

An Exploration of Compositional &
Improvisational Approaches to Jazz &
Electronics

Chris Whiter

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Improvisational Approaches to Jazz &
Electronics

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Declaration

I declare that the fourteen musical compositions and the accompanying commentary that constitute this submission are my own work and that, to the best of my knowledge or belief, they contain no material previously published or written for the award of any other degree or diploma of the University of London or other institution of higher education.

Signature.....

Name.....

Date.....

Abstract

This is a practical study focusing on the combination of acoustic jazz ensembles with live and studio electronics. The purpose of this research is to compare the effect that differing approaches to composing have had on both the resulting soundworlds and the relationship between the compositional and improvisational processes themselves.

The portfolio shows the developments in techniques of integrating the jazz and electronic elements, with each work showing a constantly evolving level of interaction. This has been demonstrated by three compositional approaches taken to how the live ensemble is utilised, ranging from the recording of each live part separately (*Truth This Way*), to the simultaneous recording of the live ensemble with pre-prepared electronics tracks on *The Borderline Suite* album, and finally to the use of live electronics applied to the improvising acoustic duos and trios used for *Emanations* and *Encapsulation*.

The research contributes to the composition technology discipline by continuing to break down boundaries between the electronic and contemporary jazz genres by furthering the exploration and development of processes of interaction.

Composition Portfolio

Truth This Way - 5' - Jazz Ensemble: Flute, Tenor Saxophones (2), Baritone Saxophone, Piano/Keyboards, Synths, Upright Bass, Drum Kit. Sequencer (playback of effects & additional synths)

May 2013

Boneyard 309 - 8' - Jazz Quintet: Tenor Saxophone I, Tenor Saxophone II, Piano, Upright Bass, Drum Kit. Sequencer (playback of effects & additional synths)

January 2014

The Borderline Suite -

- *Part I: Dystopia* - 6'
- *Part II: Fool's Paradise* - 10'
- *Part III: Envisions* - 7'
- *Part IV: Borderline* - 10'
- *Part V: New World* - 11'

Total - 44' - Jazz Quintet: Tenor Saxophone/Flutes, Soprano/Tenor Saxophone, Piano/Keyboards, Upright Bass, Drum Kit. Sequencer (playback of effects, additional synths, drums & sampled material from the live ensemble)

August 2015

Loops - 9' - Jazz Quintet: Soprano/Tenor Saxophone, Tenor Saxophone, Piano/Keyboards, Upright Bass, Drum Kit. Sequencer (playback of effects & additional synths)

September 2015

Emanations -

- *Emanations No. 1* - 8'

- *Emanations No. 2* - 9'

- *Emanations No. 3* - 6'

Total - 23' - Live Duo & Live Electronics: Piano, Tenor Saxophone, Tape, Sequencer with hardware controller (live effects applied to live duo).

September 2016

Encapsulation -

- *Part I: Introduction* - 10'

- *Part II: An Interlude* - 6'

- *Part III: The Finale* - 9'

Total - 25' - Live Trio & Live Electronics: Piano, Tenor Saxophone, Baritone Saxophone/Bass Flute, Sequencer with hardware controller (live effects applied to live trio).

August 2017

Total Portfolio Length - 1'54'

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1. Introduction

The intention of this research has been to explore the relationship between compositional and improvisational approaches within the context of my work as both a performer and composer, and how these have developed throughout the progression of my research process. The works that I have produced are situated between the genres of contemporary jazz and experimental electronics, and look to explore processes of interaction between the two styles through studio techniques.

The portfolio consists of a total of six works, three of which contain multiple movements. Within the context of the research I have looked to use and develop a range of techniques in both studio and live electronics, drawing on a wide spectrum of influences¹, which I have then combined with acoustic jazz ensembles of varying sizes. These range from the larger ensemble heard in *Truth This Way*², to the jazz quintet used for *The Borderline Suite*³, which forms the majority of the portfolio, and finally to the acoustic duos and trios used for *Emanations* and *Encapsulation*.

For the purpose of definition, the term 'acoustic' will be used to describe instruments or parts that are performed by musicians, while 'electronics' refers to the soundscapes and effects that I have created electronically through music software. This includes the use of synthesisers, sampled MIDI instruments and sampled/manipulated audio tracks. 'Studio' electronics refer to the soundscapes that are either pre-prepared or applied in post-production. These tracks or elements are fixed, and cannot be altered or affected by the acoustic ensemble during a performance, besides being cued by a sequencer. 'Live' refers to their use in 'realtime'⁴, and so 'Live' electronics can be influenced by the acoustic performers.

¹ My listening has encompassed a wide range of experimental electronic music - from artists on the innovative label Ninja Tune (such as the Cinematic Orchestra and Funki Porcini) to those on the Norwegian jazz scene (such as Nils Petter Molvaer and Bugge Wesseltoft) - and focused on how the electronic elements were used.

² *Truth This Way* acoustic line up - Flute, Tenor Saxophones (2), Baritone Saxophone, Piano/Keyboards, Synths, Upright Bass, Drum Kit.

³ *The Borderline Suite* acoustic line up - Tenor Saxophone/Flutes, Soprano/Tenor Saxophone, Piano/Keyboards, Upright Bass, Drum Kit.

⁴ 'Realtime' means the electronics are being used at the same time as a live performance, and so they will be influenced by the performers in realtime, as opposed to being pre-prepared and fixed.

Portfolio Progression

Each of my works has represented a progression in both my understanding of electronics and of the way I use them. I have found that in building my portfolio, I have taken three different approaches to composing for jazz and electronics. I will look to analyse the effect that they have had on both the resulting soundworlds and the relationship between the compositional and improvisational processes themselves.

The three approaches are represented by different works in the portfolio:

1. *Truth This Way*: The 'pop' angle. Each live ensemble part was recorded separately. The track was then constructed in the editing process.

2. *The Borderline Suite Album* (*Boneyard 309*, *The Borderline Suite*, and *Loops*): The ensemble was recorded simultaneously in a studio session. For segments of some works this involved a track of pre-prepared electronics, which the ensemble played along to during the session. Further electronics were then created in the post-production stage which included using the recorded ensemble audio as the sound source.

3. *Emanations*: Some electronics are again pre-prepared but in this setting they are more predominantly used live, with movements *No. 2* and *No. 3* relying entirely on live electronics. This involved a combination of automated buses with various plugin effects that influenced the sounds of a live duo of saxophone and piano. Layers of atmospheric effects were incorporated with parameters that were improvised live through the use of a hardware controller and software manipulation. Post production editing was not used at any stage for any of the movements.

One of the reasons for using these differing approaches to incorporating jazz and electronics is that my ability to utilise the electronic element has changed over the course of my studies. In comparison with the later works in my portfolio, the use of electronics in *Boneyard 309*, the first work I produced, could be considered to be quite detached from the jazz ensemble, at least in the approach to how they were applied. By this I refer to the fact that none of the electronic sounds are drawn from the recorded ensemble audio, but are instead produced solely with synthesisers and applied after the work was recorded.

As my compositions progressed, I developed techniques and approaches of integrating the jazz and electronic elements, with each work showing a constantly evolving level of interaction. Initially I

was reacting to the live ensemble with the electronics purely in post production. For *The Borderline Suite*, electronics were still studio based but there were levels of interaction during the recording process. As I was developing *Emanations*, the electronics became a completely internal element of the work from which the rest of the composition would then grow.

Production Processes

Throughout the portfolio I have primarily used *Logic* as the predominant DAW⁵ software for the production of my work, and *Sibelius* as the notation software for notated scores. During the production process I have found *Logic* to be suited to my requirements in a post-production studio setting. Plugin effects have been used extensively in my work, and the Space and Delay Designers found in *Logic* include a wide range of parameters that have enabled me to develop my own techniques, and so became integral parts of my compositional processes.

Emanations No. 3 is the only work produced with different software. *Ableton* is a DAW that is particularly well suited for live performance, allowing for a greater amount of control in realtime than *Logic*. A hardware controller, the *Novation LaunchControl*, was also employed for *Emanations*, and this is designed to work with the *Ableton* software, allowing for further manipulation of the parameters of plugins in a realtime setting. An advantage of a hardware controller is that it allows for greater control over a number of parameters simultaneously that would otherwise be extremely difficult to execute. I chose to incorporate the use of *Ableton* as part of the research process to broaden my experimental practice and apply the techniques I have developed in *Logic* in a new setting. This allowed me to compare the effects the use of a different DAW would have on the resulting soundworld.

The Borderline Suite album involved recording my own ensemble, The Chris Whiter Quintet, which took place at Eastcote Studios in West London. This studio was chosen for the session partly due to its layout. Three connecting rooms could be isolated from each other without compromising on visibility between them. This allowed for a degree of separation⁶, a vital component for my approaches in post-production⁷, while still allowing communication between the ensemble.

⁵ DAW: Digital Audio Workstation. Professional music software used in studio production.

⁶ Drums were isolated in room one, with piano and bass in the second room (separated by a screen to allow some degree of separation), and finally both horn players in room three.

⁷ Refers to the use of recorded audio as the sound source for electronic manipulation. Isolating each instrumental section meant the amount of 'bleed' (leaked signal) in each track would be significantly reduced.

2. Research Context

Despite situating my own work within contemporary genres, my jazz aesthetics are actually rooted in more traditional practices. The quintet used in *The Borderline Suite* echoes a very standard format of three-piece rhythm section and two horn front line, a staple of the Blue Note label through the 1950s and '60s. Although the use of two tenor saxophones is less common, it is still a line-up that has been used by some highly established artists from that period¹.

The foundations of the compositions for the suite also draw on one of the most common building blocks of jazz, and especially bebop - the use of a head melody, followed by improvised solos, which then returns to the head². Where my work then differs is that this form is part of an overall compositional structure that is quite thoroughly scored. This stems partly from having a background in classical music (minimalism has been very influential in my writing) which has led to me, in some instances, using a more detailed approach to scoring for a jazz ensemble than other bandleaders³. Despite this, I ensure my work is not so tightly composed that it does not allow the players to fully explore and push the music in different directions.

