The whole thing sounded fairly bright as well, so this meant I would experiment with mallet choice next time. Alistair also spoke to me a little bit about bit depth in recording and this inspired me to find some reading on it so I can understand it a bit better (Personal journal entry from 10th September).

Figure 16: *Electric Counterpoint*: a picture I took of the marimba positioned at one end of the room before it was rotated 90 degrees. Note the XY configuration of the microphones.

The quick start guide included with the stereo bar including directions to quickly set up different recording patterns. After trying an XY recording pattern, which made the marimba sound too harsh and directional, I found an ORTF pattern worked better for the natural, open sound that I associated with the aesthetic of the overall piece. I noted this in the journal entry below:

> …I also reconfigured the mics in an ORTF pattern, as opposed to XY as originally selected. This was at Alistair's suggestion, because XY has a tendency to cancel out lower frequencies. Based on my rudimental knowledge of physics, this is due to the longer wavelength of low frequencies, and the close proximity of the XY pairing means that if a low frequency wave is passing the microphone at a particular point, the microphone will not pick up the sound clearly (Journal entry from 12th September).

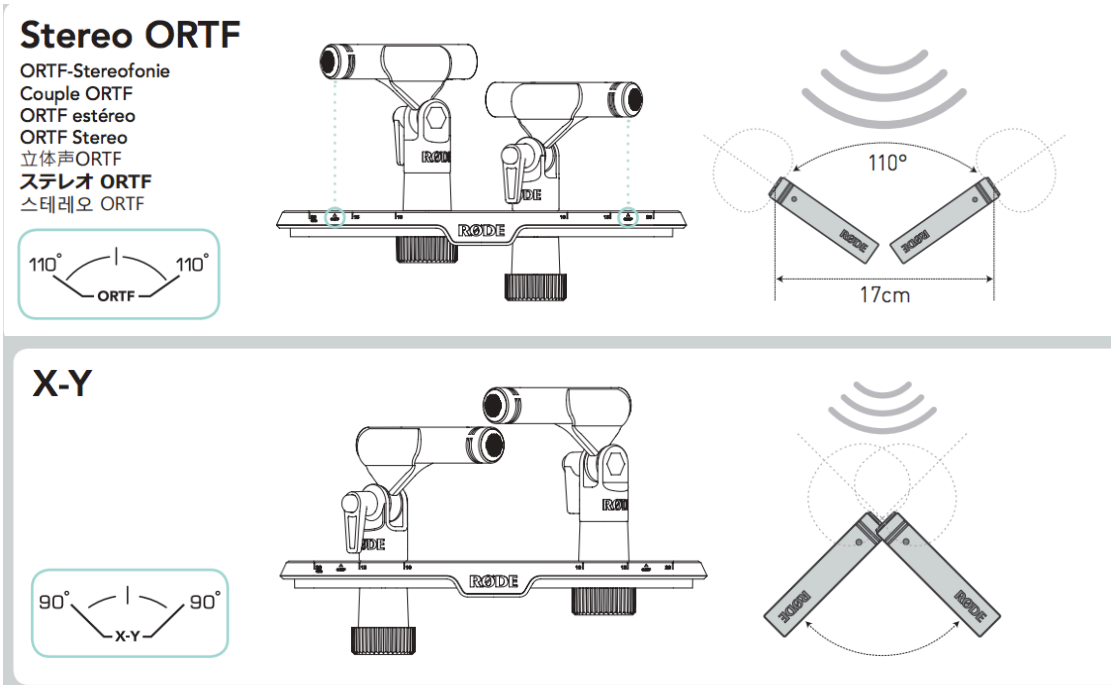


Figure 17 shows the final recording configuration I used - two microphones positioned at 110-degree angles, compared to the X-Y configuration with the two microphone diaphragms positioned very close together, which produced a directional and slightly flat unnatural sound (Rode Microphones, 2016).

Figure 18: A picture I took of the final layout I used in the room, showing the microphones silhouetted in ORTF configuration.

Furthermore, mallet selection was key in providing the sound that I envisaged for the whole project. Initially I had expected to use medium-hard rubber mallets, but these produced a somewhat bright and definite attack on each note, which went against my intention to create a warm wash of sound. The room sounded resonant when playing in the lower register of the marimba, so I experimented with covering the concrete floor with a blanket. I made these discoveries through experimentation, after unplanned software updates brought a halt to my planned recording session:

> I arrived at (the 'recording studio'), and after trying to start Logic realised that I hadn't finished an update which needed an internet connection to complete. This ended my ambitions to try and do any recording. I decided to use the time to do some practice on all the parts, and to try different mallets and see how they sounded in the room. This turned out to be a very valuable thing to do. I realised

> that certain frequencies lower in the marimba were sounding very boomy, and so I decided to experiment with putting down a blanket underneath the marimba. This resulted in some noticeable difference, but it is hard to tell without doing some test recordings. I tried four different mallet choices too, and I found myself listening in a critical manner to the attack and tone of each pair. As expected, the hard VIC FIRTH M153 mallets sounded very clear, but quite brash, and put a strong emphasis on the higher overtones of the marimba bars. My ear was drawn to the VIC FIRTH M124 Robert Van Sice signature sticks, as they have been a preference for years and create a warm blend of attack and fundamental. It will be interesting to hear how they stack up next time (Personal journal entry from 12th September).

In order to have the flexibility to work and learn with minimal time constraints, other practical limitations had to be factored in to keep costs low. Because I spent over two months on the recording process, a professional recording studio space would have cost far too much to rent. Instead, though slightly noisy, a room without rental costs provided a large amount of freedom to experiment and complete the project at my own pace.

Layering up to 21 individual tracks meant there was a noticeable hiss on the completed track. The audio interface that the microphones plugged into was an entry-level piece of recording equipment, which likely contributed to the noise issues. Ambient noise from lights and the outdoor environment added to the overall mix, though this was at a manageable level.

The types of factors that influenced the quality of recording sessions were often unexpectedly simple. The streamlining of the process, through the gradual removal of as many distractions as possible, enabled me to enter the optimal performance space within my mind and body.

> Short recording session to fix up some of yesterday's takes. I felt a lot more refreshed than yesterday after a solid sleep. I went through and re-recorded parts 1,2,3,4,6 and 7 in movement two, and found some more parts to re-record after listening critically and finding some synchronization issues and wrong notes. I also found that memorizing the parts and using the spoken click track was a far better approach than trying to read the parts. This might seem like a really obvious

> observation, but it made a big difference to the feel. I was able to pay more attention to feel and what was going on in the pre-recorded parts, and loosen up my body and breathing too (Personal journal entry from October 11).

Maintaining focus and flow during a live performance is something that is difficult to achieve across the range of percussion instruments, and the recording process can be used as a way to hone precision and consistency through repetition, evaluation and reflection.

> I also noticed that after leaving a recorded take for a day, I was able to come back to it and feel a lot happier about how it sounded. This was something that Alistair told me would happen throughout the process, and often I found that takes sounded better when they weren't exactly perfect the whole time - the slight flams between parts and imperfections give the performance a human touch and remove the possibility of wondering whether the piece has been quantized or played by a robot (Personal journal entry from October 11).

This was a significant realization, as it was easy to become overly critical in the moment and hypersensitive to the minutest points of imperfection. Instead of evaluating a recorded track directly after the completion of recording, it proved more effective to listen back later the same day, or the next day, to make lists of what required fixing in the next session.

The editing process involved selecting the best takes, panning each marimba part across the stereo image of the track, and setting levels to balance and highlight important parts. The technique of spreading each part across the left and right channels stemmed from critical listening to other recordings, and helped to clarify each the entry of each marimba part.

The automation tool[21] allowed meticulous control over the position of each entry in the stereo mix. As each part enters in movement one, the soundstage is built from left to right,

[21] The automation tool in Logic Pro enables the visual representation of parameters such as panning and volume in a continuous line for each individual track. These parameters can be adjusted throughout the timeline of the whole project.

creating texture and auditory interest as the music unfolds. McLean helped to remove noise from the final recording, by using mastering software that could analyse a short sample of the noise on the track, and the sample as a template to reduce the hiss on the entire project. Before performing the work in a performance class and the recital, I played through a movement in percussion class, and gained valuable feedback from Peter Neville about how to fine-tune the track for live performance:

> …I played some Reich for him as well, and we discussed balance, score placement, and feel. Pete also said that the track could be clearer with more attack on the front of each note to give a clearer sound overall (Journal entry from October 16th 2015).

4.4 Conclusion

Organising, preparing, recording and journaling *Electric Counterpoint* proved to be an enormously fruitful component of the research. Allocating a large amount of time to the project meant that I could try different methods to create the most accurate track possible. In this work small errors can become amplified, so it was vital to take the time to prepare an error-free tape part. In this case errors can refer to wrong notes, inconsistent rhythm and changed sound quality, among others. It allowed me to discover how to build a click track, plan a recording session, and discover about multiple factors that can produce the best possible performance. I also learnt that expert advice is required to achieve the best result in equipment setup, as well as mastering the audio track. Detailed note taking in my personal journal allowed me to understand the systems that worked, and reflect on what was less effective during each session. This included decisions about how to set up the room, position the microphones, and select the optimum mallets. All of these factors combined to create a recorded track that was used in the recital performance.

5 Matthew Fairclough - *The Boom and the Bap* (2008)

5.1 Background

The Boom and the Bap is a 2009 composition by Matthew Fairclough for drumset and electronic sounds. The drumset sounds are processed live using Max software, running a patch constructed by the composer.

Fairclough's involvement in the collaborative multimedia trio 'Powerplant' with percussionist Joby Burgess provided a platform for the creative process to allow *The Boom and the Bap* to be written. Fairclough gave insight to the work's initial stages of development:

> …sometimes when we [Burgess and Fairclough] work together we do improvisations and so what I usually did was just use the effects that were built into digital mixers and things like that, but it's always a bit… everything starts to sound the same after a while because you're restricted by what those desks can do, so I started making Max patches that we could do more interesting things with, and then eventually I had an idea to do that piece based on you know the Amen Break, using that as a kind of initial idea (Excerpt from interview transcript, Fairclough 2016).

The composition of the work was influenced primarily by the Amen Break from 'Amen Brother' by the Winstons (1963), known to be one of the most sampled drum breaks in history. The six-second loop is enormously influential, and has been sampled in over 1,500 compositions, including tracks by British Music producers in the 1990s, and later is featured in songs by David Bowie and Oasis, to name two of many notable acts (Otzen, 2015). Fairclough examined the influence of the Amen break into other compositions and musical styles in England, including dubstep and other drum and bass-driven music. Although the complete sample is not audible in the final composition, it served as a starting point for improvisation using the contact microphones and effects within Max.

> … I think what happened was when I was first working with the Max patch and trying to get interesting settings for the drum kit I went down to Joby's studio and we plugged it in for the first time and I just got him to play through a few of the settings

> that I'd made, and the first time we did it, it all sounded all kind of dark and heavy, the effects that were coming back, and it worked really well so I took the patch away and I just thought what would work with the kinds of sounds that we were getting for the drum kit…
>
> … one of my students had already written an essay about the Amen Break for one of his projects, so I was well aware of it, so I just looked at that for a while, and I did write the piece in at the beginning, but I found that it was such a strong riff, and it's such a recognisable riff, so it was hard to get the piece away from it, once you'd gone into it it was difficult to get away from it, so in the end, we cut it out and didn't play it at all, so it's not really part of the piece any more… (Excerpts from interview transcript, Fairclough 2016).

Structurally, the piece is divided into two distinct parts. The score of the first section up until Figure 18 indicates flexibility in the tempo through *ritardando*, *accelerando*, *rallentando* and *a tempo* indications. These allow for an open exploration of the electronic sounds within the parameters of the notation (Figure 15). This interaction can allow a range of interpretations through listening to the way the sounds are manipulated in real-time, and responding with the appropriate musical intent. Stutter delay, loops, grains, ring modulation, and pitch shifting alter the sounds of the drums, prolonging the usually short sustains into longer, digitally enhanced gestures. The kick drum triggers a wobble bass sample, alluding to the dubstep musical influenced by the Amen Break. Each time the kick drum is re-articulated, the oscillation rate of the wobble increases. A *piano* dynamic ride cymbal note is recorded within Max and played back with extended sustain.

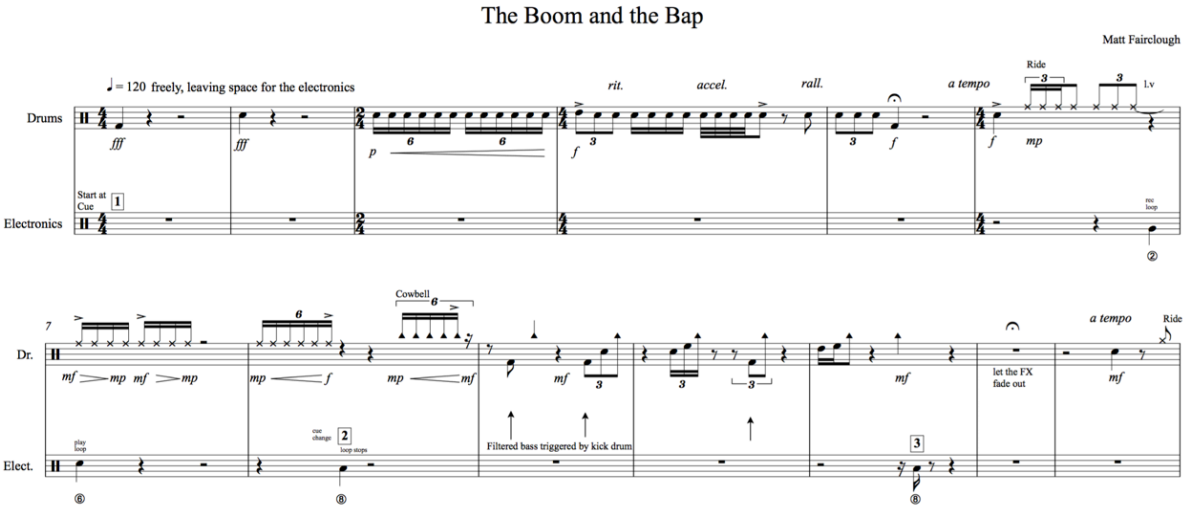


Figure 19: *The Boom and the Bap* - The beginning of the piece. Note the cue changes indicated below the stave, and the filtered bass trigger cues in bars nine and ten. Listen to the entire introduction to the piece here[22].

From Figure 12, the music conforms to a tighter structure. Once the looping section starts, the tempo becomes clear with eight bar sections in common time. The Max patch automatically advances through cues. The type of effects processing on certain instruments changes, creating a musical argument that strengthens as the digital re-articulations become more present. A short sample of how this sounds can be found here[23].

5.2 The interaction between computer and performer

The score includes technical notes for setting the piece up for performance. There are two options for where to locate the computer running Max is located; either on stage with the percussionist, or at the sound desk. I opted to perform the version where Max was run on my computer on stage, as it was preferable for my research to not include an additional sound technician for rehearsal purposes. The Max patch allows the performer control over numerous parameters, including levels for all of the effects outputs. I was hesitant to adjust levels unless absolutely necessary, as the patch worked reliably when I only adjusted the volume input thresholds to allow enough sound in to trigger the digital effects. Six microphones are plugged into an audio interface, connected digitally to a laptop. Each microphone picks up sound from an individual drum, cymbal or cowbell on the drum set.

[22] https://soundcloud.com/hamish-upton/the-boom-and-the-bap-introduction
[23] https://soundcloud.com/hamish-upton/loops-section-example-from-the-boom-and-the-bap

Audio information from each microphone is processed within Max. A MIDI trigger pad allows the performer to control different sets of sounds, record short samples to be processed and then trigger their playback, and start the bass loop section of the piece. A click-track with spoken voice cues is played back through headphones worn by the performer, and correlates with the numbers in the notated music, aligning the performer with the track.

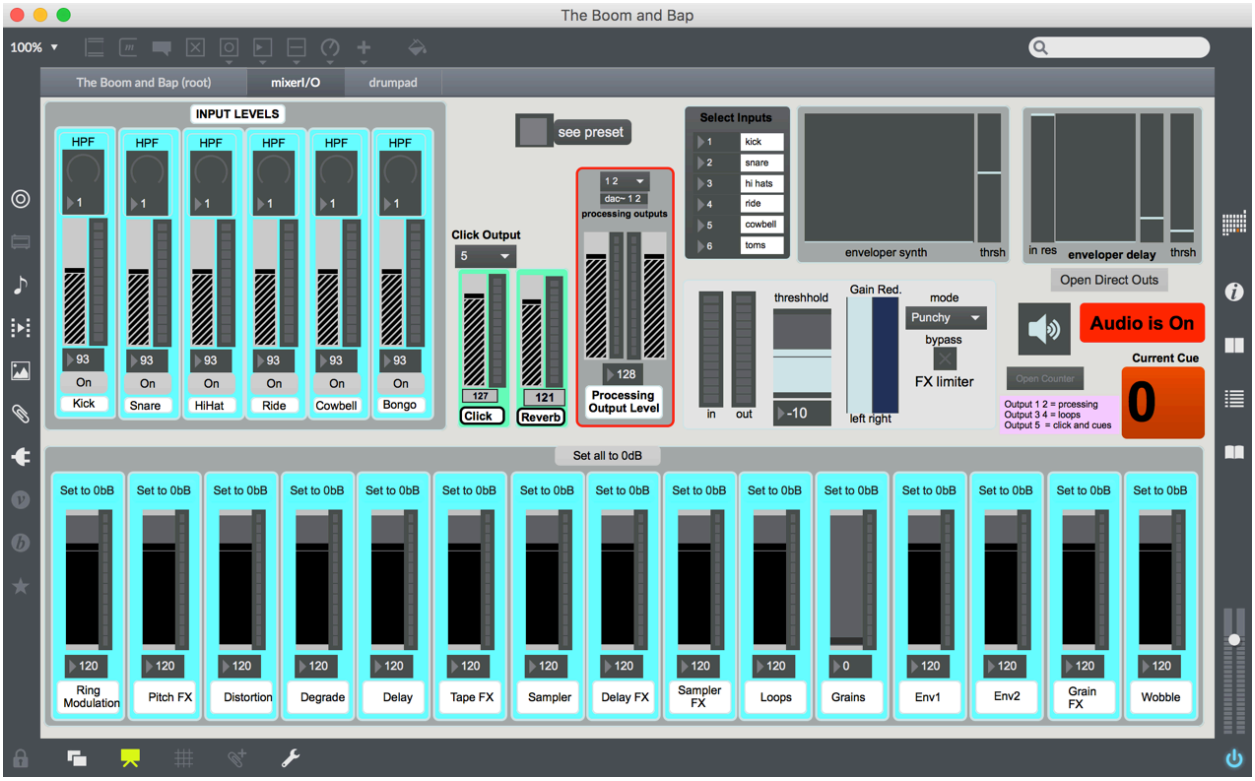


Figure 20: ***The Boom and the Bap*** **- A screen grab from the control window in the Max Patch.**

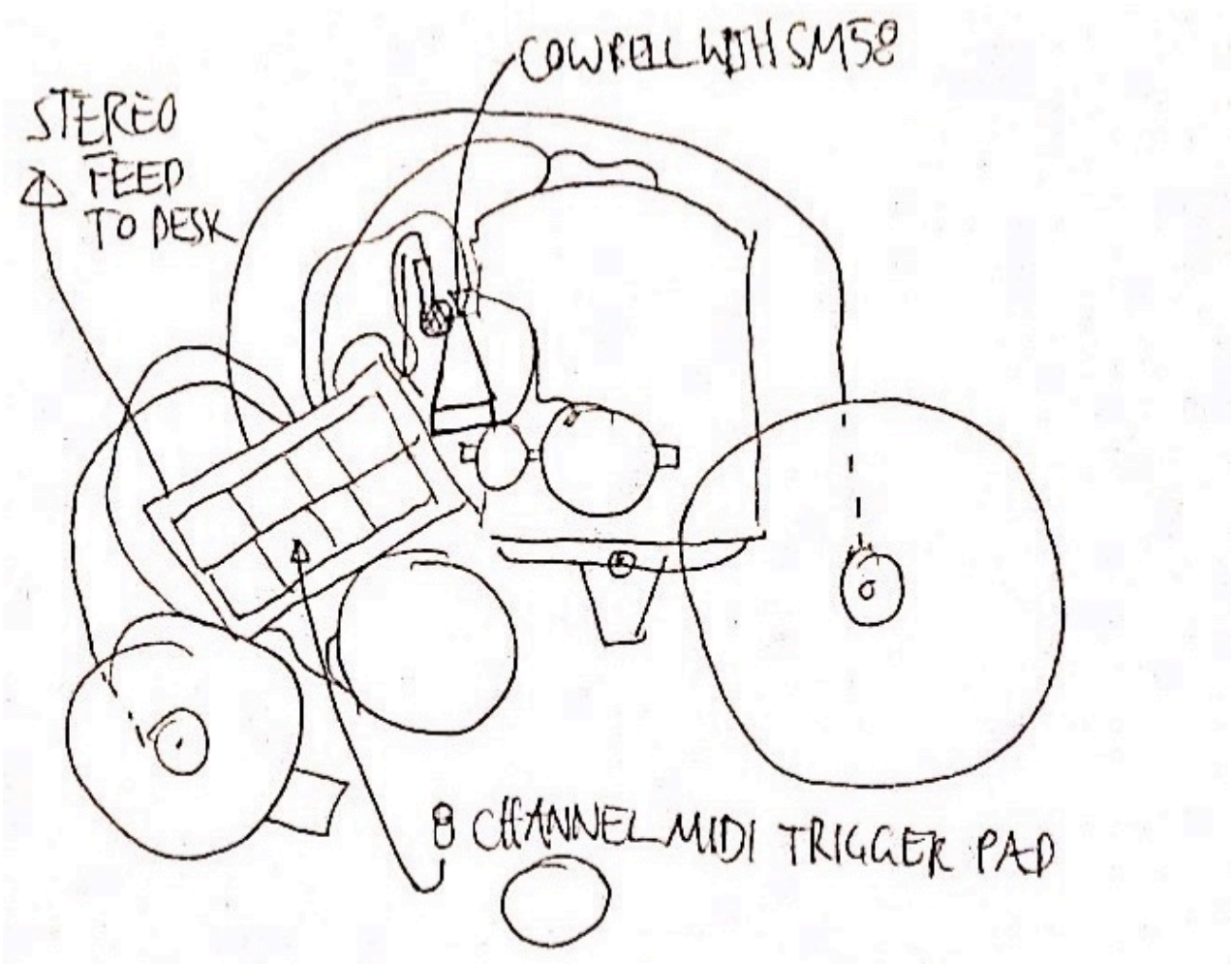


Figure 21: A self-drawn rough sketch showing the drum set up with the eight-channel MIDI pad. Each drum has a microphone line running to it, and this feeds to a preamplifier that converts the signal to a digital format.

Figure 22: A picture I took of the setup for *The Boom and the Bap.*

5.3 Personal, technological, practical and musical preparations for performance

The technical requirements of the piece meant that I needed to source new equipment. ANAM owns four contact microphones, so I needed to borrow one more, to have enough affixed to each instrument in the drumset as well as a dynamic microphone for the cowbell. I also needed an eight-channel interface to convert the microphone signals to digital for processing in Max, and this was also obtained through ANAM. I bought a second-hand Alesis Performance Pad, similar to the model specified by Fairclough. The pad consists of 8 surfaces that are struck to send MIDI information to Max to trigger different cue states and loops.

Frustrating amounts of time had to be spent in rehearsal with the electronics trying to solve technological issues involved with this piece. Simple issues would hinder the process of

setting up for a practice session. Turning phantom power off for the contact microphones, and simply unmuting the sound in the Max patch were very quick solutions, once I had realized they were causing the problems:

> Later in the evening I worked on getting a contact mic set up to see if the patch worked with it. This all seemed to be fine, I got the snare and ride cymbal triggers working. Through my basic knowledge of inputs and outputs I managed to line everything up, and after a while figured out that there was a big unmute button in the control panel of the patch! Sometimes things are far less complicated than I think. (Journal entry from October 6th, 2015)

The most challenging aspect of preparing the performance of *The Boom and the Bap* was dealing with a synchronization issue within the patch. The problem did not affect the opening passage, but once the click-track and bass loops began, the spoken voice and click track would shift out of phase with the bass loops. This issue was impossible for me to fix, so I had to contact the composer to find a solution for the issue.

> I was playing around with some ideas but I found that the click-track was consistently out of phase with the effects processing and the spoken cues subsequently didn't line up with the visual cue number changes. I fiddled around with some of the audio settings in the patch, and eventually had to get Alistair to come in and take a look at the settings to see if he could work anything out. He adjusted the 'I/O vector size' and 'signal vector size' and we found a solution that worked eventually. This is probably something I could have worked out myself, but it saved a lot of time having him there…. (Personal journal entry from October 14)

In the days following the above journal entry, I found that the same issue was recurring in the patch, and simply became more pronounced as the piece progressed further towards its conclusion. The only solution to resolve the problem was the composer reviewing the patch and sending me a new version.

The amount of time spent problem solving led me to question the value and effectiveness for a solo performer such as myself with relatively little experience working with complex technology. I asked Fairclough about his opinion on this process during the interview:

> Yeah I think ideally the thing about writing a piece for electronics is if you make it too complicated the piece will only get played when you're there. So what I'm trying to do at the moment is design patches or setups that mean I don't need to be there which means it has to be straightforward enough for someone like yourself or Joby (Burgess) to just perhaps set up a microphone and load up a patch on their computer and it should just work which is what happened with *The Boom and the Bap* … when Joby took it to America … you know the nice thing about it was he said that if you open the patch, as long as the microphones were plugged into the right places on his audio interface it just worked. So I think in that respect if it just works you should be able to rehearse it on your own (Excerpt from interview transcript, Fairclough 2016).

Fairclough reveals in this quote that he is keeping the performer and future performances in mind, but over time, differences in hardware and software configurations can pose technological challenges that render patches and pieces unworkable. My contact with Fairclough made it possible to find a solution for a performance, but in the future, updated versions of Max, changes in interfaces and computer specifications pose questions for the sustainability of current repertoire.

Setting the piece up for a lesson nine days before the recital proved to be a valuable way to discover solutions to technical and musical problems. Following the performance, I made some notes in the journal:

> Today I had a lesson with Peter Neville, and set up *The Boom and the Bap* with ANAM's P.A. systems, with the help of Alistair. This went relatively smoothly and I had a pretty good run overall with gear working. We did discover that there was a problem with the roto-tom contact mic. This is because the lead was for a stereo mic, and it was causing a problem with the response of the patch. When it was swapped in for a correct (mono) lead, it worked without issue. I played the opening section for Pete, and he talked about how he saw the musical intent as being a series of gestures, connected by a strong underlying groove feel, and each should be strong and full sounding. With the P.A. system we were able to get a large sound happening and the effects were very powerful overall. We also discussed

> with Alistair that the drums can be amplified and mixed in with the electronics, so as to create a more coherent front of house output. Pete also talked to me about the benefit of working off the score rather than improvising after figure 12, and demonstrated some of the grooves with a more strong intent than I had been showing. (Personal journal entry from October 16th)

In early communication with Fairclough, he revealed that Joby often improvises through the looped section of the piece. I decided to experiment with an improvisation cheat sheet that could be used to make the most of the different effects as they automatically change from figure 12 in the score. Rather than using any particular notation, the cheat sheet had instructions for each figure letter and which effects were being applied to which instruments at any given time. These were lifted directly from the score, where short descriptions of the processing types were given at each number. During a lesson with Peter Neville, we determined that this type of improvisation would not provide a greater musical outcome for the listener.

5.4 Conclusion

The Boom and the Bap is a unique composition that provides flexibility for the performer to listen and respond to the electronic sounds in the opening, and also has a strong rhythmic bass line that the drumset player can groove with while different types of signal processing occur. As a contemporary drumset and electronics, it acknowledges the journey of electronic and sampled music through its incorporation of the Amen Break in its compositional development. Although it was challenging to manage the software and source the hardware for the performance, Fairclough's foresight in designing the patch for future performers meant that it was still possible to make it happen in a different country, separated from his technical expertise. Working with Peter Neville allowed me to find the best musical approach to the written material, and Alistair McLean once again provided invaluable technical support while problem solving. Its performance in the second recital of 2015 meant that I could apply knowledge from repertoire performed in the first recital, including how to approach balance considerations within the space, and obtaining the patch as early as possible to problem solve technical issues.

6 Concluding remarks

The research and exploration of four unique compositions incorporating laptop-based sound technology over the past two years has expanded and enhanced my performance practice. The four case studies provided opportunities to develop strategic and holistic approaches to the musical and technological aspects of the contrasting works.

Working with vibraphone and spatialized electronics during the preparation of *Open End* expanded my performance capability, challenging me to develop physical coordination through pedal interaction with the *Puredata* patch on the laptop, while adapting to working with a click track in my ear. While learning about the piece, I gained a new perception of sound and its interaction within a performance space, resulting in an immersive performance that blurred the line between acoustic and pre-recorded material. Through a second performance, I was able to try new approaches and improve my preparation through the setup of the quad speaker system in the hall, and my cognitive approach to the sounds was enhanced twofold by Peter Neville's pedagogical input, and the discovery of more detail pertaining to the phenomenology of sounds through an interview with Hackbarth.

Lindsay Vickery's *Lyrebird* is a truly customizable composition, allowing each performer to develop a unique version. A scrolling visual representation of the performer's chosen soundscape provides a framework for improvisation within both abstract and exact boundaries, depending on the preferences of the individual. Working with Peter Neville enabled me to broaden my imagination while interacting with the scrolling score during my preparation. I created a clear structure for assigning instruments to different parts of the score, in order to strengthen the intent and focus the parameters of my realisation. Further performances will enable me to further discover even more performance possibilities inspired by Vickery's powerful Max-based scrolling score.

Creating a multi-track recording for my performance of *Electric Counterpoint* provided many new challenges for me as a performer. I assumed a new role as a recording technician, factoring in new tasks to my preparation including the best way to record the marimba sound in the space I was working in. I was able to control the way the recording

sounded through balancing the overall mix of all the parts using automation in Logic Pro. I tackled issues of focus while playing repeated patterns over five-minute movements. Creating this recording proves that it is not unrealistic for a percussionist with a minimal background in recording to gain sufficient command of technologies which, when combined with their musical experience and skills, results in the creation of a valuable musical resource for their own live performance.

The Boom and the Bap is an excellent example of how collaborative creative development between a composer and percussionist can result in a work that can be set up in different concert situations without the composer being present. Similarly to the Hackbarth, the performer has control over the progression of electronic events for the first part of the piece, and this sets up a groove-based drum and bass style build through automated cue state changes. As I had already performed *Open End* prior to learning *The Boom and the Bap,* I was able to integrate the clicktrack into my practice much more easily, and think about the interactions with the electronics during the first passage of the piece in a more musically informed way.

Throughout the duration of my research, I discovered that reflection, journal documentation and reviewing performances provides an invaluable tool kit to unlocking an ideal performance scenario and outcome, and this is strongly recommended to others wishing to approach such works. Not only does it help to refine a holistic approach to the compositions, but it also allows a chance to step outside of the problem and overcome frustrations when things do not work as expected.