I have also always had an interest in a modal approach, and the use of such harmonic tonal centres can be heard in the chord progressions of some of my works. *Borderline* is an example of this, as the head is built around Eb minor Dorian in the 'A' sections, modulating up a semitone for the 'B' section⁴. This is a common chord progression seen in such modal standards as *Impressions*, and similarly in *Milestones* (the 1958 version), which modulates up a tone through the 'B' section.

My interest in the use of electronics has constantly grown over the course of my own personal development. One instance of this has been through my work as a composer on commercial music

¹ The tenor sax duo of Eddie 'Lockjaw' Davis and Johnny Griffin had a very well known quintet in the late '50s/early '60s. Lennie Tristano's highly regarded album *Intuition* (1949) is another example, featuring Warne Marsh and Lee Konitz.

² 'Head' - The first (and last) chorus of a tune, in which the song or melody is stated without improvisation or with minimal improvisation. - <http://www.apassion4jazz.net/glossary2.html>

³ This point was noted by critic Phil Freeman during an interview he conducted with myself for a feature about the album on the music website Bandcamp - <https://daily.bandcamp.com/2016/10/13/chris-whiter-feature/>

⁴ 'A' and 'B' Section (and 'C', 'D' etc) commonly refers to parts of a song structure in jazz, with standard chord progressions, such as the 32-bar 'Rhythm Changes' form being represented by 8 bar sections divided as AABA.

projects, which often require the use of electronic elements. In this environment the sheer volume of existing library music means it is important to find a way of making your compositions stand out, and so I am constantly challenging myself to find unique soundworlds and textures. I have often done this through the manipulation of existing sampled material, instead of a reliance on synthesiser presets or pre-prepared sound effects. I have felt this always gives my work its own character, as I am producing new sounds as opposed to finding templates that could be used by anyone. As a result, I have experimented with and found techniques and processes that I have wanted to continue developing, especially alongside other compositional projects, such as my jazz quintet. It therefore became a natural progression for me to investigate further the possibilities of how I could look to incorporate these two influences simultaneously in my music.

'Fusion'

The combination of jazz with electronics is certainly not a new phenomenon. Experimentations in what became known as fusion go back to the often cited albums of the trumpeter Miles Davis, such as *In A Silent Way* (1969) or *Bitches Brew* (1970). Since the 1970s, the different ways in which electronic elements could be used has grown exponentially, with types of fusion varying from the grooving jazz-rock beats of Weather Report and The Headhunters⁵ to the ethereal ECM sounds of Jan Garbarek⁶. The rise of sampling in Acid Jazz around the late 1980s and early '90s opened up a whole new realm of possibility for how existing jazz recordings could be incorporated into electronic based genres. Fragments of what were originally recorded improvisations and live performances could now be reproduced as riffs and patterns. The hip-hop group Hocus Pocus for example took samples from one of the most famous jazz albums of all time, *Kind Of Blue* (1959), combining the harmonic accompaniments of Bill Evan's piano playing and improvised melodic fragments of Miles with a new drum beat to form the foundations of their track *73 Touches* (2005), completely re-situating the roles those fragments originally played.

All these expansive directions have meant the over-arching genre of jazz and electronics today is particularly vast, and a wide net is often cast over the varying styles within it - electronic jazz, electro-jazz, jazztronica, jazz house, nu-jazz, future jazz, jazz lounge, the list goes on. The terms encompass these modern types of 'fusion', but the degree to which jazz elements are incorporated

⁵ Gioia, Ted *The History of Jazz* (Oxford University Press USA, 2011) Chapter 5

⁶ *Rites* (1998) is a perfect example of this, with sustained atmospheric soundworlds created through subtle use of synths combined with elements of folk and jazz.

differs greatly within these contrasting styles (and in some cases the links are tenuous at best). The sample based Electro-swing tracks of Caravan Palace and Parov Stelar for example offer a very different sound to the likes of French trumpeter Erik Truffaz, yet both can technically be described as 'Nu-Jazz'.

In this chapter I will look to situate my research within the context of those artists who are in a similar, more refined field, focusing on musicians or groups that are rooted in a jazz background or have a stronger focus on live interaction and instrumentalists, an aspect of jazz that I feel is fundamentally important. I will also look to further contextualise the practice of composition with improvisation in both fixed media and live interaction.

Jazz & Electronics

There has been a particularly strong contingent of Scandinavian artists who explore the combination of jazz and electronic elements with live instrumentation. Groups such as E.S.T, a Swedish trio led by Esbjorn Svensson, were particularly adept at employing a subtle underscoring of sounds that supported the ensemble. The title track of their album *From Gagarin's Point Of View* (1999) interjects brief interludes of dark undertones that create a stark contrast with the trio's melodic passages.

Bugge Wesseltoft is a Norwegian artist whose experimentations cover a range of jazz/electronic styles and crossovers, including collaborations with laptop musician Henrik Schwarz. The compositional approach taken for my work *Emanations* reflects my interest in the fascinating soundscapes that the duo improvise and produce live. In a performance, Schwarz will capture Wesseltoft's spontaneous ideas (mostly played on keyboards), process them, and use those as the basis for his sonic soundscapes and grooves, often taking short transients from the end of waveforms to form breathy percussive patterns. A performance and workshop at the Loop Festival 2015⁷ offered a detailed insight into these processes and the ways in which Schwarz and Wesseltoft would interact and also react to each other during a performance. I was inspired by the way that a single sound source could be expanded in a realtime setting to form new compositional material and ideas. The structures of their works grow naturally and will sometimes settle into a repetitive groove section, yet within this they constantly find ways of exploring the sound further, finding constant sources of interest, before pushing the music into different directions.

⁷ 'Loop' is a summit run by Ableton that is held in Berlin annually, focusing on discussions, performances and workshops in contemporary music technology.

Food are another experimental jazz duo that have been highly influential, especially the way in which the British saxophonist Ian Ballamy and Norwegian percussionist Thomas Strønen use electronics in a live setting. The project's focus is on creating improvised music that is expanded through the incorporation of electronic soundscapes. Ballamy offers an obvious instrumental relation to myself, but in comparison with Schwarz and Wesseltoft, Food also show how a duo of acoustic instrumentalists interact with each other while simultaneously utilising live electronics. The sparse and atmospheric tonal passages that Ballamy produces can develop into dense and challenging textures that are driven by the percussive and electronic work of Strønen. The work of both of these duos arose a curiosity for me to look at how removing part of the creative control from an improviser affects their performance, which became a focal point of my processes in *Emanations*.

As well as their live work, Food's most recent album demonstrates another compositional approach. Strønen uses pre-composed material on *This Is Not A Miracle* (2015), constructing each work from sketches and structural ideas performed and improvised by the duo which are then developed with the use of synthesised instruments. There are elements of this approach that I have employed in my work, especially in the way that I used fragments of recorded improvisations to construct melodic material in *Truth This Way*. The majority of post-production in my portfolio however has been to enhance the existing material, not reshape it, and so I have looked to apply textural layers and colours to through-composed works.

Another Norwegian, Nils Petter Molvaer, is a jazz trumpeter who frequently employs live electronics when performing, and is seen as one of the forefront figures of jazz and electronic crossover. I saw him perform at King's Place (2013) for the London Jazz Festival, where the concert was given an extra dimension through the use of a live visual 'performance' from Tord Knudson, incorporating swirling images and colours and a live feed from cameras surrounding Molvaer that were then manipulated and blended with stunning lighting effects. At times this played quite a prominent role in heightening the excitement of the music, demonstrating a different perspective to how two performers (not only musicians) could interact and dynamically shape the performance.

Molvaer has a distinct breathy sound, and uses particular effects⁸ as well as certain melodic lines and modes (especially the Phrygian mode) in a way that makes his work quite recognisable. I found

⁸ Such an example can be heard on the track *Friction* from his album *Hamada* (2009), which uses a harmonising pedal that adds one or two harmonic lines in realtime, above or below what is being played.

this to be noticeable during the concert, as I would pick out passages that I almost expected to hear based on listening to his previous albums. It was interesting how this was then used in a way that I hadn't heard him use before. By combining a multiple delay with short notes played in rhythmic patterns, and then looping these with a pedal, the harmonising pedal reproduced a sound more reminiscent of a string section, and once three or four overlapping patterns had been applied, the soundworld was more akin to that of Steve Reich's *Different Trains* (1988). This concept of finding ways of layering sounds from a single sound source is what I strived to achieve in my own compositional processes, such as the polyphonic clarinet drones used in *Dystopia*, which all stem from a single sustained clarinet note.

Composition, Improvisation & Electronics

As part of my research I have looked at how electronics in jazz have been used in a broader context, beyond what I have considered to be my own aesthetic approaches. It has also been important to investigate the ways that both fixed media and electronics as the result of interaction affect the outcomes within works. I have therefore looked at how these practices have been considered in critical writing and existing practice-based research of composers within this field.

As well as its emergence within fusion, the use of electronics and electro-acoustic techniques has influenced developments within free and avant-garde jazz experimentations, with artists incorporating such techniques into their compositional processes. Earlier works such as Barney Wilen's *Auto Jazz: Tragic Destiny of Lorenzo Bandini* (1968) used pre-recorded tape (field recordings of a motor race) as a fundamental fixed media compositional source⁹, while Terry Riley's *Music For The Gift* (1963) featured real-time manipulation of trumpeter Chet Baker's quartet through his use of tape loops and delays.

Further examples of established jazz artists experimenting with electro-acoustic improvisation at this time include pianist Bob James (now more known for his 'smoother' sound), who focussed his early career in free jazz. The album *Explosions* (1964) combines his trio with tape and musique concrète influences, such as the distorted textures heard on the track *Wolfman*. Roland Kirk (known for his experimentations with playing multiple saxophones at once) incorporated pre-recorded tape sounds through the opening sections of *Slippery Hippy Flippery* (1965) with the

⁹ The work was divided into five parts corresponding to stages of the race which had been recorded by Wilen. The works then featured his free jazz combo playing to the accompaniment of actual race sounds. (Thom Holmes, 2011)

intention of creating a soundscape that his live quartet could interact with. Advancements in technology have seen this concept of interaction continually expanded upon, with computer processing and live sampling becoming intuitive tools for creating music which have pushed the boundaries of expectations of what jazz should sound like. Neil Leonard (1996) surmises that audiences have preconceptions if they were, for example, to see a solo saxophonist performer¹⁰, but in a performance where sax and computer music are played simultaneously, “nothing is certain until the music begins”. He goes on to describe computer music as a way to “expand jazz’s sonic palette, rethink ensemble interplay and explore new resources for improvisation”¹¹.