Input from and interaction with the composers was integral to the preparation and performance of the Hackbarth, Vickery, and Fairclough. As has been previously reflected upon, communication with the composers was crucial to obtaining a working patch, and in most cases troubleshooting the performance would have been severely hindered or impossible had I not been able to email each composer. Beyond these communications, interviews revealed a wealth of in-depth information into how each composer approaches working with electronics, as well as the creative process of writing and developing their unique compositions.

Understanding the architecture of each work and synthesizing this with existing musical training and on-going coaching strengthens the outcome of each performance beyond any technological challenges, leading to opportunities where technical and musical ideas are synthesized to create a coherent and polished performance. It is my hope that others will continue to explore how works for laptop-based sound technology can enhance their performance, allowing them to push the boundaries of music making beyond their current practice and discover new ways to enhance their performance practice.

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Appendices

A Transcript of Interview with Ben Hackbarth

H: Hello how's it going

B: Hi Hamish

H: Hamish yes that's the one nice to meet you Ben

B: Yea Thanks for arranging this, it's a pleasure to chat with you a little bit…

H: Yea I'm really really excited to be talking some more about the composition

B: Yea me too, it doesn't happen as often as I'd like it to

H: Yea well I'm glad that it is then, yea

B: Anyhow so I looked a little bit at your questions, and I mean I can of course respond to those as you like, but I'm happy to really answer whatever, the conversation can go in whatever direction you find most useful or interesting

H: Yea I figure if we start with those ones in mind and see where we end up, more than happy, and yea I got this all recording so that's good

B: Yea I'm sending you video if that's useful, but it doesn't matter. OK so, should we just start with the first question

H: Yea that'd be cool

B: Yea start in a specific order or just, OK Hi, nice to see you (video turns on), is it late there, it's like 11 isn't it?

H: It's 10pm yea, not too bad

B: 11 hours yeah it's not too bad Um, OK so you asked me first about *Open End* using open source free software.

H: Yea

B: I'm not sure I have an answer that's as … politically savvy as you probably would like me to have, in the sense that I..., there's a lot of things that I believe in about open source software being used that I think are really important about creativity and for freedom in the sense that open source software tends to talk about, um freedom to do what you want, freedom to make what you want, ah, at the same time I think closed source software has a lot of advantages, I mean I think get paid to write software tend to write better software, people get paid to some write documentation write better documentation, so I've used a bunch of different programs, some are open source, some not free in terms of cost, I'm not really married to one or the other, so my choice to use puredata wasn't because I was necessarily because I was interested in the political side of things, I've kind of used a bunch of programs, some open source, some not free in terms of cost, and I'm not really married to one or the other, so my choice to use puredata wasn't ah because I was necessarily interested in the political side of things, I happened to go to grad school where one of the people teaching had written puredata, also worked with Max

H: Was that in the states?

B: Yea that was in San Diego

H: San Diego that's right, I think I read that

B: there's a guy Miller Puckette there who was working at ircam for many years, very early versions of that program then wrote free alternative, what lead to my knowledge of the software, really just being a composer was interested to try and make, plug things together, and make things work and uh, have music integrated in the way I wanted to be integrated in terms of the relationship of computer and … technology… that was especially important of course in this piece, so the main thing, one of the defining features of the piece that you played by me is for vibraphone, is that there's the speaker underneath the instrument that creates really similar frequencies to those that you're playing, and you mix together in acoustical space and physical space and create these patterns of beating, which I think is a really interesting idea in the sense that if you play the electronic part alone or the acoustic part alone they are simple tones, if you play them together this thing emerges from them being bled, in the same space… and for me that was a really interesting

idea that electronics are not simply just sounding like the instrument or accompanying the instrument or occupying a similar sonic world to the instrument, but are actually… the intersection of the two physically in acoustic space, acoustic waves is creating these hidden patterns, or these other musical directional trajectories. So, For me using software that was, helpful I could arrange things how I wanted to … like Puredata or like Max, it was of course important to get that level of intimacy that I don't think you'd get if it was more fixed, and hard to make work if it was more open in some ways in terms of practicality. Yea, these things are always a balance between like trying to make sure your pieces are playable, because they're not to hard to put on, not too hard to figure out, and also trying to make your pieces flexible so that they do what you want, I'm talking specifically about technology, I'm sort of answering your first question, and I'm also sort of answering your second question in terms of … I've never written a solo vibraphone piece one of the things that interests me about combining with technology is the new kind of sound that emerges from these, this beating that intersection…

H: Because vibraphone is such a pure tone, it is very easy to get that exact beating every time yeah.

B: Yea, exactly. That wasn't an accidental choice, the choice of the music coupled to that idea was of course based on the fact that they work particularly well because they are such pure tones.

H: And did you work specifically with a particular vibraphonist?

B: I did work with someone… actually I worked with a couple of people, where I was a graduate student you have lots of good percussionists because there's Steve Schick there, so I had a good …a nice selection. I worked with a guy named Greg Stuart, he's a percussionist…

H: He was in Melbourne recently I'm pretty sure!

B: Could be. He works a lot with some kind of experimental post-Cage composers, one of them being Michael Pisaro.

H: Yea Michael Pisaro, that's why he was here, I know I'm going on a tangent, but Michael Pisaro wrote a piece called a Wave and Waves, which is a big minimalist work, and Greg Stuart recorded every part I'm pretty sure all 100 parts but then…

B: Yea I actually helped him spatialize it, I did the premiere performance of that piece.

H: Wow that's amazing. I don't know if you can. You won't be able to see it but I've got the poster up I was involved in a couple of the performances, they put it on in this big space, there were 100 performers spaced through, and then the audience was all intersected in amongst the performers,

B: So they were real performers, oh so the first performance pre recorded, it was like a tape piece,

H: Yea we had it with timers on the wall and then … we all had little running sheets, so at like 30 seconds I'd like scrape my gong for 20 seconds, so we were all sort of automated humans in a way so…

B: Sounds interesting so yea so Greg if you look at the score for the piece it's dedicated…
I knew all those guys just because Greg are, well Michael's in Valencia at Calarts, so we're all reasonably close to each other, so it came out of working with him, and working with a percussionist who's really interested in sounds, in a way that I think a lot of musicians aren't, you know, interested in the phenomenology of sounds, interested in simple things about timbre and colour and contrast, which are not necessarily part of the normal contemporary music pitch-based way of thinking, both for performers and composers. Greg was really interesting because he was

… had much different sort of musical and even politically musical views that I did, in terms of what music should be, taking influences in a post-Cage sense, working around people like Michael Pisaro so he was a really excellent person to work with, started to push me away from focussing too much on pitch, and working more on space and timbre in my music. Which was something I hadn't done too much before that point

H: And yeah that's definitely what I picked up on any my teacher picked up on when we were working with nutting out the musical side of the texture and things, he really picked up on those two - space and timbre a lot, when we were working through it yeah.

B: Um should I look at this last questions ' in your experience with sending work to performers could you talk about this experience and what kind of effect this has on composition'
Um, that's a huge topic, and a difficult topic, and a topic that composers aren't very honest about I think in general, is that … well especially composers who work with technology, we put ourselves at a huge disadvantage in terms of performances compared to composers who don't work with technology. In other words you know it's much harder to play a piece by me because you have to worry about all this other stuff in addition to learning the part, in addition to all the other musical things that happen, and I have to say that working with technology, if, I'm not sure working with technology is the best idea for getting the most performances possible. Not that that's my goal necessary or any composer's goal but it definitely works across purposes for that. And you know it's hard because in the composition world, especially in the world of kind of European commissioned work, composers living in Europe … a lot of weight is put on ensemble pieces, and a lot of weight is put on these bigger works that people do, works that are really hard to put on in the future, that are really hard to do repeat performances because they're so technically complicated and expensive to mount that, it often results in a couple of performances if things go well. So, there's no question that … writing solo pieces are much easier, are much more transportable across countries to different places. In general if you keep the technology relatively simple they're pretty easy to mount, they're pretty easy to put on. Part of the reason I use this kind of simple synthesis things, where I'm playing back sound files, and there's click tracks sometimes not other time is because there's are a couple of moments where I want really precise coordination, and there's moments where it can be freer, and it's kind of a simple solution, that has a simple elegance to it that isn't technically that savvy I think it makes the piece really easy to play, and it's been played quite a bit, and I have heard some performances and not heard others, in general I feel, I'm always interested in getting recordings back from performers because it's really interesting to see how they've digested my work, without me adding things or offering things, in terms of rehearsing and coaching and stuff like that.

H: I was gonna say I'd like to send my original performance of the piece at some point and then because I'd like to perform it again next year (2016) just because the first time I performed it I was dealing with all of these new things like you were saying about technology and having to you know handle, I was you know handling all of the technical components, part of the research was working out whether I could sort of, if I had the equipment make it work by myself rather than having a collaborator or a technician on hand at all times and I was just sort of very new to everything at that point and yea found it pretty … not overwhelming, but challenging on stage having these new elements, things in my ears, things at my feet, not being able to just sit out and hear how the spatialization was balancing, like I think it ended up working pretty well but it's so hard when no one else in the room knows the piece as well, that's the thing, it's not a standard as all of these challenges that come out of you know trying to get balance, balance is a huge thing I think in working with tracks and surround sound, and things, so …

B: I agree yea.

H: I would like to send it through and then do it again, maybe in a more controlled space, 'cos our hall is pretty like, massive and a very it's a very resonant acoustic which makes it a bit tricky to yea.

B: Yea, so I guess so I mean I think composers technology are aware of how hard it is, and yeah usually when my pieces are done there is someone sitting at a mixer for a variety of different reasons, for balance, for safety if something explodes and the speakers start blaring out maximum amplitude noise, you wanna have someone there. There are reasons that you probably do want to have a collaborator in those scenarios but I think more broadly from a musical perspective, I think what it means for composers who are working with technology is that, we should have really damn good reasons for doing it, because it adds a layer of complication and often several undesirable things for the performer, our music better be damn worth it. The things we are doing with technology really should offer something that isn't be offered that couldn't in the acoustic world. And that's offered in a really convincing way.
So part of I guess as a composer I've struggled with this problem of portability and this problem of how hard it is to play with technology, and part of my response to that has been to try to streamline it from a practical standpoint. Part of another response has been try to really make sure that I'm using technology in a way that I think changes the piece fundamentally, and the piece could not exist without that specific kind of intervention. Both sonically, and also procedurally, and so for me it's kind of I have this kind of pragmatic approach of trying to make it as easy as I can, though when I write a piece for twenty people and real time processing, I don't know how you make that easy. People on stage, so you want mics and soundchecking and all that stuff, but for solo pieces I've tried to streamline it, and I've also tried to really … figure out a way as a composer that I can really write a technology part that does something, that offers something, that isn't just an extra musical element, it's not just someone reading a recording of a poem or a video that's sort of tangentially related, it's something that's integrated into the fabric of the music to really make its presence significant and sort of undeniable as best. So that's kind of my … there's no question that technology hurts repeat performances for any composer that engages with it, and you have to find something in it that offers you so much that offers so much potential musically that you can't not do it even though it's probably a bad idea.

H: I mean I definitely got all of that from you know even though I found it challenging I definitely knew I want to play it more times and I did have a person at a mixing desk of course for the performance and things, but just as I was in the process of kind of rehearsing it I guess I was trying to work out all of this stuff myself. But yeah, I definitely agree with all those things. That's yea.

[Some text omitted at the request of the interviewee]

B: In general the music that gets me the most exciting in the concert hall is music that brings together - two media which are different that are struggling together to create something unified and hopefully that comes across in that piece.

H: To that end, would you say, is it the pieces where you can't exactly work out sometimes whether it's the performer leading the sound or the you know the electronics are leading the performer, 'cos a lot, some of the people I spoke to in the audience were not sure whether… there were times where they weren't sure what was sort of generating or what was being generated or you know, the elements and tones, what would you say about?

B: Yea I'm definitely interested in that, it's a pretty old idea in the relatively young field of mixed music, it's a pretty old idea that there's timbrel similarity between the two worlds such that the boundary between the is clearly audible. I tried to… I really like the idea, it did inspire me, there's a lot of music that inspired me in that regard, pieces for solo instrument and electronics that had a very close interwoven timbrel landscape such that it wasn't clear who was issuing what sound. At

the same time I hope that it's a bit more sophisticated than that, in the sense that I hope it's also about about, so there's something that's really interesting to me about tape pieces with instruments, or electronic pieces with instruments in the sense that you've got this physically present visual performer who does things that the audience can see and understand, not necessarily predict, but understand that in the sense that there is someone is physically present making these sounds, their actions leads to concrete results, it makes for a listening experience that is much different for electronics, nothing is visible, everything is possible and bringing those two things together, the kind of struggle of the acoustically confined relatively immobile sonic acoustic instrument and this vast world of sort of limitless potential that technology provides, bringing them together to kind of struggle with each other is really interesting to me…different sizes of the boundaries of what they can do, and that struggle is so much more meaningful if they have common points for their sound a lot like each other, and you really do identify them as being integrated, even if only sometimes, so, and I think that's pretty clear in the piece as you move towards the end the electronics break free of what has been a sonic straitjacket, for the first two thirds of the piece, and I hope that that moment of breaking free is made a lot more meaningful by the fact that the first two thirds of the piece were together in a really convincing way in terms of timbre, in terms of behaviour. So part of it, making them sound like each other is interesting, but also formally I used it at a device to make the moment when the electronics break away from the acoustic world more meaningful, more palpable, more energetic, more fantastical. I guess that's the idea. Any other questions?

H: Yea I was gonna ask what some of the works were that influenced you, you were mentioning some that you had, some that inspired you that um you used the sounds together, any particular…

B: Sure, um ah a really great piece for piano and electronics by Davidovsky, called Synchronisms number six, starts with a very famous way of a piano/pianist playing a G sharp and the electronics take that timbre and make a crescendo on the g sharp, and it's a piece that is in general it's rhythmically quite and timbrelly quite interesting integrated between piano and tape, and I guess that's a tape piece. Some pieces for real time by people like Thom Flattery, or other composers that really do simple delay based stuff, that make really interesting pieces out of simple two delay line acoustic instrument and real time electronics pieces. Certainly there's really interesting things about Kontakte in that, in the way I'm talking about, it's a little bit more obvious what's the tape and what's the instruments in terms of sonic character, but I think he's definitely trying to make the two touch each other timbrelly, even if it doesn't perfectly work out in real sound waves, the gesture is clear, that they're supposed to be inverted and together, in that sense. Other pieces for solo instrument and electronics which crossed those boundaries. Yea it's funny I'm saying things which are kind of a mix of tape and real time but Marco Stropa has a bunch of really interesting pieces he's an Italian composer living in France Marco Stropa. Does processing with really precisely followed instrumental parts. And I think there's some really amazing things in that, in that way as well. The hard part of course about real time is that it's hard - the thing I've talked about my piece where the electronics break away from the instrument because is a really hard thing to do in real time you can't make a sound that hasn't happened yet, I mean you can, but it kind of breaks the real time if you like. So for me I tend to go towards in the tape fragment you know reassembled tape fragment direction just because it gives me more freedom to break away from what the acoustic part is doing. In a sense you know real time music can't comment on something that hasn't happened yet, or can't make something happen that hasn't been presented. It's always this reactionary force, at least traditionally, and I'm much more interested in things where the instrument leads sometimes and the electronic leads other times, it's one of the reasons I tend to not use real-time things, or at least solely real time things in my pieces. Is that useful?

H: This is all really really useful, like really … I haven't spoken to a composer about you know this kinds of interactions and things and it really gives a huge helpful insight into the research I'm doing so yea I really really appreciate all your answers.

B: It's a pleasure, we should chat sometime about future stuff if you're ever interested in trying to figure out some kinds of projects that might be interesting. I know you're far away, I see you leave the Island sometimes…

H: Yea I would like to travel a bit more and meet … you know collaborate with people in Europe and things 'cos it yea we are isolated down you know, there's a great scene down here but you know compared to…

B: Yea and there's good funding considering, considering the size of the country you have a lot of, I think you've got a lot of good funding opportunities, I can imagine it's difficult. But, well, maybe in the next couple of months we can chat about that, I'm just finishing up some projects now, but if it's of interest to you we could find some

H: Absolutely yeah, huge interest.