Within the UK there have been some highly influential free jazz artists who epitomise Leonard’s description. Saxophonist Evan Parker is one of most noted names in this regard, and his relatively recent work with electro-acoustic quartet Grutronic has produced fascinating soundscapes that the ensemble leader Richard Scott describes as ‘Molecular Improvisation’¹². Parker also founded the ElectroAcoustic Ensemble (formed in 1990) which has constantly looked to exploit technology as it has developed. It draws on electronic processing as a fundamental part of their music-making, and the ensemble (now an 18-piece) includes highly established electronic composers such as Richard Barrett and Lawrence Casserley.

Casserley (1997), has explored the notion that the processing system (the electronics) should be considered an instrument in their own right.

“Each sound is taken on a journey of transformation in which new aspects of itself are discovered; and so the listener is also led on a journey of discovery. There is also another kind of journey, my own personal journey to create an electronic instrument that enables me to create spontaneously the sound transformations that my music requires. Recently I have developed a computer processing instrument that begins to answer these needs – the journey is still going on...”¹³

¹⁰ This suggestion is based on the idea that certain instruments within a genre are related to a certain expectation of how it will ‘sound’ based on what an audience has previously heard. This is often influenced by the well known artists, such as Charlie Parker or Stan Getz in the case of a saxophone

¹¹ Leonard III, Neil *A Personal Approach to Contemporary Jazz* (Leonardo Music Journal, vol. 6 1996) Pg. 15.

¹² In a supporting essay to the recording *Imaginary Birds* (2011), Scott describes molecular improvisation “not only represents a fundamental questioning of instrumental technique, but perhaps more importantly a radical challenge to received concepts of musical form.”

¹³ Lawrence Casserley Interview with John Palmer *Avant no. 21* (UK, Spring 2002) http://econtact.ca/10_2/CasserleyLa_Palmer.html (cited 11/08/2017)

His processing instruments are demonstrated in the album *The Edge of Chaos* (2008). Casserley produces some incredibly detailed soundscapes using voice, metal percussion, mono harps and his signal processing instrument. The track *Brown, Gray and Red Relief/Everything and Nothing* is particularly fascinating, with atmospheric sustains and colours that gradually shift in texture and intensity.

The idea that new aspects of a sound can be discovered is a concept that I have applied to aspects of my compositional approaches in electronics produced for *The Borderline Suite*, such as the elongated opening of *Part III*. I then looked to apply such transformations in a live electronic setting through *Emanations No. 3* by allowing the computer to take creative control of the signal delays affecting the live sax and piano duo.

What I found interesting with Casserley's creation of his processing instruments was a focus on the use of a delay-line model, rather than a sampler model as an avoidance of the long term 'storage' of material. He felt this 'would detract from immediacy of the performance' as he sees improvised music is of the 'now'. The discussion of when improvised material has affectively become composed or fixed is an important part of my research, and this been considered further in Chapter 4.

Pierre Tremblay (2012) has also investigated the relationship between composition and improvisation through his own experiments and observations of trends in both free jazz and popular music. Tremblay raises a number of interesting points of discussion, such as the 'illusion of liveness', where the addition of a human presence to an otherwise fixed media performance is seen as a way of "testifying that the music is alive", and this in turn "brings an interesting perspective on liveness." This can be related in part to the Molvaer performance mentioned previously in this chapter¹⁴. Although live electronics were used, certain grooves were fixed and cued, which I felt inhibited the sense of interaction within the performance.

Tremblay also considers Ted Gioia's concept of 'the Aesthetic of Perfection' and 'the Aesthetic of Imperfection', debating the role that studios play in the compositional process and to what extent improvised material should be edited to form the 'perfect take'. In popular music he notes how it is used as a 'hybrid instrument', with brainstorming or spontaneous recording sessions becoming edited, re-performed, overdubbed or re-arranged. I have found that I have been able to relate such

¹⁴ See pages 12-13. Nils Petter Molvaer performed as the sole musician with his laptop at King's Place (2013).

processes to my own work. Parts of the compositional material for *Truth This Way* for example were drawn from recorded improvisational ideas before being developed into melodic fragments.

Tremblay notes that, “the creative possibilities offered by a disappearance of the separation of most studio roles are endless, a phenomenon again quite common in the popular music world, where a producer is frequently a composer and an engineer.”¹⁵ Such a process has been integral in parts of my work, allowing me to intertwine my improvisational and compositional approaches.

Other Influences

In looking to compare different ways in which electronic elements can be utilised by a single performer, a stark contrast to the approach taken by Molvaer can be found with the minimalist sounds of Colin Stetson. An experimental multi-reedist from Michigan, Stetson creates unimaginably complex and layered sounds through the use of multiple microphones and pickups combined with extended techniques (such as circular-breathing, growling and vocalising). He often employs the darker sounds of the bass sax and bass clarinet, and while his solo recordings sound overdubbed, they are in fact recorded in a single take. In general, there are no loop pedals, plugins or sampled material ¹⁶, making the resulting soundworld that much more striking and fascinating.

Although Stetson is only using the most fundamental of electronics in the form of microphones, the unique soundworlds he creates would not be possible without them. The track *Those Who Didn't Run* (2011) is a fantastic example of how many varied textures and colours can actually be found and exploited from a single source, and the use of multiple microphones allows these all to be heard simultaneously, which includes a prominent use of contact microphones¹⁷. This process highlights details and sound sources that would otherwise be unnoticed. The amplifying of key clicks for example provides a prominent percussive effect that can be heard in many of his works. In forming a sonic soundscape for *Emanations No. 1*, I looked to explore more extreme microphone

¹⁵ Tremblay Pierre Alexandre, *Mixing the Immiscible: Improvisation within Fixed-Media Composition* (Electroacoustic Music Studies Network Conference Meaning & Meaningfulness in Electroacoustic Music, Stockholm, June 2012) Pg. 12

¹⁶ The only notable exception I have found is the use of a gradual low pass frequency filter through the opening of *Those Who Didn't Run*, but even here the recorded audio itself has not been edited.

¹⁷ Contact microphones pick up vibrations through structure-borne sources as opposed to air-borne noise, and this is best demonstrated by a band Stetson wears around his neck. This contains a contact mic which then amplifies the growling and singing noises made while the instrument is still be played. This process picks out much more detail than would normally be heard, and a similar process is applied to the instruments themselves, with contact mics placed inside the tubing of his saxophones.

placement as a technique to capture more unique sounds of the recorded flute and sax lines. This was particularly fruitful in discovering percussive fragments that added subtle texture to the rhythmic layers of the work.

Where Stetson really influenced my processes has been in the concept of exploring the possibilities of a sound source in greater detail, beyond its basic form. I wanted to expand upon the idea of extracting unique sonic soundscapes and, while Stetson achieved this through acoustic microphone techniques, I looked to discover other ways that I could use electronics to find new 'sounds' within the recorded material. This involved experimenting with effects plugins within *Logic*, and is best highlighted through the elongating of sampled audio with reverb effects that is heard in the openings of *The Borderline Suite Part III* and *Part V*.

Other artists who have had an impact on my research practices include Ryoichi Nakamoto and his collaborations with Fennesz on the album *cedre* (2007) and Alva Noto, with whom he has released a number of albums. The mesmerising ambient layers of sustained pads and sparse, subtle effects is a soundworld I employ regularly in my work, with varying levels of pervasiveness. The Swiss artist Don Li's 'Tonus Music'¹⁸ concept offered similar inspiration, such as the minimal yet hugely atmospheric tonal palettes used in such works as *17minutes of 7hours* (2016).

¹⁸ "Tonus-Music" is a music and compositional concept developed by Don Li that uses elements of reduction and repetition as its core values (<http://www.tonus-music-records.com/en/about>), forming very sparse soundscapes that have subtle influences of jazz, electronics and ambient music.

3. Portfolio

i) Truth This Way

Truth This Way has been produced using both sampled and synthesised electronics, and includes the following recorded acoustic instruments: flute, tenor saxophone, baritone saxophone, piano, rhodes, upright bass and drum kit. The electronics used are a combinations of synth strings, sampled keyboards and effects applied to the recorded acoustic ensemble.

It was inspired by and written for a short film that was part of the Waterloo Film Festival 2013¹. The film contained no sound design, narrative or dialogue, allowing the music to prominently take on the role of conveying the story and emotions portrayed in the picture. The composition has three clear sections, distinguished by the changing scenes, each establishing very distinctive moods.

The opening is full of intrigue, with improvised looping saxophone lines based on an uplifting piano motif, underpinned by the baritone sax and bass playing the melody in unison. As this fades away, a more menacing keyboard synth replaces the piano motif with a percussive groove. Bass and cymbal hits add a sense of momentum, with extended techniques (overblowing, vocalising²) of the flute interjecting more percussive movement. The original piano motif gradually returns as the texture continues to thicken, with swirling sustained strings and effects crashing into a driven baritone sax and bass groove. Another swirling increase in texture finally brings the work into it's climactic moment, with the tenor sax melody developed from the opening bass line souring over a 6/8 swing feel in the rhythm section. In a final twist, the driven baritone and bass return over a straight 16ths drum groove to form an intense flourish, before finally fading away.

Initial Atms and Planning

I wanted to use this piece as an opportunity to push both my understanding and ability of incorporating electronics into my work. At this stage of my research, I had already begun experimenting on combining electronic elements with a jazz ensemble in the work *Boneyard 309*.

¹ A copy of the film has been included in the Appendix.

² Vocalising on flute involves singing and playing simultaneously.

For this I had a clear plan of the live ensemble I intended to use (the jazz quintet) and so based the additional material around this.

For *Truth This Way* my approach was the opposite. For the compositional process I wanted to focus on the soundworld created through the use of electronic instruments and effects, and so the use of live instruments was taken into consideration after this process. Because of this, each instrument was either added or recorded separately, with no live interaction with other performers, only the track in it's existing form. I had not intended for the work to necessarily be performed live, and so I felt this approach to producing the track would not have a negative affect on the overall sound. For this reason a full score has also not been produced, as each idea was recorded separately and in sections. Instead, fragments of notated material were used when required for the acoustic instrumentation³. By focusing on the how the use of electronics could form the desired soundworld, it gave me the opportunity to overlook the limitations of using a live ensemble in this context.

Methods and Experimentation

As the work was produced for a short film, this had a profound influence on how it was structured. There were three clear sections used to form the basic shape of the work, and within these were a number of hit points⁴. These gave me the opportunity to experiment with adding subtle textures that I formed by manipulating recorded audio samples. As an example of this, I initially recorded short fragments on flute that included extended techniques: overblowing, vocalising, jet whistles and harmonics, providing a wide palette of material with which I could then experiment. I found that using a vocoder⁵ resulted in a vastly altered sound that texturally was very abstract. A vocoder effectively synthesises the inputted audio, and these sounds can then be processed in a variety of ways. By applying the LFO⁶ modulation parameters, the waveform of the soundwave could be modulated to only allow certain frequencies to be heard at one time with either sudden, gradual or random changes, and the speed of the modulation could then be quantised to match the tempo of

³ The sections of notated score produced for Truth This Way have been included in the Appendix section of the commentary.

⁴ Hit points are a specific moment in a film or clip where something happens, such as an action within the shot or cut to a different camera angle.

⁵ EVOX 20 Track Oscillator (TO)

⁶ LFO: Low Frequency Oscillators

the track. Applying a synchronised rate set at demi-semi quavers and a random stepped waveform⁷ to the flute samples gave a fascinating sound, and added interjections of texture to the work as it developed.

There is a heavier influence of dance music in *Truth This Way* compared with the rest of the portfolio, which required me to develop new skills and techniques that I had not used before. This included side-chaining, a process where the output of one track is used to control the action of a compressor on a completely different track⁸. A common application of this technique is to give the bass drum more punch, particularly in dance music, as other frequencies can be 'backed off' temporarily to give the kick more prominence⁹. The result can be a sort of 'pulsating' effect heard in sustained notes.

Although I was drawing on such techniques, I did not want the work to settle into a simple four-beat dance pattern, and so explored the implementation of complex time signatures alongside the bass kick. I devised a four bar phrase, containing three bars of 5/8 and one of 6/8, using the same rhythm in each of the respective time signatures. The full phrase is rhythmically repeated four times, so to add variation and a sense of development, the 6/8 bar is shifted forwards in the pattern, meaning that by the fourth repeat it has become the first bar of the phrase (see *fig. 1*). Layering this over the four-to-the-floor kick gives the passage a polymetric feel and heightens the sense of tension and release, as the climactic melodic 6/8 section is reached.

To heighten this sense of tension, I utilised another technique that is synonymous with dance music - the use of a riser effect. This creates a sense that the music is building to a certain point and is often employed in musical transitions. To apply this concept to *Truth This Way* I utilised a ringshifter plugin¹⁰. This works as a ring modulator, which from the perspective of how it audibly sounds can be described as a way of passing the audio signal in a circle around the stereo image (looping left, front, right, behind etc). The rate of the frequency can be controlled through

⁷ EVOG TO LFO Settings: LFO Rate: 1/32. LFO Waveform: S/H. LFO-> Formant: 0.60. Format Stretch: 1.50. Resonance: 2.50

⁸ Coletti, Justin *Beyond The Basics: Sidechain Compression*. <http://www.sonicscoop.com/2013/06/27/beyond-the-basics-sidechain-compression/> Cited. 04/07/2016

⁹ The artist Holy Other is a good example of side chaining, which can be clearly heard in the opening of *Know Where* (2011). *High* (2012) by Sun Glitters is a more extreme example, with side-chaining applied to the entire track, creating a much stronger 'pulsating' effect.

¹⁰ In the context of my research, the use of ringshifters in rock and electronic music was highly popular in the 1960s/70s, and was also employed by fusion artists, such as trumpeter Don Ellis, among other devices to produce amplified distortions and exiting electronic effects. (Bob Yurochko, *A Short History of Jazz* Turnham Inc. 1993)

automation, and so gradually increasing the speed of the modulation forms a swirling motion that I found to be highly effective when used to transition between sections of the composition.

fig. 1 - Representation of the polymetric patterns in two sections of *Truth This Way*, with drums in 3/4 against rest of ensemble.

This technique for utilising a ringshifter would become an important tool throughout my portfolio, although not as a riser effect. The sense of motion it produces can add another dimension to an atmospheric soundworld, and features heavily in *Part III* of the suite, giving what would usually be a static line¹¹ such as the snare drum a constant and unpredictable sense of movement.

One of the challenges I faced with *Truth This Way* was the way in which jazz elements were integrated. The separate recording of the acoustic rhythm section instruments (piano and bass) was partly due to limitations of studio space for them to be recorded simultaneously. It was also not

¹¹ By static I refer to its place within the mix of the track. Elsewhere in the portfolio the snare is usually positioned slightly right of centre in the panning, and would not be altered through the track. With the ringshifter applied, it constantly moves around the stereo image.

feasible to record the drums in the facilities available¹², and so sampled drums were used. Because of the way the work was written for the short film, the sections are quite tightly arranged and controlled, meaning that the overall sound was unlikely to differ greatly if the ensemble were recorded together. Despite this, I would have preferred to have recorded as much of, if not the full ensemble together once the composition had been finalised after my experimentations, as I feel the detachment of live parts can potentially be heard musically. If there were more free or improvised sections, this lack of live interaction would have been far more noticeable.

Although this interaction is more artificial than I would have liked, there is still a prominent use of improvisation heard in the horn lines. Each of the melodies formed in the work were initially freely improvised. The main head through the 6/8 section for example was looped while I recorded several tenor sax lines, and on one of those passes I played a melodic passage that I felt suited the climactic moment of the work. A similar approach was then applied to the recording of the baritone sax melody heard through the opening, although I found this was then influenced by the tenor sax material. As I had already listened through the tenor recordings, I found myself naturally responding to those ideas, drawing on them as I played. This gives a sense of fluidity and continuity to the melodic material and helped shape the overall compositional structure, creating a sense of musical coherence between sections.

¹² Recording the drums remotely was considered, but the resources required for the level of micing required were not available at the time of production, and I did not want to compromise on the quality of the recording, as this would have been noticeable in relation to the production level of the rest of the track.

ii) Boneyard 309

Boneyard 309 is scored for an acoustic jazz quintet, consisting of two tenor saxophones, piano, upright bass and drum kit. The electronics used are soft pads (synthesiser) and electronic effects, which can be triggered by a sequencer during a live performance. For the recording they were applied in post-production, and I shall refer to their use in this chapter within this context.

The introduction opens with a piano cadenza, leading into a percussive rhythmic motif played on the E minor tonic. A strong bass entry builds with the tenor saxophones and drum cymbals and atmospheric pads, developing into a driving minor blues, with a contemporary twist. As the solos develop and the melody returns, an unexpected driving piano line is suddenly introduced. A straight groove is established, taking the piece in a new and increasingly complex direction, with the bass playing in a polymetric 3 over 4 time and the saxes playing contrapuntal melodies, building to a hugely exciting finale.

Initial Atms and Planning

The initial inspiration for this work came from a short clip taken from *Baraka* (1993), a film produced by Ron Fricke. It featured aerial footage passing over a series of disused military planes that were parked geometrically. I discovered these areas are known as 'Boneyards', and this particular one filmed was the 309th Aerospace Maintenance and Regeneration Group in Arizona, USA. I was fascinated by the kaleidoscopic shapes and patterns formed by the lines of the planes, and imagined the concept of contrapuntal melodic patterns over complex percussive lines. This would go on to form the basis of the work's finale, moving and overlapping the contrapuntal melodic figures between the saxes and piano over the groove established in the bass and drums (*fig. 2.*).

I planned on using electronics subtly in *Boneyard 309* to add another dimension to the opening and closing sections. I took inspiration from the group E.S.T. in the way I approached this, especially the track *From Gagarian's Point Of View* (1999). It is a fantastic example of how understated, yet integral the use of electronics can be in a composition, with the dark undertones creating an eerie and haunting atmospheric underscore to the trio's sparse, ambient acoustic material.

The image shows a musical score for the ending of 'Boneyard 309'. It consists of two systems of music. The first system starts at measure 218 and includes a rehearsal mark [L]. The second system starts at measure 223. The score is for a live ensemble consisting of Tenors 1 and 2, Piano, Upright Bass, and Drums. The notation includes various musical symbols such as notes, rests, and dynamic markings like 'f' and 'ff'. The piano part features a complex, rhythmic pattern with many sixteenth notes. The drums play a steady, rhythmic pattern throughout.

fig. 2 - Scored live ensemble parts of the ending of *Boneyard 309*. (Score Reference: *Boneyard 309*, page 15).

Methods and Experimentation

Boneyard 309 was the first composition that I started working on as part of my experimentations in combining acoustic ensembles with electronics. In comparison with later works in my portfolio, such as the *The Borderline Suite*, the interaction between the ensemble and electronic elements could be considered quite detached, as the soft pads and effects used do not draw on the ensemble as an audio source, and so act more as an underlying texture that supports the acoustic instrumentation, with little application of plugins to the live recorded audio.

Despite this, their inclusion in the work is not purely cosmetic, as they add a dimension and sonority that defines the soundworlds of the opening and closing passages of the work. They also enhance the contrast between the main melodic material and straight ahead sections. Another of E.S.T's pieces, *Tuesday Wonderland* (2006) highlights how this contrast can be achieved with electronic sustains and colours. As the opening builds, there is a gradual and subtle introduction of sustaining sounds that increase in intensity up until Esbjorn's piano solo, where there is a sudden drop in texture. The removal of the effects here makes the listener so much more aware of the sudden sparseness created by the live trio as the piece moves into the solo section. As this then builds again, the effects are reintroduced gradually, enhancing the intensity once more. Elements of this approach can be heard after the introductory solo piano cadenza of *Boneyard 309*, where the soft sustaining and swirling pads enhance the depth of the atmospheric soundworld. Their removal at the start of the percussive piano motif makes their re-introduction towards the end of this section so much more effective.