H: Because um yea I'm just sort of scratching the surface of… this year is really the first year tjat I've explored into pieces with electronics and I've decided to use the research project as a way of doing that and then presenting each work as a case study and … so yea I'm but I don't wanna leave just at that, I'd love to keep performing and get your feedback on the performances of your piece 'cos as I say I think if I do a repeat performance it'll be a lot more effective in terms of just being familiar with how everything works and things yea. Great. Well…

B: Let's um we'll find time, I'd love to get the recording so just send

H: Yea I've got a dropbox link to that…

B: I'd love to see it and I mean I'd be happy to talk to you about the piece too and other projects. Yea let's find time to chat about it

H: That'd be super cool. I did …another like offhand question just sorry before you go about those sounds towards the end that are all sort of crunchy and things, what exactly… how did you create it? Where they from recorded sound or was it synthesis, or…

B: Um so what um they're different sounds of scraping across different surfaces like gravel and stone and things like that. And originally the idea was … what I'd tried to do which ended up being really hard was take samples of the tinfoil-wrapped F, was it F? Yea F natural. And I'd tried to remove the pitch from it to just try to get the metallic noisiness of the sound, and I'd tried to get rid of the F, all of the F and its overtones just to have this kind of metallicness, so there's kind of parts towards the beginning of that transition which are like that kind of sizzly, noisy sound that you get from the tinfoil, then I kind of gradually transition to these sound which are kind of more material and metal and stone, so kind of moving away from everything being about vibraphone materials, everything being about vibraphone metal wrapped in other metal to being about all kind of earthly material. But I'm not sure you get all of that from a performance but that was the impetus behind the, how the sounds unfold in that.

H: Great, we'll yea I'll be in touch I'll email through the … performance and then yea I'd love to hear about possible future collaborations and things but yea thanks a lot for finding the time to do the interview!

B: That's a pleasure. Nice to meet you over skype and speak soon.

H: All the best!

B: Thanks, Bye.

B Transcript of Interview with Lindsay Vickery

L: OK, so ah I got a Churchill fellowship in 1995 … and it just was my fortune that, that that summer they had this Max/MSP kind of introductory course, at CNMAT, which is the kind of electronic music specialist institute attached to University of California Berkeley, and I think it was three weeks, this course, so it was fairly substantial and like I'd heard of Max/MSP and I think I'd been working with this group *Magnetic Pig* with Cathie Travers, and I think that the subject of Max/MSP had come up so I knew potentially what it could do, ah but I didn't have a copy of it or… this is a long time ago, 20 years ago. So anyhow, so I did that course and it was with a whole lot of really fantastic people and it was … you know it was kind of like an intensive language course, in the sense that, you know we were just doing that all day and all night. And so you know I got, and I had some like quite specific sort of projects that I wanted to do, ah so it meant that I could kinda get quite a long way in it because I was able to ask ya know there were some great kind of tutors there and that actually … brought along these people to … to be at the workshop kind of as participants who were actually you know very advanced Max users so they were kind of helping people out as well so because I could say you know how would I do XYZ that meant that I actually got a lot of … kind of direct experience of rather than having to just learn it from … from the ground up if you know what I mean…basically learning a whole lot of stuff and thinking well I don't know what I'd ever use this for, well I was kind of able to go directly to the stage of I wanna do this, how do I get there so that was, that was really great, ah so this is before Max MSP could deal with audio, it was just called Max, because there was no SP, no signal processing, so it was all just MIDI. So and then I went back to the States in 2000 and did a residency at Harvest Works in New York, which is another kind of you know Bastian of Max/MSP use, and I'm pretty that was after the MSP had been added, so I kind of seen that arrive and I had no idea like how to use it and I'm not sure that my computer was even quite fast enough at first but anyway ah so you know this same kind of thing happened I think I did a week there or two weeks and kind of got my skills upgraded a little bit with that, and the jitter side of Max/MSP is another kind of important element, unfortunately that is like something that I kind of had to teach myself because I just haven't kinda you know been having family that kind of thing I haven't been able to go off on fabulous solo adventures to hang out with people and do programming, so I kind of pretty much I think just kind of worked that stuff out for myself, but it sort of followed on from in some ways this project …. there's you know a few papers floating around out there which described the project of Decibel starting to put scores onto you know a scrolling screen, and it happened because um ah Cat Hope brought along this very very long literally physically long piece made up of I dunno ten A3 pages in colour and with lots of glissandi all the glissandi were measured against a grid and we tried to play it using stopwatches, and you could kind of do it but it wasn't accurate and it just I had just before that made a piece where I had an image which kind of scrolled from right to left on the screen with a it was called Transit of Venus, and it had like little graphical symbols that moved across the screen so you know I said so why don't we try to put your score onto this into this same kind of format, and so we did and I guess like the last piece of the puzzle of where *Lyrebird* came from I guess is um just kind of getting used to all like developing skills to be able to scroll things and on the screen and also kind of developing ways of trying to and networking them and also developing the ability to keep the timing between the scores as precisely the same as possible, because that is a real issue, obviously. Because you have scrolling score, you think that everyone's looking at the same thing but you can't really tell, and people's computers work slightly different and ah you know even for I don't quite know why but even for you know these modern day computers it seems to be like quite

a processing challenge to scroll a great big image across a screen which you know like for a laptop or something so every computer responds to it slightly differently so that's kind of how this emerged and you know I guess I'd been kind of interested in generative scores like making scores where the notation is generated in real-time and I'd done that by pre-creating images or like taking a score and chopping it up into lots of little bits and then importing the images in indeterminate fashion onto the screen and developing timing structures which would allow the elements which were being picked up at any particular time to be co-ordinated with for example a clicktrack or audio processing or something so there was a kind of a meaningful connection between the actual thing that the person was playing and the way it was being processed or the tempo that it was going, that kind of thing, am I talking too much?

H: No I'm loving it! This is great thank you! This is all really interesting.

L: So along comes Vanessa I guess it was 2013 maybe? Or it must have been the end of 2013 like October or something she [Vanessa Tomlinson] received a grant to develop this piece called, this program of pieces by Australian composers for solo percussion, which is called 8 Hits and she so I you know I was lucky enough to be one of the people that she commissioned for that, and then Decibel, so I had some kind of ideas about it and I guess like the very, the thing which was uppermost in my mind, or the things that were uppermost in my mind is were that I was making a piece for someone who's an incredible improviser, and you know that's always a slight problem for a composer because the improviser is like on one hand - Vanessa is also a fantastic reader and she reads the most complex *Bone Alphabet* by Ferneyhough, I believe she was the first person to memorize it ever, anyway! So but you know I love the improvising side of her work and so I wanted to make something which was still you know like a real composition not just kind of telling her to improvise and do anything but at the same time allowed her to use those you know her judgement which I trusted as to perform the piece so that was one in my mind, and the other thing was Vanessa and her whole family had just gone on this really long road trip and you know like literally I'd been seeing on Facebook pictures of them in the Outback and various places, I think they drove from Brisbane to Adelaide through the Centre of Australia, like I was aware that there is a very sort of ecologically conscious part of Vanessa's practice and she's kind of very involved in that sort of way of thinking about living in the World, literally so I was keen to make something which would reflect that, so the next thing that happened in this process I guess is that we were in Decibel was touring in Europe, I'm trying to think where we finished I guess we probably finished in Sicily, yea I think we finished in Sicily, and my family were staying with some friends in Germany at that time and I went up to stay with them after we finished our tour, and Vanessa had been in Gent in Belgium for maybe a few months at that stage at the Orpheus Institute doing a residency there and so I asked her you know could we pop up and we'll work on this piece as part of your residency you know very kindly she said yes because it was me and three other people, and so you know like my family, three other small loud people, two small loud people anyway so we all went there and the idea for *Lyrebird* I guess was kind of, well we kind of workshopped with different things and she had some field recordings that she'd made so we tried out some of those so that we could see how expressive we could get the images to be, and so on … but I realise as I'm saying this I have actually left out a part of this story which is this piece called EVP so which was 2011 I think?… ah so ah let me just talk about that for a second, so as a result of the evolving of the Max/MSP/Decibel score player and everything I had been just experimenting with different kinds of generative notation being able to … and this was abstract pieces, I guess my idea behind it was to be able to make cloud-like Ligeti style generative passages or you know basically to be able to control all of the different elements of notation in a real-time way that I guess essentially looked a little bit like what the Decibel score player looks like, or what these kind of scrolling scores look like without being a fixed thing. So I'd been working on that, and I think I'd had some input from Stuart James on how to do that in the LCD object in Max/MSP people and that was kind of one of the ways of scrolling images that we already had developed in for the Max version of the score player and well I you know I have this … an interest in, I think a lot of people have this

interest in this kind of fringy area of human expression which takes in things like conspiracy theories and superstition and so on… I kind of see it I guess in a way as you know that I do my imaginative thing of making abstract compositions or whatever, and some people who don't do that express themselves in a similar way by you know connecting really odd dots about things that are happening in reality and ascribing them to aliens or ghosts or whatever, you know sorry to any people believe in that stuff out there but that's essentially my position that human beings find patterns in things and it's a kind of creative pursuit but I'm kind of interested in the fact that people do express themselves about conspiracy theories and other kinds of things like that in this very sort of Baroque way. Anyhow, so I discovered along the way this thing - these things called EVP's which are Electronic Voice Phenomenon, and this is like a whole subculture with like people go around into graveyards and 'so called' haunted houses and whatever in the middle of the night usually I think with their recorders and they walk around and they record stuff, ah and then they go home and they chop little they think they hear something so they chop that little bit of audio out and then they compress it and make it go backwards and they find voices in them and so there's like huge numbers of samples on the internet of purported to be ghosts saying stuff.

H: I had absolutely no idea, sorry to interrupt!

L: I think that it's really interesting, as a phenomenon, that people would - these people are incredibly devoted to it, they're unbelievably committed, and like some of the samples have been sampled so much, it's just ...anyway. That's beside the point. So I had this idea of making this piece with EVP samples, and so generating some kind of tapestry of EVP samples was not a problem, I'd done kind of things like that before so that was alright but how would you make kind of instrumental parts to somehow meaningfully interact with these. And you know I'd been using a lot of spectrograms and that kind of thing, and so it was I guess a possibility of ah actually just taking a spectrogram of what a particular channel of the recording looked like and then giving it to a performer to play the spectrogram, but the problem with spectrograms is they include all of the information about what energy is happening at every frequency of a sound, and so they don't in the sense look like what we hear because our auditory system combines all of those harmonics and that's what we call timbre, so like we hear things as a single source with a particular timbre or colour ah whereas a computer sees every frequency, every aspect of the frequency of .. and of course our auditory system does a whole lot of other stuff of segmenting these elements together to say that this sound belongs to that, it must have all been made by the same sound source. Rather than because of course what the sound that reaches our ear is a kind of soup, you know it's absolutely amazing that we're able to tell that one sound comes from a particular place, and that must be the cricket that's over there, and that other sound must be from the bird that's over there, and when it arrives in our ear it's all the same stuff, it's our brain that makes the auditory scene up etc etc. Anyways, so the idea was basically to in Max/MSP have the concept was a scrolling LCD object, so it scrolled like the score players had, and at what speed? I didn't know at first, so that had to be discovered and then to draw on screen, and originally I just did this in black and white, EVP was black and white, to draw on the screen a little rectangle at a position which was determined by the frequency of the sound, and with a size that was determined by how loud it was, so the way that I got from the original sound source, to the determination of the rectangle and how big it would be, and so on, was using 'Fiddle' which was Max object which detects pitch and amplitude and whatever, and you can tell it to look for as many frequencies as you like, but my idea was at first that it would be too complex if it was looking for lots and lots of - it would be too dense for people to read, so I would just look for the most prominent , the strongest particular frequency at any instant, during the recording and then I would put a pixel there, and the size of the pixel would be determined by how loud it was, and so it would draw these kind of shapes on the screen which would scroll past, and I guess another important element of this was the idea that the recording itself would be fed into a delay which was all in Max/MSP, a so called 'digital delay' which would delay the sound of the recording, until the pixel which had - which was representing the sound on the recording had reached the left side of the screen. So, in case that

was kind of hard to understand, so it would draw a pixel on the right hand side of the screen which was a particular sound, and then it would scroll across the whole screen, it would take 12 seconds, when it reached the other side of the screen, the sound which had produced that particular kind of rectangle would be heard simultaneously. The cool thing about that which I guess I intuitively realised at the time but I kind of hadn't put it in words, was that the performer in that sense gets to see into the future, so and you know that's not a big deal in a normal musical score because that's what a score is, it's something that allows you once the piece has started, you should know more or less how it's going to unfold in time. But this is kind of different because the audio is not notated, and it's quite indeterminate, it doesn't have a tempo or meter, it's not fixed to any particular pitch structure, it's not in a mode or anything, so everything about the recording is totally free so this allows you to actually see what's going to be there in this very kind of indeterminate sound world, before it arrives, and that turns out to be a really cool thing. In fact it's something that I really think I've kind of been obsessed with a little bit, sort of maybe back to my opera which was like 2001 because so the whole opera had a projected video going at the same time, and therefore it had to have a clicktrack to keep the musicians in time so the singers are kind of on the stage, and they're free in the sense of they just have to be in time with the performers but the performers had a clicktrack, which mean you could have all kinds of things which seemed to be very random, which were completely synchronised, and there's something about that which I find really intriguing and in some senses it's just one of the elements of music, like music's all about the amazing synchronisation of sound events and … but something about the synchronisation of the video and everything which I really like so in a way there's a thread that comes right back from that time, OK so I guess when so, that was EVP was performed in 2011 by Decibel and then fast-forward back again, or whatever, ah return from back to Gent with Vanessa, so initially the idea was to use something very similar to EVP but instead of sounds of Ghosts, to use the sounds of field recordings, and the other part which is I think very specifically about Vanessa was I wanted to make - I wanted to have the piece … have a kind of a real time or near real-time quality to it, that is the decision could have been at that point to find the perfect field recording, and to make one piece which you could play in this thing and it was you know was in the score player thing that I'd made which was perfectly calibrated to that one piece, and then it became you know - that - became the thing, you know that became the piece. Sort of in keeping with the ethic of improvisation and I guess the ethic of interaction with nature which you would hope is going on in a field recording, or performing with a field recording, making a field recording, my idea was to take the, to make this a kind of generic player which any field recording could be loaded into. So with … and the ideaology behind it I guess is that the performer can actually go out even on the day of the performance and make the recording, and come back, and play through it with the score a couple of times and perform it that night, and have a meaningful interaction with the field recording they've made. And that in addition to that, while they're out making the field recording, they could actually pick up you know things from that environment which they could use in the performance, so that the objects that they're playing on are actually from the same place as the recording. Because you know there's this kind of question of well why would you make a field recording, why wouldn't you just go sit in that place, and what does it mean to bring a recording of some other place into a concert hall and put it - a bow tie on it and so on. So there was this kind of issue of trying to make it more the performance more as much connected to the actual location as site-specific as it could possibly be, so, that meant if this was going to be a generic player which could deal with any field recording, it meant that the kind of controls for you know what frequencies would be represented and how could not be generalised, they had to be made specifically for each one. And so it ended up that *Lyrebird* has this control panel with kind of readouts of what frequencies are coming out of it and what amplitudes are coming out of it and whatever and that you can adjust the scaling of those elements so that you're capturing the part of the - either as much of the field, as much or as little of the field recording as you want, so I guess the kind of standard way of doing this would be to make sure that whatever the range of frequencies and amplitudes and whatnot that you're getting from the recording, that you're getting the entire range and representing that across the whole of the screen, as the piece is playing but that's not necessarily the best way, sometimes all of the