Among the effects that were applied to the soft sustaining pads was an auto funk wah pedal. The pedal effectively suppresses certain frequencies which are then 'released' as the auto-wah filter processes the signal. This produces the 'bubbling' effect, heard most prominently after the initial piano cadenza. This has become a technique that I have used in conjunction with other effects throughout my portfolio to add further depth to my soundscapes.

I have mentioned in my research context that while my portfolio is positioned within contemporary jazz genres, there is a strong influence of traditional practices in my jazz aesthetic. *Boneyard 309* offers a clear example of how I have blended traditional jazz forms with more contemporary sections. The main head of the work utilises a 12 bar form and is built on a chord progression that is loosely based on a minor blues. If the head and improvised solo passages were to be isolated from the rest of the composition, they could then be considered a very standard and traditional form of jazz repertoire.

The opening and closing sections however create a stark contrast. They are driven by straight percussive grooves and the finale of the work uses polymetric patterns. Also, despite harmonic similarities, there is a more distinct use of rock derived chord progressions through the opening sections, with *Vlmaj - Vllmaj - Im* being more reminiscent of a progression heard on the likes of Stevie Nicks' classic rock track *Edge Of Seventeen* (1981). The detail with which *Boneyard 309* is through composed and the differing musical directions produced by these contrasting moments move the work away from its traditional roots and into a more contemporary setting.

iii) The Borderline Suite

This five part suite is written for an acoustic jazz quintet, consisting of tenor saxophone/flutes, soprano/tenor saxophone, piano/keyboards, upright bass and drum kit. The electronics used are a combination of pre-recorded material (both sampled tracks and recorded acoustic sounds), and effects applied to the quintet instrumentation that in a live context can be controlled by a sequencer, and in a studio recording are used in post-production. For the purpose of this chapter, the effects and electronics discussed relate to their use in a studio context.

The basic concept of this suite is to tell a fictional story that follows the tale of a character's journey to a better place. I have intentionally kept the story and characters as open as possible for a number of reasons. The first being that I do not wish the story to be associated with any particular geographic or political context. This would create preconceptions of certain soundworlds or styles, which I wanted to avoid. Similarly, if I were to create very detailed characters and story lines, I feel this would place unnecessary limitations on my writing and the compositional shape of each work.

Predominantly, the reason for using the idea of a border crossing is that it gives the listener a basic concept of a story on which to use their imagination while they are listening to the music. In having these suggestions of either a dream (in the case of *Envisions*) or of a chase (*Borderline*) for example, the listener can then invent their own personal beliefs of how it is being portrayed. This allows much more freedom of interpretation without a need to focus on particular details, characters or background knowledge.

The five parts of the suite are -

1. *Dystopia*

Set at the journey's starting point - a poor place with few prospects.

- Rhythmic cells are faded in, created from background noises (such as a creaking chair) found when recording. Heavily sampled clarinet sustains fade in, constantly looping with oscillators. A sinister solo clarinet enters playing a cadenza which develops into the melody, accompanied by the bass, playing with a hint of a bossa groove. String and synth chords then fade in as a tenor sax solo takes over. This continues to develop with ever more frantic rhythmic cells, and as the clarinet

melody returns the work grows into an intense climax, before all but the original sampled clarinet sustains and background noises are left to fade away.

2. Fool's Paradise

The character's vision of the better things they feel they can achieve in a more affluent place.

- A tenor sax cadenza like opening develops into complex overlapping rhythmic riffs and patterns with a triplet feel, using an unusual time signature of 21/8, that builds and accelerates into an uplifting yet laid back melody over an eight bar progression. The complex rhythmic riffs return in the final section, continuing to be developed before growing into more improvised lines, with electronic effects adding to the intensity, as the work continues to accelerate to an exhilarating conclusion.

3. Envisions

Accounts the character's reflections/dreams before their attempted crossing.

- Originally taking inspiration from the 1930s Duke Ellington recording of *Echoes of the Jungle*, the opening creates an evocative soundworld that serenely develops into sustained thematic material. The ideas slowly develop and more layers are added and built around a tenor sax solo, and following the climactic moment of the solo breaks back down, serenely morphing into an acoustic 'four to a bar' comping section with a vintage tonal quality, before effects are used to bring the piece to a slightly interrupted yet ideal conclusion.

4. Borderline

Encaptures all the intensity of the character's daring attempt (stealth, chases etc) to make the border crossing.

- An atmospheric opening evolves into a 3/4 development section based on simple bass riffs with edgy flute interjections and eerie trance like lead pads. This builds in intensity and tempo into the main head - an AABA form in minor modes, that leads into the tenor sax solo. A brief return to a faster development of earlier 3/4 riffs grows into more improvised solos with the piano and drums, before building back into the head and a climactic finale, and an ending that leaves the listener uncertain of the outcome.

5. *New World*

Closes the suite with the character's goal being reached..

- A reflective opening gives way to a subdued yet defiant melody. The melody then fades away into a series of solos on the soprano sax, bass and piano, each gradually building on each other with changes in time signature and increases in tempo as the work continues to grow. The melody returns for an emphatic finale before finally fading away, with the lack of cadence adding a sense of ambiguity to the end of the character's story.

Part I: Dystopia

Initial Aims and Planning

The focus for the opening part of *Dystopia* was to create atmospheric sounds and rhythmic devices derived solely from a single sound source. The manipulation of sounds and effects has been an integral part of the works that I have produced during my research. *Truth This Way* and *Boneyard 309* rely more on the use of existing sampled material and synthesisers, and I therefore wanted to experiment with live recorded audio as much as possible through the suite.

The overall tone of the first part of *The Borderline Suite* is very dark, eerie and at its climactic moment quite intense. Its role in the suite is to tell the story of the character's starting point in their journey - a difficult background in a poor place, with few prospects or opportunities. I imagined the rhythmic elements to be almost mechanical in their sonority and hypnotically repetitive, with the sampled material giving a sense of unease and uncertainty.

Methods and Experimentation

For the introduction of *Dystopia* I decided on using a clarinet as the sound source, and began by recording a single sustained note. This is altered using pitch manipulation to create varying harmonies on separate tracks, which are then periodically faded in and out, creating various dissonant chords. Each track uses its own ring shifter running at slightly different hertz frequency rates. This essentially gives each line its own rhythmic pulse, free from any set tempo. Once these are overlapped it results in a constantly moving and pulsating drone underlying the opening passages (*fig. 3.*).

An unexpectedly useful by-product found from recording the clarinet was background noises picked up by various movements, such as the chair in my home studio creaking as I moved from the computer to the microphone, or the key clicks as I prepared to play. From this I discovered loopable sections that had distinct patterns, which I then restructured into four rhythmic cells (fig. 3.). Once looped, they replicated the sound of working machinery, and combined with the sustained clarinet chords formed a complex and multi-layered ostinato that added depth and originality to the eerie soundscape that I had envisaged.



fig. 3. - Overlapped sustained clarinet drones (red) & looped background noises (gold).

As well as the sustained clarinet note, I also recorded an improvised solo clarinet cadenza. This was done without a backing track or tempo click. Allowing it to be a completely improvised solo captured the raw material and ideas that I felt I wanted to portray at that time, resulting in a more natural and flowing performance. Finding a balance between the inclusion of electronics and keeping my compositions grounded in my jazz aesthetic has been one of the greatest challenges of my writing and research. Improvisation is seen as one of the defining aspects of jazz, and its prominent inclusion in my work helps to ensure that the creativity of the performers is not sacrificed in favour of a reliance on electronic music.

To add intensity and a darker character to the solo clarinet, the same line has been copied and is simultaneously playing on three channels. The first uses a reverb plugin to push the channel back in the mix, mimicking the effect of hearing the clarinet on the bottom floor of a large echoey staircase

from the top. The long sustains that come from this then pass through another reverb plugin that adds colourful swirls, panning the audio slowly from left to right at varying speeds to subtly increase the stereo effect. The second channel is closest to the original audio, with a pitch changer subtly adding an artificial fifth for more harmonic colour. The final channel is the most audible and prominent. The signal is passed through a simulated amp, adding distortion and a grittiness to the sound. Another pitch changer with subtle artificial harmonics is added, further altering the natural sonority and making it less recognisable as an acoustic clarinet. This layering and combining of different effects and plugins result in unique sounding passages that help to give my works their own voice.

While improvising, I built my lines around the key centre of F minor and had created a flowing melody that I wanted to use. On listening back to the recording I could imagine the bass line, hearing a slight bossa groove, and from this composed a chord progression to accompany the melody. Once I had this in place I had formed a sixteen-bar progression which would then be repeated and used as the basis for a tenor sax solo. At this stage I started to utilise the full ensemble, with the piano providing harmonic accompaniment and the gradually increasing complexity of the drums driving the solo through to its climax.

To thicken the texture and increase the intensity of the rhythmic impact through the tenor solo, I experimented with adding sampled cymbal hits. For this process, I would run the cymbal through a guitar amp and then use a noise gate¹³, severely limiting the audio signal passing through the channel to short and sharp injections, with the resulting sonority being very harsh but still holding a groove. Two unique channels panned left and right give a full stereo effect that elevates the level of excitement in the final choruses. The melody then returns on the final chorus, before fading away back down to the opening rhythmic ostinato which is brought back into prominence.

¹³ Noise Gate Settings: Threshold: - 15dB. Hysteresis: - 3dB. Reduction: - 100dB. Attack: 4 ms. Hold: 0 ms. Release: 0 ms. Lookahead: 0.0 ms.

Part II: Fool's Paradise

Initial Atms and Planning

The role of *Fool's Paradise* in the suite is to portray the character's aspirations and hopes of being in a better place. The title is derived from the idea of being in a state of positive thinking while not accepting a reality that is much more bleak and offers little hope. As a concept I looked to convey this in the work by starting with a single acoustic instrument playing a relatively sparse and rhythmic line. Further lines would be added on each part of the acoustic ensemble, finally creating a complex layering of rhythmic patterns (*fig. 4*). I wanted this to depict the conflicting voices the character could be hearing as they convince themselves of this more prosperous life that they strive to reach, so while each cell has a varying rhythmic pattern, they all overlap into a coherent groove that locks together once all the parts are added. This would then form the core of the composition from which I would develop the melodic material.