interesting stuff is in a much smaller band of frequencies, so this also allows you to kind of zoom in to a particular locale - I don't know if locale's the right word to use for a field recording - but you know in nature I'm sure there's - I'm not a field recording expert and I'm sure there's people who would be able to speak with much more authority about this but my experience so far has been that there are kind of frequency bands in field recordings that-where activity happens, and areas where not much is happening, so and my supposition here is that in nature you animals evolve to have calls and so on and make noises which occupy a particular frequency band that no one else is occupying which means that they can actually be heard over the din, so it's something also to do with the size of the animals or whatever, or like in general frogs tend to be one of the lowest kinds of sounds that you encounter in the environment, as far as I can tell and then the large birds like Magpies and crows and that kind of thing and then the small kind of twittery birds, and right up the top crickets, which are like really really high frequencies. So, there's an element which is also out of order here which I need to go back and fill in which is the difference between EVP and *Lyrebird* was essentially that I had the idea like well we can - it's great that we can represent the pitch and amplitude but it doesn't' tell us much about what that sound is, you know it doesn't tell us any more characteristics, and by that time I'd discovered some other real-time analysis tools that could be used in Max/MSP notably Tristan … no… I'd have to check the name anyway it's J-e-h-e-n is his surname; let me just quickly look it up. Oh… J-e-h-a-n. Anyway I'll update you with … I'll do that very quickly, sort of quickly. Alright well I guess it will work out in a minute. So analysis tools which could for example evaluate the brightness of a recording you know different kinds of spectral qualities. So brightness is basically looking at how many overtones are present it literally measure the spectral centroid, so it basically says if the harmonics are spread over a certain range and the loudest frequency is in this particular range, the wider its spread, the brighter it is, and it's been shown to line up pretty well with what normal people say is a bright sound or a dull sound, but I have discovered that it also gives the same brightness reading for so for example if you ring modulate a sound and you have a very high pitch being generated by a very low pitch, it also gives the same brightness even though there are no harmonics in between as far as I can tell. But alright… well Microsoft word seems to be behaving now… Oh it is Tristan! Tristan with an A, Jehan, with an A. Anyway so the object's call *analyzer*. And so that's brightness, noisiness is the I believe it measures the level of inharmonicity in the sound that is a sound is more harmonic if all of its overtones are whole number ratios to one another so for example when you, you know hit a note on the piano actually maybe a pianos… everything's a bad example, nothing in nature is perfectly free of noise, but in a kind of best case scenario the overtones of an instrument can be heard as particular pitch because they're all whole number ratios so the first harmonic is twice the frequency of the lower one, the next one is three times, and the next one is four times and so on, so noisy sounds are sounds which are, where it's hard to determine what the frequency is, and the reason for that is that the harmonics are not whole number ratios to one another so our ear can't determine that they belong to the same single pitch. Alright so that's noisiness, and the last one is the weirdest one, the other thing that it measures is something called Bark Scale. So I mean you can - I think that there's a reference somewhere explaining what Bark Scale is, and it does seem a little bit mysterious but essentially my understanding is that it - if you take ah - it breaks up the entire frequency, the entire frequency spectrum, so not of a sound, just every, you know, it breaks frequency up into a whole lot of bands, and then what it does is it says if there are more frequencies in a particular band it will deform, that one will become weighted more heavily. And I should maybe step back one pace and say that it's meant to be modelled on how the ear actually works, so in our ear the Cochlea has a bunch of little hair receptors in there and basically if a whole lot of frequencies are in a very similar place, they kind of overload the sense in that region. And that's why for example, well that's why we hear cloudiness when we listen to *Micropolyphony* by Ligeti, like all the frequencies are in a particular band which is about a perfect fourth, all the frequencies are in that same band, we find it hard to discriminate each individual one, and so now our brain can't stream them into separate streams so our brain says they all belong to the same thing, and because their time is all slightly different and their pitch is very similar, our brain says … gives up and says it's a cloud of sound. We can't actually hear all those

28 violins playing pitches between C# and F. So Bark Scale is basically trying to mirror this like how much would these bands have to be deformed by the sound so in a way I guess what it's measuring is like what region has the most energy, well that's what I hope it's measuring… as far as I understand it. And the way that the data that I'm getting out of it is a little bit of a cheat in the sense of so the way I'm measuring it is basically, so what you get as Bark scale data is not a number, it's a set of numbers, it's a list of numbers and each number refers to how much I think in the case of the analysis object, he gives 26 numbers or something and the numbers relate to how much each of the 26 bands has been deformed, so what I do is basically take - but there's an object there which puts them all into order so instead of saying that the thirteenth band is being deformed the most, it puts them all in order from least deformation to most deformation, and then it outputs the average, so it's not in that sense it's kind of a real thing that does tell you something useful about the sound but it's not a very precise thing. And um so those three parameters are used to determine the hue saturation and luminance of the colour of the individual rectangle - the colour that the rectangle is. And so why that order? Well, in a way… so there's no scientific reason, so I don't think that there's any scientific reason for colours to be assigned to sounds, in terms of human perception, you could say that A 440 if you multiply that by blah blah blah you'd end up with a frequency which is a frequency of a particular shade of colour, but that … and that might be meaningful in terms of a computer or something but it's not meaningful in terms of a human being because our eyes don't work like that. And I'm, I had been doing , I was just about to start when I wrote this piece, sidetracking.. project as an early career researcher grant believe it or not. And so I had been reading a lot about visual perception as well as auditory perception, and so you know that's one of the if I can explain it briefly essentially the hearing, the auditory system is linear because we have those tiny hair cells go from large to small and they do it in order so that sound is actually mapped in our brain in a linear fashion but sight is not and the reason is that there are cones and there's rods and there's three different kinds of cones in the eye and they have different sorts of sensitivities and so basically the important element of this is that things which should appear to… well the brightness and darkness or dullness or whatever are don't match up to parameters of music in the same way that they match up to parameters of colour as far as human perception goes. So everyone knows the spectrum of colours is ROYGBIV, so you wouldn't expect, also firstly, we could say that so which of those colours is the darkest? Alright? Well, probably some kind of purply violet right? Before we get to black. But the thing is violet is actually a high frequency colour, and it's read that's the lowest frequency colour, no. That's wrong. Sorry. Scratch that! So red's the high one and purple is the no… sorry! Purple is high red is low. OK but so that's the first thing, so frequency, the light spectrum is kind of upside down as far as perception goes to a certain extent, but it's not just that it's upside down, it's also that the, there are kind of bumps in it so for example we go red, orange, so is orange brighter than red? I think it is… right? And then yellow, that's brighter, and then green, that's not as bright, and so on.. ah and so the anyway it's a very complex question but essentially it seems that because of the way the sensitivities of the cones are arranged, there are certain colours that appear to be brighter to us because the sensitivity of the cones kind of falls off at that point, and they have to have more energy for us to even see them, so yellow is one of those because it falls in between the red and the green cones, and Cyan is one of those because it falls in between the green and the blue cones, and also magenta which is on the other side of purple, sorry the other side of blue so that appears to be brighter than it should be to us. And there are all kinds of evolutionary questions about why we should, why it would be useful for us to see yellow as the brightest colour, which may or may not have to do with primates growing up on the Savannah where most things are principally yellowish. But anyway let's not get into that. You know, like people have actually tried to or developed models which say the sensitivity of the cones is X as we go through the frequency spectrum, that should mean that certain colours have different energies which should allow you to predict which ones would be brighter to a human being as opposed to other ones and so one of those... and there's a number of different kinds of systems that people have nominal spectra from bright to dark that people have explored and one of them is the CIE lab which basically has white on the top and then yellow and it goes, it has a kind of a left and a right polarity

like one which is green blue and one which is kind of red orange on the other side, and they come down at the bottom to black. So I think that most people would agree that White is brightest and black is darkest, it's all the things in between which are the kind of difficulty and if you look at this it's kind of map of bright to dark, in this CIE Lab spectra, I suspect that some people see it slightly differently depending on, because the sensitivity of everyone's cone cells is slightly different, so I guess what I'm trying to get across here is that the key issue is if you're going to represent something on a screen, and you are hoping that people will be able to understand from what they're seeing, what they're about to hear, you want to make it as a semantically understandable as possible, um and so for example if we were to hear a very bright sound what would be the most appropriate kind of colour to represent that? And so my idea was that brighter sounds would be given a hue which was brighter. Ah and that duller darker sounds would be given a darker colour. And there's quite a lot of pretty reasonable evidence which I think is pretty indisputable that there is this ability of human beings to cross modally use cross modal metaphors - you've heard of the Buba-Kiki experiment?

H: No.

L: Oh so the Buba Kiki experiment, can you actually see me?

H: No I can't.

So it's like these I can't actually see where the oh… ah! There we go. So the idea is they find these two letters of a martian script on mars and one of them is this kind of like cloud shaped object, and the other is a star spiky shaped object and they asked people which one is which, which one is Kiki and which one is Buba and almost everyone chooses Buba as the blobby one and Kiki as the spikey one. And this is thought to be because of this cross-modal metaphorical understanding of which is common to all humans and maybe the reason why we talk, actually because we can create sounds which mean things rather than … and then it's kind of just got out of hand now and become very abstract. But so basically ah the idea is that there's cross modality, there are you know like anything which can be placed upon a continuum can be experienced as belonging to one side of this cross modality or another, so high, bright, sharp, all those things on one end, and you know dull, dark, and so on. And you know you can hear it in expressions that people use oh you know that's a very sharp taste or you know whatever. That's a very loud colour you're wearing, it's just part of the way the brain appears to work. Anyway, so the idea was to try and colour these sounds in the most kind of natural … semantically natural colours so, ah so brightness was pushed down one end of this mode um and then, so noisiness is used to describe the saturation and you know I don't know whether there's like a .. it just seemed like the best idea to me and I did , I tried a bunch of different - connecting the inputs to different places before I came up with hue saturation, so brightness, noisiness and bark scale attached to hue saturation and luminance, um. But ah you know so anyway so that's how they got attached.

H: OK cos that, as my performance of the piece went I'd sort of wondered what the colours were about, and now I guess it probably would have changed my selection of textures and colours and everything, which is why I'd love to perform the piece again this year, um with … now that I've had this insight it's really great, yea.

L: Yeah so the most important aspect in a way is not even just that there is meant to be a semantic connection between the colour and the timbre of the sound so much as the fact that every time that the same kind of sound is made it should be the same kind of colour. So and to test this out I got Pierre Schafer's *Chemin de Fer* etude to *Chemin de Fer* which is a music concrete piece made out of sounds of trains and it's made from the sound of train interiors and exteriors and whistles and a whole lot of different kinds of sounds, and I ran it through this thing so this is the kind of interesting trick you can do with *Lyrebird*, if you change the scroll speed to be very very slow, it basically piles

the information up so you can visualise the whole piece within one screen and that's kind of useful as well to see where everything is. I might add that ability (so you get an overview and structure your improvisation and your different sounds, so you know about this far through you can return to that or grab that one out. That won't be too hard to do anywho, so the thing which I haven't said which is due to the research I was doing on colour theory and all that kind of thing I made a bunch of different kind of mappings that the performer could use so CIE colour space is one of them, which should mean that the brightest sound is yellow and the darkest sound is purple, or dullest sound is purple, but I included ROYGBIV and then ones which are just kind of went down one side of the colour spectrum, so they left out green and blue, and ones which went down the other side of the colour spectrum and left out red and yellow, ah sorry red and orange, and for example other ones which basically went … they kind of went to the peaks which were at yellow and Cyan and Magenta, so if you like they, I've been doing all kinds of hand signals all the time, you couldn't see them…! Anyway and it would be possible to for example to just allow the performer to map it however they want. So the, so if you open the analysis panel in *Lyrebird* you can see all those, you can see eight mappings at the moment. And it would be possible to make it even more non-linear um ah but the thing is that any time that you play a particular field recording with it, it won't, I mean you would naturally thing that CIE colour space is always gonna be the best way to represent that, any field recording because it's the colour mapping which is most like the idea of brightness, bright to dark colours ah in human visual perception but the thing is it's not always, and i think the reason for that is to do with the fact that recordings themselves are non-linear as well so ah if ah you know you were going out and recording … well if you were recording an orchestra for example where there's frequencies at almost every possible, in every single band, um because the sound is filled out, then probably CIE would probably be the best one but in a field recording, you know you could, a bird could come really close to the microphone at one point and you know so most of the interest in the field recording might be at a very particular range of pitch and also because of the thing I was saying before about the you know a lot of the sounds being kind of in specific bands rather than kind of filling out the whole space, ah then it just happens that certain of those mappings work better with a recording so it's kinda worth going through it a number of times and seeing what the mapping looks like, you know it could be for example that um well you understand what I mean. So in terms of where, so I you know I really like the piece and I've been working on it a lot actually, ah you know just recently still because I think it's useful for some other things as well, ah for example making artificial field recordings, so making things which sound kind of like a field recording, but are actually not, so and I've made one of those so far which is called, it's got a long title*, Murmers tracked within the Bark* which is a whole lot of insecty clarinet sounds which are processed by this other software that I made which changes its pitch and plays back the sounds and whatever, and it ends up sounding, well it sounds like a field recording to me. And um so you know I used it to process that, and then the other things of course is that to go back to what I was saying before is that it is completely possible to make fixed pieces with this and I , this is actually what I've been doing a little bit as well um so make a fixed piece which looks at a … that comes up with a very particular kind of score which relates and is maybe more annotated and so on, and I guess definitely has more of the kind of composer's control of what's going to happen … a kind of tool for improvisation or something. So there's some of those on my Facebook site, I think and there's also some actually just finishing a paper about *Lyrebird*, so I'll send it to you cos it's got ah, there were so Vanessa recorded - she came over here and made a recording, and then at the same time while she was over here I made one and ah a couple of actually I'm not allowed to say who but a pianist and another percussionist, a double bass player and a cellist all made recordings of different things and ah you know it's very interesting to see what people take out of the score and what they leave, and how they respond to different kinds of environments, so for example there's one which has a recording where the kind of main feature is these bullfrogs, and the pianist who played with it has perfect pitch, which is invaluable, the pianist chose to just focus completely on the Bullfrogs, he just plays exactly what they're doing on the piano, for six minutes or something, like really really it's so precise, it's crazy. And whereas Vanessa tends to play quite free, she does things like, which is what I had kind of expected as well, that you know you can see

in the score there's crickets you know you can hear them and you can also see where they're gonna stop and she kind of takes over from there once they've stopped and that sort of thing, so she's kind of interacting with it um more but so the idea of like interacting with it, you know on the other end of this contiuum of course is like actually fixing very precisely what sounds are being made, and another kind of development of this piece I guess is taking the same analysis tools and using them to actually generate a notated score, so you can imagine what a mess that looks like, so I've been trying to refine that so, you know it's not a score you can give someone to play, it's kind of a guide, which you can then you know edit for about six months, to turn into something which actual human beings could play, but of course the cool thing about it is that it's very precisely aligned to the recording so you know if you play this piece at crotchet equals sixty, everything will be completely in sync with the you know whatever bullfrogs or whatever is in the background.

H: And so you intended for it to be primarily an environmental… you know an environmental sounds recorded for it, I did a fairly domestic sort of one

L: Yea no I didn't so the idea was that you'd make a field recording wherever you were, so you know like that kind of assumed that most of the time people were gonna be performing in a city somewhere, and that they would try and get some kind of interesting um you know sound from you know it could be a park that's near the city or a nature reserve or something, or it could be like a factory, actually I've been really regretting because I went to Denton in Texas last year, and that's the place where they invented fracking, and now they're trying to get rid of it, because the fracking people have been building fracking wells like everywhere, like next to hospitals and people's back yards, but they can't...anyway Texas changed the law so they wouldn't be able to stop people fracking wherever they want, and I should've tried to get some kind of field recording of one of these fracking wells because I've got no idea what they sound like, ah anyhow that's not the story but you know it could be for example it could be for a political reason like that that you know you make a recording of some thing which is a blot on the landscape, or the soundscape, yea or it could just be a you know like in of the sort of most interesting sounds around here, um there's a sound that trains make as they just come into the, inner city part they go into a little tunnel, I dunno whether it's the brakes, or it's just the particular angle of the track or something but they make a really interesting sound, not really probably long enough to make a piece out of but

H: Is it sort of a high pitched kind of edgy scrapy squeaky sound or something?