Methods and Experimentation

While developing ideas for the layering of rhythmic patterns, I experimented with utilising unusual time signatures in compound metres. I find triplet grouping of quavers allows for a greater sense of fluidity in overlapping rhythmic ideas by regrouping across the beats or in pairs of quavers, implying a simple and compound metre simultaneously. The use of a $21/8$ time signature, combined with these techniques and a slower tempo¹⁴, reduces any strong emphasis on the downbeat, further adding to the flow of the passage.

The layering of instrumental textures and rhythmic patterns has been a technique I have utilised extensively in my composing, and so minimalist works, particularly those of Philip Glass and Steve Reich, have always been inspirational. I feel the second movement of Reich's *Electric Counterpoint* (1989) relates to the sense of flow I was looking to create in *Fool's Paradise*, with the overlapping quaver patterns forming complex groupings which can be felt or counted in a variety of ways.

The main looping motif, heard on tenor 1 (*fig. 4*) formed the basis from which I composed the counterpointing lines, with each voice having it's own rhythmic independence. On occasion the parts briefly align (an example being the relation between tenor 2 and the piano) before changing

¹⁴ Dotted crotchet = 76.

direction, suggesting the character agreeing and disagreeing with the conflicting thoughts they might be feeling.



fig. 4. - Layering of rhythmic patterns in Part II: Fool's Paradise. (Score Reference: Part II, page 6).

In comparison to the other parts of the suite, *Fool's Paradise* is the most acoustic, only using subtle electronic effects to add atmospheric textures. There is an opening cadenza on tenor sax with rhodes accompaniment, with the bass and light cymbal colours being introduced later in the section. As with my approach to *Part I*, I wanted to use the existing material to build the atmospheric soundworld through the use of plugins. To do this with *Fool's Paradise* I used long reverbs combined with a simple delay effect on the tenor sax cadenza, creating very long sustains which provide an underscore for the introduction. This adds to the dream-like textures that I was aiming to produce, reflecting the meaning and role this part plays in the suite.

In the final section of the work the layered rhythmic patterns are reintroduced at a faster tempo¹⁵, injecting a greater sense of urgency and complexity. As this develops, the ensemble is then instructed to gradually move away from the scored riffs and instead improvise around these patterns. Combined with an *accelerando* to the end, this already complex sound becomes almost chaotic, further enhancing the idea of the contradicting thoughts that the character may be feeling. Some of the electronic effects used in the opening are reintroduced, as well as more delay effects that are sparingly applied to both sax lines. These add further interjections and colours to the existing ensemble layers without overpowering them.

¹⁵ Dotted crotchet = 115.

Part III: Envisions

Initial Atms and Planning

For this track my main aim was to create an evocative and elongated soundworld that was hugely ethereal. An example that inspired this idea was not an original composition, but instead a sampled track produced by an artist called Birdfeeder¹⁶, which was uploaded on SoundCloud and went viral, with over 2.5 million listens to date¹⁷. It was simply the main theme from *Jurassic Park* (1993), but the audio had been stretched out to extreme lengths, changing what was originally a 7'30" track into nearly an hour long piece. The results were quite fascinating and evocative, and made me think of how I could create a similar effect using my own approach and techniques. In *The Borderline Suite*, *Envisions* recounts the character's reflections and dreams on the night before their attempted border crossing, making the concept of an elongated and elegant sonority a well suited platform for the composition.

I imagined first sampling an existing track as the basis of my initial experimentations. Focusing on jazz repertoire, I discovered a collection of recordings of Duke Ellington and his Orchestra dating back to the Cotton Club years¹⁸, and found myself settling on *Echoes Of The Jungle* (1931). The steady tempo, range of voicings and simple yet interesting harmonic progression were ideally suited for the work I was planning on producing.

Methods and Experimentation

Initially I sampled the track *Echoes of The Jungle*, using a combination of effects and techniques to create the desired outcome; an evocative and elongated soundworld based on the sampled material. The same effects and techniques were then applied to the live ensemble in post-production, resulting in my own unique soundscape. The processes opened up completely new melodic passages, as the audio would overlap as it was stretched and manipulated through reverb plugins. This influenced my own compositional material, as I experimented with how applying these techniques would affect the melodic and harmonic lines of the scored quintet. I also looked

¹⁶ *Jurassic Park Theme (1000% Slower)*. Birdfeeder.
<https://soundcloud.com/birdfeeder/jurassic-park-theme-1000-slower>

¹⁷ Based on play count statistics up to 20/06/2016.

¹⁸ Duke Ellington and his Orchestra had a number of stints at the Cotton Club from 1927-1937.

to take inspiration from the sounds and growls heard in the horns of the original Ellington recording.

I used the Space Designer (a powerful reverb designing tool in *Logic*) and found the preset 'Backwards', a short reverb that reverses the waveform creating a 'mirrored' repeat. I then lengthened it by changing the sample rate of the Impulse Response (IR) to an eighth of the original, effectively increasing the reverb, or 'room' size by eight. Now, instead of simply hearing a replica of the audio reversed, it has also been elongated by over six seconds, and as the effect is applied to the whole ensemble, the result is hugely atmospheric. An issue that arose was the prominence of the original audio. To compensate for this and achieve the results I wanted at this stage, I reduced the dry output to 0%. This is the equivalent to hearing the sound from the furthest distance possible in a giant room, giving the resulting effects prominence over the original audio (*fig. 5.*). After this process, I could layer on more plugins to modernise the sound - adding a pedalboard as a bus send with delay and autofunk pedals, giving depth and variation. I also introduced a ringshifter, fading it in and out by gradually increasing the modulating frequency and the dB level on the sample track's automation.



fig. 5. - Space Designer settings used in opening of Part III - Envisions.

In terms of the work's structure, at first I imagined that the main compositional material (the head) would grow and morph out of the sampled live ensemble used as the opening. This could then develop into a solo section or elements of the opening could be recapitulated.

The transition from the opening of the work to the head section was initially problematic. My first compositional ideas did not hold the listener's interest in the same way as the introduction, and felt somehow dated, and so were rejected and reworked. Applying similar techniques used through the opening modernised the sound of my own material. I found that recording dark sustained clarinet 'swells' in the lower registers then turned into a slow pulsating swirl with the plugins applied. The serenity of the transition was aided by the inclusion of sampled strings. I found this instantly gave the new material warmth and depth, and the continued yet subtle use of a ringshifter on the strings created a more varied texture.

With the development section now established, I could use this as a basis from which to structure the rest of the work. I used the chord progression of the development to create a solo section for the tenor saxophone. The first chorus omitted the bass riff, but introduced the piano for the first time as an accompaniment to the solo. In the second chorus the bass riff is reintroduced, as well as the drum groove which develops through choruses three and four, building to the climax, before fading away and morphing into a fully acoustic and vintage sound.

A key aspect of *Envisions* that I wanted to differ from *Dystopia (Part I)* was the climactic soundworld at the height of solo sections. The structures for both tenor sax solos are similar in the way they are shaped with a dense textural palette in the final chorus, but the aim of *Dystopia* was to instill a sense of unease and high intensity, while the aim for *Envisions* was to be softer and more euphoric. I achieved this through subtle changes in the approach of the acoustic jazz ensemble and in the way the electronic textural layers were utilised. The electronics in *Dystopia* are much more intrusive and play a prominent role in the soundscape, especially through the distorted cymbal effects, which build a more intense dynamic and encouraged more interaction from the acoustic ensemble. In contrast, *Envisions* uses an equally dense palette of electronic textures, but these are more subtle, adding colour to the overall soundscape and playing a more supportive role to the acoustic quintet. The marimbas are the best example of this, as they are barely decipherable in the track when first heard, but if removed from the mix the track lacks the same subtle rhythmic intensity (*fig. 6*).

fig. 6. - Underlying textures on the final chorus of the Tenor Sax solo in Part III - Envisions. (Score Reference: Part III, page 19).

After the sax solo, the work begins to fade away before serenely morphing into an acoustic ‘four to a bar’ comping section with a vintage sound. To achieve this I used a combination of effects, including a simulated vinyl crackle and filters to limit the frequency range to a much narrower band¹⁹. As the work reaches it’s conclusion, the filters are gradually widened so that the full frequency range can again be heard, and the autofunk pedalboard is reused to warp the sound. The melodic material here is again influenced by the work of Ellington, with the chord progression from part of *Echoes of the Jungle* forming the basis of this section. I partly see this as a recognition of the importance the Ellington track played in the development of this work, but also feel in terms of the story it could be seen as the character slowly awakening from their dream.

¹⁹ Low cut shelf: 260Hz; High cut shelf: 1340Hz.

Part IV: Borderline

Initial Aims and Planning

My intention was for *Borderline* to encapsulate a sense of tension, excitement and drama to reflect the sense of a chase. When considering the compositional structure, I decided to approach the use of electronics differently, with a clearer separation of electronically influenced and straight ahead²⁰ sections. This would create contrast within the work in a similar way to *Boneyard 309*, although with *Borderline* I wanted the electronic elements to have more prominence.

I considered ways of using techniques applied to the opening of *Dystopia*. Forming interesting textures from generic and unintentionally recorded audio creates a much more unique palette of sound that can be used to add a sense of stealth and edginess. One such sound source that I felt would work for this was a vinyl crackle, which I have also heard used on Lemon Jelly's *Experiment No. 6* (2002). In this track there is a looped cell taken from a sampled crackle with a clear accent on beats one and three, that is used as the basis of the groove. For my own work I also intended on using a looped cell, but this would be much longer and detached from the tempo of the live ensemble to help form a sense of free time and ambiguity through the opening.