L: Yea but it's very, I dunno it's a kind of sound I like, it's very very rich kind of sound so it's not too squeaky, it's got a little bit of a kind of human scream kinda vibe, but it's also at the same time it's sort of quite rich and harmonic sounding, ah OK you know or a factory or …I was trying to think of because I have to make a field recording for someone coming up soon and I'm trying to think of like what are the most amazing sounds I've ever heard, I can ever remember, or the most amazing sound environments I can ever remember and um one of them was when lady Diana died, I went into work I think it was a Saturday or something, and I got out of the car, and so many people were listening to exactly the same broadcast, you could just hear it everywhere, and you know 'cos like so I work at WAAPA, and it's not that close to any houses and there's a park across the road, so you know I was pretty far removed but it was just so incredibly ubiquitous, there was this kind of rising and falling sound of them talking about um about that event and I presume the same kind of thing happened on 9/11 although I didn't drive to work that night. And another one would be maybe like in ah in Kuala Lumpar at certain times of the day when the call to prayer is happening, it's a very similar kind of sound to the lady Diana thing, so like when you open the windows of wherever you're staying, there's just you know I dunno how many thousands of call to prayers all happening simultaneously, across the whole city, and it's a very, it was stupid I didn't' know what it was at first, I was like what the hell is that sound you know like crazy but um so you know I but things like

that are very rare of course, and ah only ever happen if you don't have a decent sound recorder on you.

H: that's the thing yeah 'cos I guess the quality of the recording call definitely influence, yeah. I'd like to make a better one, I've got some much better microphones now

L: I've kind of been wondering about um you know like race-calling, horse race calling that kind of thing? But you know the sort of thing that you did is actually perfect, you know like just sounds from you know which include people talking and cars are unbelievable ubiquitous in our world, in our sonic world, um now did you actually pick up any items that you used in the

H: Yeah well I'd eaten some sushi or something and I had the box and it had a lot of really excellent sounds that it could make, so I did use that alongside with other similar kinda plasticky bubble wrap and some marbles in a bowl and things like that, but that was the sort of thing I was eating at the time that the recording was being made, so that was kind of the centrepiece of but I can imagine you could get your whole collection of there or combine them with conventional western percussion instruments? or is that not the intention so much?

L: No you totally can, you know like someone played this on the piano, so you're not going to accidentally find a piano in the middle of the forest, so you know so it's not a kinda crucial element but I think it's a nice element and you know it kind of applies to percussionists more than everyone else because I mean because you know you don't tend to hit stuff as often, you know I have a way of making sounds out of things in nature which is so obvious as being able to you know strike it or rub it or whatever. Um I hadn't thought about that, maybe I should pick up a tin can and stick a mouthpiece in it. (laughs)

H: oh that's right, yeah, I used a radio as well sorry I just remembered, and I was just fiddling with the dial on the radio, sort of in synchronisation with when I'd see larger bands of sound coming, just 'cos it blended in really well with the voices that were in the recording, there were lots of people walking past and chatting and talking about the rain and stuff, and it sort of seemed to fit quite well in terms of elements. but yeah

L: It um yea might actually be interesting to like just plug the radio into *Lyrebird* yea I've been… I was kind of like looking into the idea of having computer controlled radio, but it's not a simple process as it turns out, you can buy these kits which are you know like plug into your USB and basically like allow you to tune radio and turn the volume up and down from a computer but the reason I did was we were doing Cage 'Radio Music' and I was like speculating out loud about the idea of making an installation version which keeps on playing the piece, cos it's a fairly indeterminate piece so it would allow you to like play the piece over and over again in different versions, different lengths and that kind of thing yeah, anyway. I dunno what it was there are sometimes you have these projects and they kind of they're extraordinarily difficult to do at a particular moment but then later on five years later you find like someone's made a really cheap way of doing X Y or Z so anyway.

H: I think that's sort of answered all my questions that I had pretty much so… just having a look through 'cos just I sent you the performance and was gonna ask just about you know based on what you heard based on what your take on it was and things
L: Yeah I was going to relisten to it cos I haven't listened to it for a while

H: Yeah fair enough it's been quite a while

L: Yeah I think another approach would be to like really close mic things, that make very very minute sounds at the same volume as the recording

H: I had some mics over my stuff but they weren't close, they were like yea overhead mics rather than close mics

L: Yeah um or you know like put them on top of a timpani or a tom or something, to amplify them, or contact mic it or a bass drum. And the other kind of quite big thing and I think that Vanessa, actually I haven't heard any of her, cos she has performed *Lyrebird* but I haven't got a recording of it, well I only know of one performance that she's done of it, so I don't know whether she played it again after that, but um are there's just this kind of interesting thing about whether you actually use the environment recording or not, ah because you could just play the score,

H: That's what she said, she said she experimented with having a pedal that controlled the volume of the recording

L: Oh right 'cos that's what we talked about, so yeah that's the other thing like being able to turn the recording off for particular moments, I dunno if you're aware of this piece Carbon Copies by Alvin Lucier?

H: I think I might have seen it referenced in one of the papers you sent through but yeah

L: So essentially in this piece you have four people make different field recordings, they sit down on the whatever in the concert and they play the field recording for two minutes, or a period of time and then they start to play along with it, and then the field recording is turned off as far as the audience are concerned but the performers can still hear it in headphones, and they continue to play along, and then the recording turns off for the performers as well and they just continue by themselves, so it's very kind of possible I think configuration of you know performing with or being with ah an environmental recording, so yea that's kinda interesting. Yeah I'm… you know another thing would be, well you know the point of the piece is that you can use it to play with environmental sounds that you like. So like for example I really like the kind of indeterminate sounds of ah you know like a farm windmill you know the kinds of sounds that that makes when, those kinds of heaving metal sounds that kind of are very indeterminate, I like those sort of sounds, so um

H: That'd be cool, get up under a big windmill, 'cos that's also ties in with the environmental sensibilities yea

L: I don't mean the slick modern ones

H: Oh the older ones

L: You know the ones that were put on farms 40 years ago, and they're not actually using it any more but it still kind of spins around a bit if there's enough of a breeze that sort of things, or you know how on flagpoles the like usually two like kinda brass things that bang against the pole, stuff like that. That's the kind of thing that I really like but yea it should hopefully be a vehicle for you to explore ah sounds in the environment that you find interesting. Alright, that's long enough!

H: Yeah that's a really excellent explanation of everything, thatnks for taking the time especially during the break, and I'll be in touch

L: Yeah when I finish this paper which hopefully will be soon, I'll send you a copy. It's not substantially different from anything I've sent you before, I think because what I think I sent you was like powerpoints and papers where it was mentioned?

H: Yea it was papers that it was mentioned I didn't get powerpoints or anything I haven't sent you anything that's just about *Lyrebird*, cos this is the first one. Alright, Well great to meet you on Skype

L: yea good to meet you! Say hello to Thea for me.

H: I'll do that, I'll be seeing her shortly I'm sure

L: She's my little niece

H: Yea she was over yesterday actually, she made lemonade that was really cool.

L: See ya thanks Hamish! Bye.

C Transcript of Interview with Matthew Fairclough

Hey thanks so much for, I know you're super busy so thanks for finding the time to have a wee chat about *The Boom and the Bap*

Oh that's fine no problem

It's an awesome piece, I really really love it.

Good, good good

It was fun getting it to work … um yea so I guess um I'd love to hear a bit about how the piece came to be how you've sort-of, how your career's led to finding electronics, and working with electronics, I mean I've read your bio and everything, but it'd just be interesting to hear first hand specifically about *The Boom and the Bap*, and things like that.

Right. Um well we'd worked together for a long time before that piece because we, I've a trio which is Joby playing percussion... I do sound and then there's somebody called Kathy Hinde who does video for all the pieces so it's a kind of multimedia trio, so we'd done a few, well a lot of concerts together before we did this um and sometimes when we work together we do improvisations and so what I usually did was just use the effects that were built into digital mixers and things like that, but it's always a bit… everything starts to sound the same after a while because you're restricted by what those desks can do, so I started making Max patches that we could do more interesting things with, and then eventually I had an idea to do that piece based on you know the Amen Break, using that as a kind of initial idea. So to begin with we, I wrote a kind of skeleton structure for the piece and some grooves really for Joby to play, and then made the patch and it wasn't a strictly structured piece, so he could actually go backwards and forwards through the presets in the Max patch and improvise and play around with it, and early on it had the facility to change the tempo...and that was one of the main ideas for me was that he could manipulate the tempo and all the effects would change so if there was a delay working and he changed tempo then the delay time would change and it would all stay in time, and so we did quite a lot of concerts with that system, and the nice thing about it was I didn't need to be there, it was a little bit more straightforward so he (Joby) did about six concerts in America without me being there and it all seemed to work really well. But then I decided, I sort of decided it wasn't working quite the way I wanted it to and that there would be more things we could do more interesting things we could do if it had a fixed structure that always went through the same sequence of events. So then I scored it a little bit more strictly and we added the loops, in the second half because he wanted

something to play off as well as just being on his own, so we added those sort of low bass loops in. So that's kind of the second half of the piece … and then the other problem with the early versions was the bleed between all the microphones, and if we'd put an effect on the hihat it would end up on the snare drum, and whatever we did to the bass drum seemed to end up on every other effect as well because the bass drum was so loud. So that's when we had a look at using the contact mics to close (call breaks momentarily)…. It made it more complicated in terms of setup, but when we had soundchecks to get all those settings right, the system finally tuned, we got a much more interesting and ... a more detailed sound without all the bleed and you could hear what was going on a lot more clearly but I think like you said also it was affected by the acoustics of the venues too, in reverberant venues it never really worked as well, but a lot of our concerts are in black box theatres with black drapes around, because we're using video as well our concerts work well in those spaces. So in those spaces that piece works really well too.

Hamish: Yup Cos yea for a future performance yea I'd love to do it in a better venue that our town hall down the road, it's very … all of the student recitals happen there by default but um yea I'd love to look into that, and it's I guess I found it's tricky if your engineer … you know I was sort of thinking after I performed it you know I was working with an engineer in soundchecks and everything, but because they didn't know how it was really meant to sound, they wouldn't have been away and studied the recording, I was just wondering what your thoughts were on sort of overcoming that is it just a matter of working with an engineer who's really familiar with the way the piece plays out? If I wanted to perform it in Australia, for example…

Matt: It should be … it should be Ok to do if the sound engineer's good at getting a standard drum sound, ...which is a close-mic'ed drum sound and they're used to using gates and things like that to get a really 'poppy' drum sound, because that'd really what it needs, it's all about trying to get an isolated signal into the patch. And so I think once the drum sound's good, and the levels into the patch work OK, it should take care of itself after that. Well, that's the idea anyway, it probably … there's so much going on in there though that it … I did originally set up the patch so that you could save each preset that you stepped through on the piece, you could actually save , re-save it for each performance based on what was happening levels wise, but I found that ... Joby never had time to do that , the sound checks are always so hectic and there's so much pressure that it was better to remove that option so that we didn't waste time or he didn't waste time trying to sort that out so yeah it's always gonna sound different in each performance but yea it's probably one of those pieces where you have to do it lots and lots of times 'til you find out exactly the best way that works for you and your instruments and your mic setup and things like that. It's difficult. I mean that is partly a research thing too, you know trying to find out the best of doing those things, and one of the things about being a University composer is you're always trying to do things that are slightly different and slightly new, which means you don't always get there the first time, it takes a lot of development. But um yea I can't … I don't think there's an easy answer to getting that good sound I think it's trial and error and practice really but I mean if it you do try and you find something you think that would … a change that would make it work much more easily then I'm always happy to revisit the patch and make new versions.

Hamish: Yea look I'm sure I think I was wondering whether if I sent a recording through from the recital whether if you even just had a chance to scan through just so you can hear maybe mics were picking up things or levels were set, you'd probably be able to tell pretty quickly sort of whether things, cos it sounded like things to me like there may have been some cross-talk between… but I mean that shouldn't happen with the contact mics as well at the same time, but it may be that the '57, the cowbell, had an SM… yea I had a mic on the cowbell that might have been, but it was also just the room it was really tricky… but the overall effect was fantastic, people really enjoyed the performance I think so… I think it worked overall but just compared to the listening to Joby's recording on headphones it was interesting to compare the two.

Matt: Yea I mean obviously with the recording that was a kind of ideal 'clinical' situation because the way we did that was … he played in a very dead studio you know a completely dry studio space with the electronics only in his headphones, so the mics were completely clean and they were going into a digital studio mixing desk where everything was nicely gated and compressed and perfect, and of course we did lots of takes, and once we'd got the drum track down, and I was then able to keep playing the recorded tracks into the patch, and tweak the levels and the settings specifically for that recording, so you know, it's cheating really, because it's not, you could never do that in a concert situation but for the recording it gave us a kind of something to aim for in concerts so it's a sort of reference. We've got really close to it in the venues where we've been able to get the contact mics set up properly, and the acoustic's not been too wet. The acoustic doesn't just cause a problem with the microphones picking it up, it also just causes a problem with ... being able to hear the detail in the performance because it's amplified and there's a lot going on if it's a reverberant acoustic, there's just too much information you know in the room, even if it's all working properly, once you get the drum kit's… the drum kit's being played pretty heavily, it gets pretty chaotic the sound, and then depending on what the bass response of the room's like too it can get quite muddy so even if it's working really well it can still have issues. I always try to get Joby to play quietly, that seems to help but he doesn't like playing quietly…

Hamish: Drumset quietly yea it's a tricky thing!

Matt: People like the sound - Drummers usually like the sound of their drums being played loud, that kind of style of music it makes people want to play louder but for the electronics it's more effective if you hold back a little bit. Cos you get less crosstalk between the mics. It's just a challenge to work through it.

Hamish: It's a fun.. I found it really rewarding just because I've been doing a bunch of quite different pieces with electronics, and each one has its technical challenges and things, but yea once you get it working it does change the way you think about playing things I find a lot which is really cool. Um I was also just going to ask a bit more about the Amen break)

[Call cuts out]
[Reconnection sounds - some text omitted]

H: I was gonna ask about more about the Amen break and how it sort of found its way into the composition and cos it's what I sort of went and watched some videos about it and the way it's been used over the years and things, and I was wondering how you came to choose it and how it influenced, if the fusion with the drums and electronics and things have come a long way since it was recorded.

M: I think what happened was when I was first working with the Max patch and trying to get interesting settings for the drum kit... I went down to Joby's studio and we plugged it in for the first time and I just got him to play through a few of the settings that I'd made in the patch, and the first time we did it it all sounded all kind of dark and heavy, the effects that were coming back, and it worked really well so I took the patch away and I just thought what would work with the kinds of sounds that we were getting for the drum kit, and I kept thinking of the kind of sorts of dark drum and bass kind of dance music that you get a lot of in this country, and I mean it's more … it's slightly underground sound, it's still quite popular in this country so I looked at drum and bass tracks and ... that kind of wobble bass sound that you get in dubstep and I was thinking about … and then I started looking at where that all came from, I sort of worked backwards a little bit and actually one of my students had already written an essay about the Amen Break for one of his projects, so I was well aware of it, so I just looked at that for a while, and I did write it into the piece in at the beginning, but I found that it was such a strong riff, and it's such a recognisable riff, so it

was hard to get the piece away from it, once you'd gone into it it was difficult to get away from it, so in the end, we cut it out and didn't play it at all, so it's not really part of the piece any more, it's just a kind of spark for ideas, but it did make me think about the whole drum and bass genre, so that it was a starting point for the idea and everything grew from it but it's not really a part of the piece any more.