Methods and Experimentation

Producing the opening section of *Borderline* required a lot of trial and error. The additional textures were derived from short samples taken from generic sounds found in between takes, such as the door of the recording booth opening and closing. After separating these into individual samples, I would manipulate each to see which would work. I rejected a number of the samples I had created during this process, predominantly due to the fact that they lacked rhythmic interest, or that the background noises heard were too strong, such as a bleed²¹ of audio from the studio monitors heard if the booth door was open.

Eventually, through this process I discovered two sampled cells that were usable in the final track.

The first added a subtle texture in the introduction, while the second played a much more

²⁰ The term 'straight ahead' can be used to describe a standard jazz swing format of a head followed by solos, and then usually returning to the head. Stylistically, a walking bass is usually heard, along with swing quavers on drums, with an emphasis on beats 2 and 4.

²¹ The term 'bleed' is used when an audio recording picks up other sound sources that it was not intended to record, which occurs when sounds/instruments are not isolated or are all recorded in the same room.

important compositional role. Rhythmically this two-bar cell fitted perfectly with the up-tempo $3/4$ time signature of the piece. To add further interest and presence, I experimented with various delay patterns. I could then imagine this being played with brushes on a snare, and so transcribed a groove from the completed cell that would form the basis of the live drum rhythm through this section. Further rhythmic variation was formed by the multi temporal layering of the sampled two bar cell over the looped vinyl crackle from the opening (*fig. 7*).

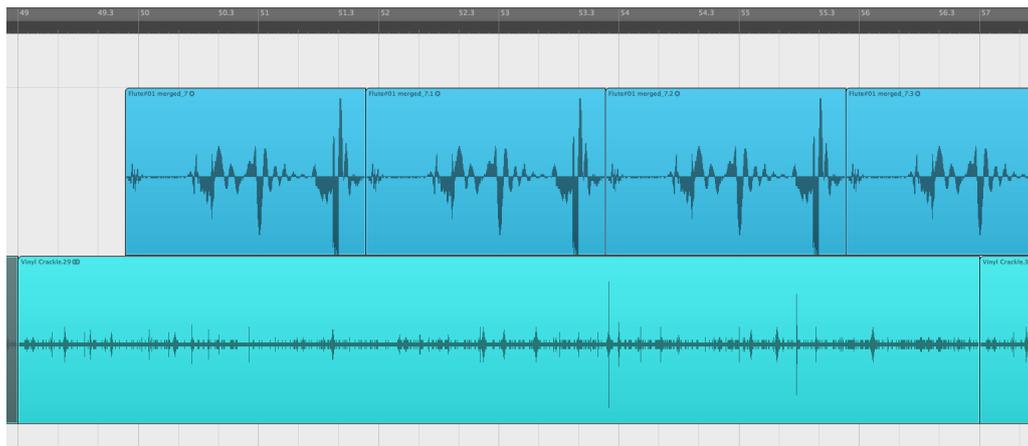


fig. 7. - Comparison of looped samples in Borderline.

Once the groove was established, further layers could be formed to intensify the mood, and so I experimented with intentionally recording various objects and textures. I found objects with a high attack were too potent, and instead those that could be brushed over with my hand close to the mic, such as paper, give a more varied, subtle sound. More specifically I used paper currency for it's raspier texture. Once sampled, this was combined with a Space Designer effect that reversed the soundwave, enhancing the breathiness of the sample.

The flute solo is the only part of the suite where I looked to specifically manipulate the audio of the improvised passage during the post-production process. I focused on applying three contrasting effects that would be attached to the flute channel through buses so that each could be controlled separately (*fig. 8*). The first used a long delay which also affected the pitch of the repeated audio, creating the effect of the sound spiralling downwards. The second channel used a simple echo plugin set with a quick response rate which amplified the background noises (such as breathing) at the end of a phrase. The final channel utilised a long and distant reverb delay, giving the end of the solo a more atmospheric sustain.



fig. 8. -Three effects channels applied to flute solo in *Borderline*, controlled through bus automation in post-production.

In preparing for the recording session, it became apparent that using a click track would be necessary for certain parts of the suite. Although the suite itself works acoustically, the addition of rhythmically driven electronic elements meant that a set tempo had already been required during production. I was very conscious of ensuring that a click would not inhibit the natural performance of the ensemble. Individual click tracks were therefore prepared for *Parts I, III, IV* and *V*, each used for varying lengths. In the case of *Borderline*, the click ran only as far as the accelerando into the main head of the work (see *Borderline* score page 12), as from this point it would inhibit the natural swing feel of the rhythm section, and was deemed unnecessary.

Part V: New World

Initial Aims and Planning

As the closing part of the suite, I wanted to draw on previously used elements and processes to produce *New World*. In doing this, I hoped it would give the movement a subtle sense of recapitulation, while still standing apart with its own unique soundworld. For the opening I aimed to convey a sense of eerie calm and reflection that would follow after the tense and dramatic borderline crossing attempt had occurred. The atmospheric sounds and colours would be reminiscent of those heard in the opening of *Envisions*, which would then grow into sustained chords on the piano and bass.

Throughout *The Borderline Suite* I constantly looked to reuse as much material as possible. As I have developed as a composer I have come to realise how much potential and variation a seemingly small idea can have, and that recycling and developing this as opposed to reintroducing more and more new ideas creates a better sense of coherence through the work. As a result, I aimed to construct a short chord progression that would form the harmonic structure for the majority of *New World*. I felt that a harmonically complex approach would not suit the tone of piece, and instead wanted to focus on building excitement and variation with rhythmic and melodic techniques.

Methods and Experimentation

In looking to produce a sense of reflection and sentimentality during the introduction, I drew on similar techniques to those used at the start of *Envisions* - Using IR reverb effects to form an evocative and elongated soundworld. I continued to use recycled material to form new compositional ideas by layering samples of unused tenor sax takes from *Envisions*, using a pitch shifter to move these down a whole tone.

As well as being a technique developed for producing electronic material in the suite, my use of IR reverbs has also presented opportunities to approach the composition of the notated live ensemble material in a new way. By applying the long reverbs, what starts as a single melodic line then becomes polyphonic and harmonically rich, as parts of the original sound source overlap as they sustain. I find it fascinating that within this material, entirely new melodic fragments and lines can be heard and discovered. I subsequently transcribed two melodic lines from this to form the live

parts for the soprano and tenor sax (*fig. 9*). As a process, the development from pure improvisation to a creation of timbres and then effectively transcription of this back into traditional notation resulted in a compositional outcome I would not have achieved without the integration of electronics.

I felt it was important that the finale of the story would not obviously conclude as either a happy or sad ending, as the result should be a work that listeners can interpret in their own way. As a result, I avoided the use of certain compositional approaches, including clichés such as a ‘happy’ perfect cadence to end the work, or the clear use of major or minor chords to suggest uplifting or sinister tones. This was achieved through the voicings used for the opening chords in the piano, as the close clusters, extensions used and the omission of 3rds and 5ths give the overall progression a sense of fluidity as it moves from suggestions of minor to major and back again²².

The image shows a musical score for Soprano and Tenor Sax parts. The top system includes the Soprano Sax part with a 'Sop lead (Tenor echo)' and the Tenor Sax part with a 'Sop lead - Echo'. The piano accompaniment is shown in two systems, with measures 7-12 and 19. The tempo is marked as quarter note = 96. A section labeled '[A] R/S Entry' begins at measure 19.

fig. 9 - Scored soprano and tenor sax parts for opening of *New World*. (Score Reference: Part V, pages 3 & 4).

I looked at ways of extending the concept of recycling the existing harmonic material when developing the electronic material. Through the head and soprano sax solo, the electronics are used to form a highly atmospheric sustained underscore which echoes the live ensemble. Using the same chord progression as the live piano part, the sounds are created from heavily sampled pianos

²² Chord voicings for piano through head of *New World*:
 Dm11(omit 5); Fmaj9(omit 3); Bb9#11(omit 3); C11 A7sus4(b13).

and strings. A number of plugins are used to then make these samples unrecognisable. The Space Designers gave a sense of distance and sustain, while an oscillating vibrato, ringshifter and pedalboard effects were used to further alter and modernise the sound. (fig. 10.). The sustains are reintroduced in the final head with more presence, adding a subtle boost to high-mid frequencies that fill out the soundworld through the climactic moment of the suite.



fig. 10. - The extent of plugins used to manipulate piano and string samples in *New World*.

On a basic structural level, *New World* follows a traditional straight ahead format of head/solos/head, but compositionally it is more complex. Each solo sends *New World* in a different direction as it grows and morphs into the climactic finale. As I was looking to be restrictive harmonically, I focused on using variations in style, time signatures and tempo. These not only help to progress the work, but also created material and ideas that could be recycled and developed. The shift into an uptempo 3/4 feel in the piano solo is used to create a sense of movement, while the rhythmic patterns that underlie the bass solo are then reintroduced and developed before building into a recapitulation of the head over the slight pop groove²³ that is suggested in the soprano solo.

²³ The sense of a pop groove is achieved through the use of a backbeat (emphasis on beats 2 & 4) in the drums.

iv) Loops

Loops is scored for an acoustic jazz quintet, consisting of tenor sax, soprano/tenor saxophone, piano/rhodes, upright bass and drum kit. The electronics used are effects applied to the quintet instrumentation controlled by a live sequencer. In the studio recording these effects are used in post-production, and for the purpose of this commentary they are discussed in relation to their use in this context. The work has also been scored for an extended big band, consisting of five saxophones (two alto, two tenor and baritone), flute, five trombones, five trumpets, french horn, vibraphone, electric guitar, piano, upright bass and drums.

Best described as groove driven jazz/funk fusion, the style of *Loops* draws on many influences from a variety of genres. The opening utilises contemporary classical techniques, with dissonant melodic passages interjected with piano swoops and use of its extreme range. This gives way to the primary looping bass riff, with a funk/rock drum beat settling the piece into a solid groove. The thematic material continues to develop before giving way to a tension releasing and climactic key change, which fades into the solo section, settling back into a full funk groove. An increase in tempo out of the final solo leads into a recapitulation of thematic material. A sudden interruption dramatically alters the texture, with a linear sustained note passed between the saxophones, before a huge crescendo into a half tempo heavy rock feel with a recapitulation of the original bass groove and melodic material.