H: Oh I see yeah, yeah cos I didn't find it easily identifiable in the written part so I was just curious but that's really interesting.

M: Yeah it was a good idea for in the beginning, especially when it was still heavily improvised then Joby would … there would always be a point in the piece where the electronics would take a back seat and he'd just play that round a couple of times and then bring the electronics in over the top but yea it's hard with … it was easier to get the whole thing to integrate if we locked certain things down like the loops in the second half so yea the idea was a more abstract first half to the piece and then going into something which was a bit tight for a more locked down … in the second half and letting it grow and get the sound get bigger so by the end of it there was quite a lot of effects going on and the snare drums triggering its own synth and the bass drum's effecting how the wobble bass works. So I don't know if it's clear what's happening there but um the wobble bass has that filter that sweeps up and down which is how you get that wobble bass sound so what happens is the speed of the filtering is determined by how regularly you play the bass drum yea so you can make it go faster if you play the bass drum more often and that kind of thing and then um yea there are other … there a couple of other settings which I've forgotten that take that timing...it might be to do with there… the cymbal or the whole kit gets recorded part way through that second section, and then it gets glitched… little bits of it sections of it get played back in time with what else is going on and I think that gets affected a little bit by that bass drum setting, but it's a while now … it got so complicated that patch I've actually forgotten quite a few of the things that go on in there but the idea was that it would all be … it would all be really closely related to the tempo and the activity of what's happening live, and that's what I'm working on in my other pieces at the moment, trying to make as much as possible the electronics be determined by what the player's doing. So last week I just had a new piece done it was for trombone and some electronic sound but also for video, live video so what I was doing there was tracking the dynamics, the volume envelope of the trombone, and having the 3D graphics grow at the same rate as his volume changes and then also making a measure of how clean or raspy his sound was so that if he played a really distorted sound with flutter tongue and so on, the video would become distorted too, so it was really integrated and hopefully the audience could see a close relationship but the idea is that I'm doing less with the electronics and even though it's video, it's part of his instrument. So it's like he's playing the video, and he's playing the electronics too, and all I actually did in that piece was press the spacebar at certain times to change the settings for the video so it just changed shape and things like that or maybe a different video, there were videos wrapped around objects, so I changed the video that was wrapped around the object but he was still controlling the size and the look of the overall shape. Yeah so I'm just doing more of that now and but originally but that all grew out of the idea of doing that mostly grew out of *The Boom and the Bap*, cos that was the first time I really tried to use what the performer's doing to control what's happening in the electronics, rather than fixing it all in advance.

Hamish: So just another question that sprung to mind was how important do you think it is that the performer has a deep understanding of the software and how the, the way hardware works, or do you think it should be very much that there's an engineer taking care of that and the percussionist or trombonist can just practice and then you know a couple of weeks before can meet and put everything together. What's your view on that, just cos I've sorted been through the struggle of trying to make things work myself, and then haven't even … just complicates things in a way and I mean I've sort of gotten quicker at working out problems and things but it always adds extra.

M: Yea I think ideally the thing about writing a piece for electronics is if you make it too complicated the piece will only get played when you're there. So what I'm trying to do at the moment is design patches or setups that mean I don't need to be there which means it has to be straightforward enough for someone like yourself or Joby to just perhaps set up a microphone and load up a patch on their computer and it should just work which is what happened with *The Boom and the Bap* … when Joby took it to America it you know the nice thing about it was he said that you know open the patch, as long as the microphones were plugged into the right places on his audio interface it just worked. So I think in that respect if it just works you should be able to rehearse it on your own. That piece was a real development piece there, so there are snags with it, there are a lot of experiments in that piece, and it's gone through so many versions now that there are probably gremlins in there that you know I don't know about, but um so I think everything should be ideally simple enough to setup so that you can rehearse it and actually be able to rehearse the whole thing not just rehearse your part and then add your… add the electronics at the first soundcheck. Ideally you should be able to um rehearse practice it with everything there, so that you can actually practice what you do in relation to what's happening with the electronics. But I think when it comes to performance, it's always best if there's a sensitive sound engineer there too, because you can never hear onstage exactly what it sounds like in the audience. I mean that's always true, even with acoustic pieces you know especially with things like piano you know it sounds different if your head's a foot away from the strings, than it does if you're in the back of the audience, you never...the pianist never really knows what it sounds liek to the audience, and I think it's the same with all pieces but with electronics it's really critical because there's something you can do about it. You know, when a good engineer who knows contemporary music will know that actually I'll just need to tweak the fader and it might only be a small amount but it's the difference between a really good performance and an OK performance. And I think that obviously there's a budget issue there, to get really good sound engineers it costs, but um I think it what I've found is with I do a lot of that work where I go to um just mix sound for concerts for um quite high profile musicians in the UK and Europe, and I think that those high profile ones the successful ones that have the advantage of budget, but they also , they always make sure that that person's there because they understand that it gives them an edge, it guarantees that their performance goes smoothly in terms of the sound and cos I've been to lots of concerts where it's not quite right, and it's not a difficult thing to have corrected, but there's just nobody there to do it. So it's a difficult issue at the moment because so many of the performers are doing their own electronics with their laptops, and it's tempting for them to do everything themselves, because it's cheaper and it's easier and they can have their own setup and take it around, but there's just that final polish on the performance that you can only really get when somebody's sat where the audience is sat is just tweaking the balance, so I think it's important, so I mean for your question I think it's really important that you can rehearse the piece fully and hear everything so that you... that it's an it's informed practising, but yeah I think you still need somebody there in the concert situation where possible.

Hamish: Yeah it's good our resources are getting better at the institution now we've actually got a permanent PA setup in our studio, cos I was setting it up in the studio and I had to drag everything down myself, you know we've got a great, the recording engineer he was always around, he'd come and help me try and… you know when there was that issue with the patch where it was going slightly out of phase, and he was trying to help me with fixing that too, so I did sort of have people on hand, and in the soundcheck he was there plus another engineer and my teacher and things, and they were trying to work out why some things were sounding quite whack, and there was me trying to adjust the gating on some of the things, so I was sort of scratching the surface of maybe what you were talking about, so it's also something I'm just …

Matt: Yea, I think I did try and, I did make one version of the patch where you could plug in the contact mics into the audio interface and the gating was done in the patch, it was I had to do it without you know at home sort of thing and guess how that could work and it did work but it wasn't

tuned well enough for a live situation, so I abandoned that patch but I think with more it's all down to time, you can only spend so much time on one piece before you have to do the next one, there would be a way of doing that where you could .. because contact mics are pretty basic, there's not much variation in what they do, you know, you just need to, it just needs all the contact mic should do is tell you that that drum is being hit, and it's that drum and not another drum that's being hit, and then it just opens the mic channel for the real mic that's on the drum. Um and I think that you could do that all within the patch, because it's just doing something so simple, but it needs really careful setting up, because I've found with a lot of contact mics actually if the cable that connects to the mic is touching another drum, that sets it off too…

Hamish: Oh the cable! OK cos we had other problems with the cables too that I won't go into, but oh that's really OK so even if the cable was wrapped around a stand and it was touching, another ooooh ok! All very good things to know for the future.

Yeah it depends what kind of contact mic it is but I used the really cheap one the piezo ceramic contact mics and they definitely the cable turns into part of the mic so you have to be really careful that sometimes you get around it by taping a bit of the cable that's near to the mic to the drum and then that kind of fixes it still at that point and then if the cable goes to the floor then that can help but yea it's always a problem and then also if the floor's flexible when you hit the bass drum hard, the whole kit moves so that sets off a trigger so that opens up a mic so … so it's not easy.

Hamish: Great, well I'm conscious of your time so … that sort of covered … just check the questions, look there's a lot of really useful information there so thanks very much. Um what I will do tomorrow is I'll just I dunno if you did have time if you wouldn't mind taking a quick listen to the performance, and I'll just, even if you just had some dot points it would just be really helpful for the research to get sort of a picture of where I got to whether and then part of my research is sort of seeing where I get to speaking to the composer seeing... taking another level with the knowledge that I got through sort of trial and error, and you know synergising everything together so it would be a great help, but thanks again.

Matt: I'll definitely do that

Hamish: sorry if I've been to pestery with anything, I know I've been emailing so thanks very much.

Matt: No problem, I'll look out for your email and I'll definitely have a listen and send some notes.

Hamish: Great

Matt: OK nice to see you

Hamish: OK you too take care thanks a lot Matt

Matt: Cheers bye

D Personal journal

Sunday 6th September:

Traveled to studio. I set up the marimba in a configuration that my rudimental knowledge of acoustics suggested might be ideal for the room. The space has polished concrete floors, and a reasonably low stud. It's small and has a hole in the wall to the kitchen, and several shelves. I opted to set up with the marimba at one end of the room. I also set up the mics and interface and cables. After setting the rig up before hand at ANAM I thought it would be straight ahead, but for

some reason there was a harsh white noise when I attempted to record. This persisted when I tried to turn everything off and on again, and reset the computer. I'll speak to Alistair tomorrow and hopefully there is a solution.

Wednesday 9th September:

I took my laptop, interface, and mics into ANAM and approached Alistair with questions about why I was getting strange distorted sounds when I tried to record. After trying different microphones and checking the Sample Rate and Buffer Size settings, we discovered that the USB cable was not working properly. After changing it to a shorter one, the problem was gone. So, after lunch I headed up to the studio and set things back up, with the mics in an XY patter over the marimba. I decided to pick some sections to layer up and see what it was like to attempt. I found it hardest at first just working with the clicktrack. It became more natural to play along once there were three or four parts to play against. It also became clear that the more pre-setting of each channel and input was done in advance, the easier it will be in future to lay down each track. I set a two-bar count in on the metronome, and after a few false starts found it was easy to get into a rhythm where the notes were checked before I started, and I became centred on the task and less aware of the headphones and other distractions with the recording equipment. I noticed a few possible reflections - these are likely off the walls and floor. I will take it in for testing on ANAM's monitors tomorrow. I'll also want to make a balance plan for mixing - it quickly has become apparent that it is overwhelmingly busy sounding if all parts are the same level. This could also be solved by mixing for four channels(!)

Thursday 10th September:

Played back some audio to Alistair at ANAM. He encouraged me to experiment with placement of marimba in the room. Also placement of mics, and their configuration. The whole thing sounded fairly bright as well, so this meant I would experiment with mallet choice next time. Alistair also spoke to me a little bit about bit depth in recording and this inspired me to find some reading on it so I can understand it a bit better.

Saturday 12th September:

I arrived at (the recording studio), and after trying to start Logic realised that I hadn't finished an update which needed an internet connection to complete. This ended my ambitions to try and do any recording. I decided to use the time to do some practice on all the parts, and to try different mallets and see how they sounded in the room. This turned out to be a very valuable thing to do. I realised that certain frequencies lower in the marimba were sounding very boomy, and so I decided to experiment with putting down a blanket underneath the marimba. This resulted in some noticeable difference, but it is hard to tell without doing some test recordings. I tried four different mallet choices too, and I found myself listening in a critical manner to the attack and tone of each pair. As expected, the hard VIC FIRTH M153 mallets sounded very clear, but quite brash, and put a strong emphasis on the higher overtones of the marimba bars. My ear was drawn to the VIC FIRTH M124 Robert Van Sice signature sticks, as they have been a preference for years and create a warm blend of attack and fundamental. It will be interesting to hear how they stack up next time.

I also reconfigured the mics in an ORTF pattern, as opposed to XY as originally selected. This was at Alistair's suggestion, because XY has a tendency to cancel out lower frequencies. Based on my rudimental knowledge of physics, this is due to the longer wavelength of low frequencies, and the close proximity of the XY pairing means that if a low frequency wave is passing the microphone at a particular point, the microphone will not pick up the sound clearly.

Sunday 13th September:

Advantages of self directed recording project:
Lots of chances and time to do retakes if you have the time!

First time today recording with ORTF configuration. Makes a more natural and full sound - less harsh and direct than XY. Liking it after recording one part. I'll try and keep stacking parts up and see how it goes

It seems to be a warmer, purer sound. This will have to do with placement in the room, as well as choosing softer mallets

Monday 14th:

Played audio back to Alistair on ANAM's pair of monitors. The result is much better than last time - warmer sound and fewer reflections. It is also more natural. Alistair suggested different ways that reverb can be used to put certain parts in the foreground, and also discussed getting hold of presets for really good reverb sounds, rather than Logic's stock standard. He also suggested I don't worry too much about noise issues on the recording- instead it is better to worry about it later and lay all the tracks down first.

Wednesday 16th:

I was slightly delayed in beginning today's recording session. It ended up being a short, productive time, as I discovered that the mallets sounded better slightly softer through the whole passage. I also found that I need to do more work with subdivisions, as the rhythm tends to sound quite relaxed and a bit on the back foot. I'd prefer if it had a bit more vitality and drive. It's certainly a test of mental endurance to keep laying these parts down, much in the same way as playing Bolero - a two bar repeated rhythmic pattern.

September 22nd:

I was a bit tired for this session. Due to extra workloads I have been unable to get to (the recording studio) for longer than I'd like since the last visit. It took a while to get into the flow, and my hands had trouble warming up, even with warm-up exercises. I was distracted by a number of thoughts, including that time is running a bit short, and that it is difficult to note where things are out when there is not an engineer. On listening back, I also found that the feel was not great in part one at its entry at figure 10. It's very easy to just be a slave to the metronome and forget to put some feel into the whole thing. This is very difficult to balance with the precision required in playing each part so that it perfectly interlocks with the rhythm of the next. While playing, it crossed my mind that it would be a good idea to just spend a larger chunk of time getting a movement completed, as it's too difficult to work on sections when it feels like time is limited. So, I'm going to look at full days where I can come to the house and spend hours practising and recording without interruption or pressure, and make sure I get a good sleep first!

September 30th:

I had a short but productive session today. I have decided that, on top of having longer recording sessions in general, I will also just lay down tracks and not worry too much about accuracy until I have all the parts recorded. This helps my state of mind while recording each track. It also pays to give some space between recording and listening, and make sure I turn the click track off and listen to the coherence of the parts themselves without the machine chopping it up.

It has been a while since I journalled about *The Boom and the Bap* as well. Following some email correspondence with Matthew, I now have a working patch! So this is super exciting. I also have the Alesis performance pad, as of last Friday. I have put it into my drum setup, and am starting to work on co-ordinating it into my practice routine. It is something that will need a LOT of slow work to remove any hesisitation or doubt, as hitting the wrong pad could be quite a doozy.

I REALLY would like an iPad pro, too!

October 6th:

Hi Journal. Today I set up the Alesis pad. As always, it took a while, but it was possible to eventually work it out myself! I started off by plugging it in via USB, and some triggers happened. But not in sequence. So, I decided to see if it would work via MIDI, and I went and bought a midi cable for $9. I plugged it in, and it still didn't work. I discovered, that if I put it on the preset for kit number 20, it will be able to trigger correctly! Now the next trick is to get the sound working. I need to discuss this with Alistair, so I don't break any equipment :-)

Later in the evening I worked on getting a contact mic set up to see if the patch worked with it. This all seemed to be fine, I got the snare and ride cymbal triggers working. Through my basic knowledge of inputs and outputs I managed to line everything up, and after a while figured out that there was a bit unmute button in the control panel of the patch! Sometimes things are far less complicated than I think.

October 8th:

I set up all the microphones on the drums today. I am really bad at organising leads. So, next time I will get some tape and a pen, and label each one. I'll also plan the layout of the whole setup better, so that it is neat and tidy. Balance is going to be tricky without a proper P.A, but I'll get there!

October 10th:

Spent a few hours at (the recording studio). I recorded all tracks for movement two of the Reich. Even though it isn't perfect, there are some good takes in there that I will keep, and I am going to go back and re-record some tomorrow. Working for an extended period of time was very valuable, and I became very attuned to how things were working after a while. Tomorrow I will begin movement three. I'm going to create a setup for *The Boom and the Bap* in room 108 at ANAM today, and try to make it as neat and tidy as possible!

October 11th:

Short recording session to fix up some of yesterday's takes. I felt a lot more refreshed than yesterday after a solid sleep. I went through and re-recorded parts 1,2,3,4,6 and 7 in movement two, and found some more parts to re-record after listening critically and finding some syncronisation issues and wrong notes. I also found that memorizing the parts and using the spoken click track was a far better approach than trying to read the parts. This might seem like a really obvious observation, but it made a big difference to the feel. I was able to pay more attention to feel and what was going on in the pre-recorded parts, and loosen up my body and breathing too. This kind of princple will certain influence how I approache solo playing. I also noticed that after leaving a recorded take for a day, I was able to come back to it and feel a lot happier about how it sounded. This was something that Alastair told me would happen throughout the process, and often I found that takes sounded better when they weren't exactly perfect the whole time - the slight flams between parts and imperfections give the performance a human touch

and remove the possibilty of wondering whether the piece has been quantized or played by a robot.

Monday October 12th:

Spent from 2:30-5pm in a small room with Boom and the Bap. Setup time was a lot quicker, and the patch worked OK. I think that there may be a slight issue with the click track though, as it doesn't consistently seem to line up with the cue numbers in the patch.

Matthew has told me in emails that Joby frequently performs the piece with playing the beginning section up until 12 very freely, and then improvises from there on. I am pretty open to this idea, as reading drum music in this context can often sound contrived. It also provides me with numerous new questions pertaining to the interpretation. I had a moment where i wasn't sure at all if I had set things up right, and the whole thing sounded pretty gainy and crap. I went back and read the notes, and these made me a bit more confused than before. I re-read them, and realised that the cowbell needs to have a SM57 mic or similar to pic up its sound. I also pulled Alastair in to have a look at the setup and he realised that I had the phantom power on all channels, which isn't exactly ideal. So we switched that all off, and then everything sounded instantly A LOT better. This was a relief, as I was getting pretty frustrated and hungry and wondering if anything was going to go right! So I tried playing through a bit and it sounded far better thank goodness!

I have decided to devise an improvisation strategy. From figure 12, the piece is divided into sections that are announced over the click track by Matt's voice. If I study what he has written, and select some of the material, this can be used to improvise around and create a more natural feeling interpretation of the piece. I can also go through each cue and look at what effects and processing are happening on each drum, and then devise a strategy to improvise that uses these effects to their full advantage!

October 14th:

I set up *The Boom and the Bap*, and made an improvisation strategy cheat sheet to experiment with. I was playing around with some ideas but I found that the click-track was consistently out of phase with the effects processing and the spoken cues subsequently didn't line up with the visual cue number changes. I fiddled around with some of the audio settings in the patch, and eventually had to get Alistair to come in and take a look at the settings to see if he could work anything out. He adjusted the 'I/O vector size' and 'signal vector size' and we found a solution that worked eventually. This is probably something I could have worked out myself, but it saved a lot of time having him there….

I'm still not 100% sure that I am able to just improvise after figure 12 with this patch, but I am just assuming this is the case, and I'll keep fiddling around with ideas, and play it for Peter Neville in my class on Friday.

October 15th:

I headed up to the recording studio today, and worked on the third movement. This is by far the most challenging to play with note jumps and more frequent pattern changes than the other two. I am listening to Svet's version now, and it has a distinctive groove. I particularly struggled with the basslines as I was preparing them, and these will need some significant work before they will be recordable. Fortunately, I still have time to make this happen! I am wondering whether I may have time to create a version for spatialized sound!

October 16th:

Today I had a lesson with Peter Neville, and set up *The Boom and the Bap* with ANAM's P.A. systems, with the help of Les and Alistair. This went relatively smoothly and I had a pretty good run overall with gear working. We did discover that there was a problem with the roto-tom contact mic. This is because the lead was for a stereo mic, and it was causing a problem with the response of the patch. When it was swapped in for a correct lead, it worked without issue. I played the opening section for Pete, and he talked about how he saw the musical intent as being a series of gestures, connected by a strong underlying groove feel, and each should be strong and full sounding. With the P.A. system we were able to get a large sound happening and the effects were very powerful overall. We also discussed with Alistair that the drums can be amplified and mixed in with the electronics, so as to create a more coherent front of house output. Pete also talked to me about the benefit of working off the score rather than improvising after figure 12, and demonstrated some of the grooves with a more strong intent than I had been showing.

I played some Reich for him as well, and we discussed balance, score placement, and feel. Pete also said that the track could be clearer with more attack on the front of each note to give a clearer sound overall.

October 18th:

I spent some time creating a new part to play off for *The Boom and the Bap*. I then decided to work on learning the notes for the whole piece - a lot of it is sight-readable. I still seem to be having some trouble with sycronising the clicktrack and my playing. I have since been in touch with Matt, and he sent me a screenshot of how the audio settings are at his end. I adjusted them to what he said, and then tried it again. It seems closer but still not perfect, but it's actually quite difficult to tell. Feeling better about it overall, though.

October 19th:

Travelled to the recording lounge. I worked on the third movement and it went better than the last session. It is much more challenging still than the other movements, so I will keep working on it every day this week, as Matthias does not need his marimba back before my recital, fortunately. The bass parts are going to be particularly tricky, as they need to be ABSOLUTELY metronomic, and 100% accurate, for the part to be effective. Because I left them until the end of the session today, I wasn't at my energy peak so I will start with them tomorrow.

Because of the challenging nature of the parts, I have decided to splice takes in order to increase the quality of the recording. This is a common practice, but I am going to attempt to rework each part as a single take over the next week, as this still sounds more organic than splicing.

October 20th:

I played *The Boom and the Bap* in class, and I still seemed to have an issue with the track being out of phase… but it was good to get some feedback and perform it for people. I played the Reich in the class as well - forgot to turn the clicktrack off too… but then it was OK

October 21st:

I can't seem to finish movement three of the Reich. I also have no money and food so it it's really hard to concentrate on what I'm doing. I did discover that the bass parts are doubling one another on the main beats in the third movement, and that it's extremely difficult to get them to line up exactly. A quick solution was to leave out the doubled notes when recording the second bass part,

and this produced a nice result. I am not feeling overly confident about the research side of things so I am wondering about whether to call off the whole thing.

October 22nd:

Today marks one week until my recital. So I need to finish the third movement! It's nearly there. I'm just having trouble with the chords coming through the texture. I will bring some different mallets to try in tomorrow's session, perhaps some hard rubber ones! There are some occasional wrong notes so I'll have to fix them tomorrow but that will be easier in the morning when I'm fresher! Observations I made about accuracy - it's really tricky reading music with big leaps in it and trying to keep hitting the right ones all the time! The bass parts are also not quite simple enough to memorize… this could have been something to consider earlier on in the picture.

October 23rd:

Today's session was not super productive. I didn't manage to reach my goal of finishing recording the three chordal parts in the third movement - it's really annoying trying to exactly land them in the right place. I did re-record a part I found that was missing in the first movement - marimba three. I discovered another incomplete part in the first movement that I will have to go back and redo. I think this calls for a complete review with the score to check there is nothing missing, it's pretty tricky as I am recording to remember everything that needs finishing. This means that I should have stuck with the checklist option that I wrote earlier on in the project… it would have saved a lot of wasted time.

October 24th:

I spent from 2:30-5 ish at (the recording studio) and managed to finish recording all the parts! I had some thoughts about mixing, based on some of what I heard in Svet's recording. I will make a 'panning plan' and see if it is effective in creating some space around the recording. I spoke to Alistair last night about giving him the recording to attempt to remove some noise from, and he said he would also do a quick master if I didn't provide him with a track that was too loud. So I will go through each movement and adjust some balances so that the correct parts are more prominent. I will set aside some hours to do that across the next day. It will also be important to work on the solo part for all movements, in particular the third movement. There are a few wrong notes in the final movement, but I will be able to copy and paste a measure here and there, as it is going to take too much time to go through and fix everything by re-recording each part.

I had a scary moment when I thought I had lost some parts, and it turns out that yes, after recording parts 5, 6 and 7 in the last movement, I lost all of them somehow when undoing or redoing some edits. I also lost part five, which I had just re-recorded in movement one! So, I had a break and kept my cool, and after some food and coffee I managed to record part five BETTER than before in movement one, and get parts 5, 6 and 7 better balanced in the mix in the third movement. This was a big lesson, ALWAYS be saving my work, and avoid doing any key commands unless absolutely necessary… but mostly just save my work!

I'm on my tram ride, and there is a guy wearing a T-shirt that says HOME TAPING IS KILLING MUSIC. Food for thought, I guess!

Sunday October 25th:

Based on years of listening, and some critical listening to both Kuniko's and Svet's recordings, I've done a first draft mix of the final product for using in my recital. A lot of the panning is based on what I heard in their recordings, but I am fairly inexperienced, so I just went with my gut

feeling. This was mostly mix from left to right, and put the more prominent parts in the middle. If I had years of experience, I probably would have thought differently, but I am pretty happy with this first try! I'll fix a few things tomorrow morning so I can give the bounce to Alistair to fix up a bit.

Tuesday October 27th:

I tried Reich for the first time in the hall.

Wednesday October 28th:

Today was the tech run for the recital. I started setting up at 4 for the 4:30 beginning. I felt more comfortable on stage than the first recital but it was still pretty bizarre trying to figure out what was going on. The first run sounded super hectic and it turns out that it was out front! The techies (Alistair and Declan) switched out a microphone for the kick drum and sorted that out to sound better. I also adjusted the outputs of the effects, and turned down the gating on some of the inputs so that there wasn't 'cross talk' or unexpected triggering on drums that weren't meant to be creating effects. This completely changed the piece and I got some positive feedback from out the front, so that was good.

Thursday October 29th:

This was the day of the 6pm recital. It was a great culmination of the process so far. I felt a lot more comfortable on stage with the technology than previously.

Fairclough:

I was able to get to a point with the drumpad that made it feel like a natural part of the setup, and really enjoyed playing the first two pages of the piece - a more free and open passage than the rest of the piece which is tied down to a clicktrack and predetermined score.

I just took a brief listen to a recording of the recital performance, and I am not sure that the electronics worked exactly as they should have. It was so hard to hear exactly what was happening in the acoustic as it was, and without the input of a 'reference person' who knew exactly how each sound should 'sound'. In this respect, it would have been good to have another expert on electronics who could study the score, and listen to Joby's recording on the Powerplant label to figure it out. This may not necessarily have provided a 100% accurate reproduction of the piece as it should have been though, because the technician would have been dealing with room acoustics, and each microphone and its placement would be slightly different than that in Joby's recording. So, how do I even go about producing an authentic performance of the work? This will be a question for Matt.

Following this discussion, it would be good to take into consideration Matt's feedback, and then look into finding a much drier venue to stage a follow-up performance of the piece. A drier room would enable greater clarity for each sound to be balanced better, and for myself (the performer) to hear what is going on. It would also be worthwhile finding a way to work in the space and recording runs of the piece, and analysing carefully with the score where balance issues arose. I was fortunate to have a great sound engineer on board, who rode the gain on the playback through the piece to make sure that each section sounded balanced.

It was also nice that Dad acknowledged that I was following up on an aspect of music that I've always been interested in.

Speaking to Alistair (ANAM recording engineer) in an informal conversation, I was surprised to learn that he had no formal training as a recording engineer, but instead he divulged that he had a passion for recording from a young age, and used this as a way to improve his performance through recording practice and performances for analysis. Perhaps a formal interview with him would be good if more data is required?

For Marimba and Tape

Even though this was a supporting work to the main repertoire for study, it provided much interesting material in its learning process. Wesley-Smith alludes to an updated version of the score in his original typeset notes in the score, but there are still a number of unclear or missing pieces of missing information.

In the early stages of learning the piece, I had trouble working out how to fit the first few pages with the tape part. Transitioning from the first page to the second, I found that there were no subdivisions in the tone, and no indication in the tape part where the downbeat was. It really was a hit-and-miss approach to work it out, where I just tapped along with the tape until I found another clear reference point in the tape part to line up with. There was also a tempo change with a metric modulation, and this took me days to understand before I worked out that the triplet in the previous figure became the new quaver beat in the next figure. All this would have taken was the addition of a new written text marking in the part! The repeated section with nine-tuplets also posed some strange questions as to how to line up.

This provides quite a big contrast to the Hackbarth, which came with a part that has a wave-form in line with the track, so that you can see how the sounds line up exactly in the part. Because the composer does not work through a publisher, any score revisions are immediately fixable if a performer emails the composer directly. This is a whole other argument, but in any case an interesting observation into how times have changed.

Reich

This was a very interesting process, and also the most frustrating in many ways as I was the least familiar with the process of recording, and also aware of flaws in the process. The limitations of my recording experience provided a great deal to journal about. I have already discussed that memorizing the patterns and focusing on just the visual aspect of how they fit on the keyboard. I thought about this a bit more, and how it relates to memorization in general on keyboard instruments. It also provided quite a bit to think about in terms of mindset for playing. I found that when I read a book on the tram on the way to perform, and I had any kind of goal or framework for the session, it proved to be more productive than if I had just showed up and played.

Monday 24th May 2016

Today I set up the quad PA in the hall. The new speakers had a big impact on the sound, and ANAM now have a much more performance friendly desk for managing levels in the space. Instead of a fixed analogue desk, all levels can be balanced from anywhere in the space using an iPad based mixing tool. It was great to separate the playing from the playback, and hear the electronic sound played back in the space.

E Recital Programs

ANAM Solo Recitals 2015
Hamish Upton (NZ), percussion
Timothy Young, Faculty, piano
6.30pm Thursday 4 June

Australian Government

John Psathas (b. 1966) *Drum Dances* for drum kit & amplified piano (1993)

Lindsay Vickery (b. 1965) *Lyrebird* for solo percussion & electronics (TBC)

Ben Hackbarth *Open End* (2007)

Kevin Puts Marimba Concerto (1997)

"…terrific sun on the brink" (flowing)
"…into the quick of losses" (broad & deliberate)

Durations: 12' – 8' – 8' – 21'

Hamish Upton (NZ, percussion) supported by **peckvonhartel architects**

ANAM Solo Recitals 2015

Hamish Upton (NZ), percussion

With ANAM Students

6pm Thursday 29 October

Matthew Fairclough (b. 1936) *The Boom & the Bap* (2010) 6'

Matthew Wesley Smith (b. 1945) *For Marimba & Tape* (1983) 12'

Peter de Jager *TBC* (2015) Bare Earth Spirits

James Townsend (NSW) Percussion
Rachel Grimwood (NZ) Viola

Steve Reich (b. 1936) *Electric Counterpoint* (1987) arr. percussion 15'

I: Fast
II: Slow
III: Fast

Australian Government

ANAM
AUSTRALIAN NATIONAL
ACADEMY OF MUSIC

ANAM Solo Recitals
Hamish Upton *NZ,* percussion
Peter de Jager *Associate Faculty,* piano
Daniel Smith *QLD,* cello
6pm Thursday 26 May 2016

Ben Hackbarth *Open End* (2007)

Osvaldo Golijov (b. 1960) *Mariel* for percussion & cello (1999)

Iannis Xenakis (1922-2001) *Rebonds A* (1987-89)

Emmanuel Séjourné (b. 1961) Concerto for vibraphone & strings)

Damien Ricketson (b. 1973) *Time Alone* (2014)

Durations: 8' – 8' – 8' – 9'

CITY OF PORT PHILLIP

Australian Government