Initial Atms and Planning

In contrast to other works on *The Borderline Suite* album, I wanted to solely use the acoustically recorded instruments as the basis for the audio manipulation, and looked at ways the sounds of the ensemble could be manipulated.

The sax solo in particular was scored with this intention in mind. Through the opening passages of the solo, the keyboards are omitted and the supporting groove is provided by a sparse bass line and consistent funk like pattern in the drums. This underpins the sax but allows a lot of space for both the solo and for effects to be subsequently applied. I hoped that this would result in me being able to manipulate the sound of the sax in a far more extreme manner than I had previously attempted, drawing on the various techniques I have developed in my other works, as well as experimenting with new ideas.

Methods and Experimentation

The use of automation played a key role in *Loops*, and this is particularly highlighted through the sax solo section (see *fig. 11*). As with the processed clarinet passage in the opening of *Part I*, fragments of the waveform were copied onto separate channels. This allowed for the layering of effects that were used to add interjections of dissonance and harshness to the soundscape. One such technique for this was the application of a bitcrusher. This distorts the audio by reducing its resolution, and by downsampling²⁴ the audio to extremes lengths the sound was drastically altered. The intensity could then be controlled and varied through automation as the solo develops.

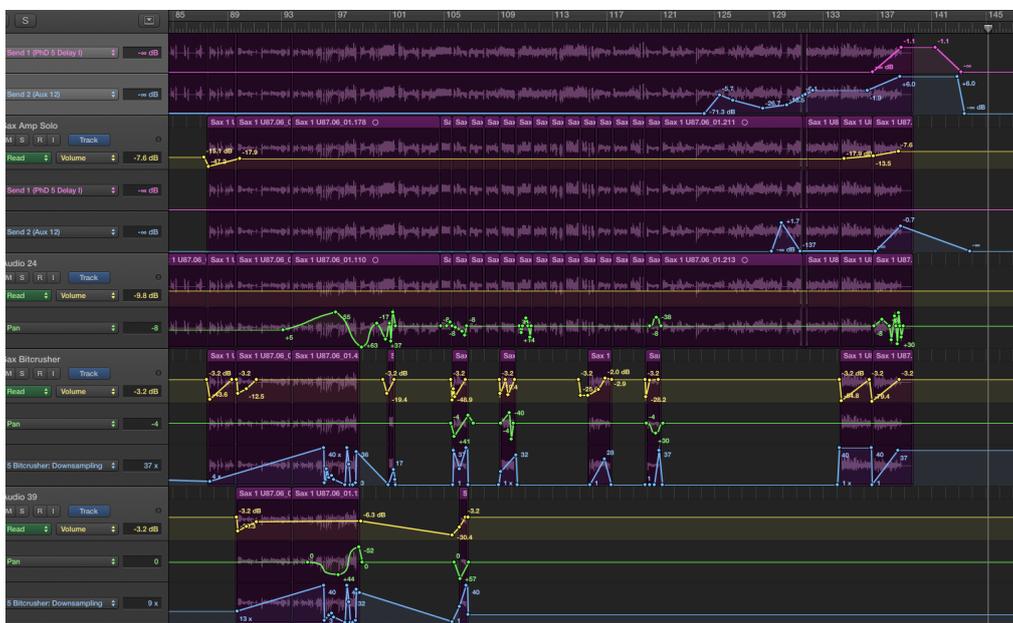


fig. 11. - Automation applied to tenor sax solo in Loops.

My experimentations with applying electronics to the sax solo were an interesting process. These were created through the post-production stage, and so I had not decided the way in which they would be applied prior to the live recording. Despite this, I found that when soloing during the recording session I was conscious of the fact that I wanted to manipulate the solo, and this affected my improvisational process. I found myself taking a more rhythmic approach, while also using extended techniques, such as overblowing and harmonics, as I considered what would work best once additional effects had been applied. On reflection, although the resulting recording works well, I feel this awareness may have slightly constricted my performance in the studio setting.

²⁴ Downsampling reduces the number of bits per sample, effectively reducing the overall quality of the waveform. In *Loops*, this was taken up to 40 X, resulting in a huge reduction of audio quality.

The finale of the work stylistically moves into much darker territory, and so I decided that the break down section before this climactic ending needed to be as contrasting as possible to enhance the sudden changes in both dynamics and texture. The score is written with pulsating swirls heard in the saxes, piano and bass that pass around the ensemble (*fig. 12.*). Distant reverb effects were then applied to each part to make these swirls more atmospheric and mysterious. Gradually fading the original audio back in over the final bars of the transition built more momentum into the heavy rock feel.

The image shows a musical score for a contrasting section. It features four staves: two for saxophones (top), piano (middle), and bass (bottom). The saxophone parts are marked with dynamics like *ppp*, *p*, and *sf*, and include phrasing slurs. The piano and bass parts feature dense, pulsating rhythmic patterns. A key signature change to B-flat major is indicated. A rehearsal mark [K] is placed above the saxophone staff, with the instruction "Dark and heavy" written next to it. The score concludes with a "Solo fill" for the piano and a final dynamic marking of *ppp*.

fig. 12. - Score of the contrasting section that builds into the climactic ending of Loops (Score Reference: Loops, pages 13 & 14).

Here, I wanted the ensemble to sound as huge as possible, attempting to emulate the dense soundscape achieved when scored for a full big band²⁵. The use of distorted amps forms a much thicker and dirtier texture, further enhancing the dark and heavy feel while creating an illusion of additional instrumentation, such as electric guitars. The application of electronic effects throughout *Loops* help to enhance the intended soundworlds as the composition develops, and their derivation purely from the acoustic ensemble creates a natural relationship between the two elements.

²⁵ See Appendix - *Loops* Big Band Score Extract

v) Emanations

Emanations consists of three movements and is performed live by a duo of tenor sax/electronics and piano with no pre-composed written score. The electronics are used predominantly in realtime by the saxophonist, using effects channels that are applied through the use of a hardware controller. Studio electronics consisting of pre-recorded piano, tenor sax, baritone sax, flute and alto flute that have been processed and manipulated are used in conjunction with the live performance for *Emanations No. 1*. *Emanations No. 2* and *No. 3* both solely utilise live electronics.

Throughout my research I have constantly looked into ways of reusing and recycling existing material. I have done this through traditional composition techniques, such as melodic fragmentation, and with electronics and sampling. I have often drawn on 'non-musical' sounds, such as the creaking chairs in *Part I*, and manipulate these to form new percussive and melodic effects.

For my final portfolio work I wanted to take this much further, and intended on finding ways of using a small amount of melodic and improvised material as a source, which is then transformed into a full soundscape. To do this, I continued my experiments with using reverb and delay plugins to both elongate the sound and to create grooves and patterns which can loop for varying lengths of time.

One of the influences for this approach and my work in general has been Norwegian jazz trumpeter Nils Petter Molvaer. As mentioned in Chapter 2, during his performance at the London Jazz Festival 2013 he collaborated with a visual performer who improvised stunning images and lighting in the concert hall using various cameras as the source material. While I have no plans to introduce a visual element, I intend on using the piano as a similar source, using the material produced by the piano player as a basis for the electronic improvisation.

By being in control of the parameters affecting the live piano, the pianist will be reacting not only to my improvisation, but also their own, in a unique and different way to how they would in an acoustic setting. I will look to consider how taking away part of the creative control from the improviser affects their performance, and how they react to the electronic elements in this setting.

Initial Aims and Planning

The soundworlds for these works focused on the live element, while incorporating other electronic effects and textures, as well as utilising pre-recorded audio that would be manipulated in realtime. *No. 2 & No. 3* were drawn solely from the live audio created by the duo of sax and piano. The focal point here in the context of my research would be how the piano player reacted to, and interacted with the sounds produced by the sax after they have been processed, as opposed to the raw material alone. As *No. 3* developed, these roles may then also be reversed, and the sax would react to the warped textures of the keyboards.

The overall structure of each work was intended as follows -

No. 1: This was the most structured movement, as it included a pre-prepared track formed entirely from manipulated sax, flute and piano audio (no artificial synths etc). The live duo would play along to the track and I would improvise live electronics and effects while we were playing.

No. 2: The movement was completely improvised. There was no pre-plan of track structure and all electronics improvised would be applied in realtime.

No. 3: Again, completely improvised, but with some slight planning of structure. An improvised sax cadenza with linear piano lines would be captured and looped once. I would then switch purely to electronics on the loop, focusing on manipulating the second piano layer, which would be more harmonically driven. All electronics would be added in realtime.

I hoped that the variations in approach to each of the movements would create contrast, while the similarities in elements such as the effects being applied would form a sense of coherence.

Methods and Experimentation

Although the instructions for the live performers of *Emanations* were extremely sparse, the level of planning and experimentation for the electronics was extensive. In order to achieve the desired outcome for each movement, the effects used had to be created and prepared, and initially I had to consider what would be the best approach to applying them in a live setting. I wanted to have a number of options for different effects that could be used independently, and so created bus channels that were then attached to the live channel. At first, I automated each bus send, meaning that the faders for each were preset on the live track, so that different effects were being applied as the track progressed. The result of this approach would have meant each section needed to be clearly marked with strict control over the number of bars, as the automated faders could not then

be manipulated in realtime. While this would have allowed me as the saxophonist to focus solely on improvising, I saw it as placing too many limitations on the possible explorations of a live performance. The purpose of this work in the context of my research has been to explore ways of applying the techniques I have developed in a live setting, and so I investigated how I could create more freedom and give more control to myself as the electronics performer.

I experimented with using hardware controllers, and looked at ways this could be done in a live setting. The *Novation LaunchControl* was well suited for my intentions, as the output level of each bus channel could be assigned to an individual knob that gave me a much greater level of control while keeping the setup relatively simple. This allowed me use the controller quickly while performing, and so I was able to make changes even while playing the saxophone²⁶.

Fig. 13 shows how the recording was set up, where the hardware controller can be seen to the right of the saxophone mic. It also highlights the close proximity between the two performers. This was an intentional aesthetic choice made while preparing for the recording, as the slight bleed of the audio signals between each instrument meant that they would be processed by the different effects being used on each channel. I found this added another (very subtle) dimension and depth to the overall soundscape.

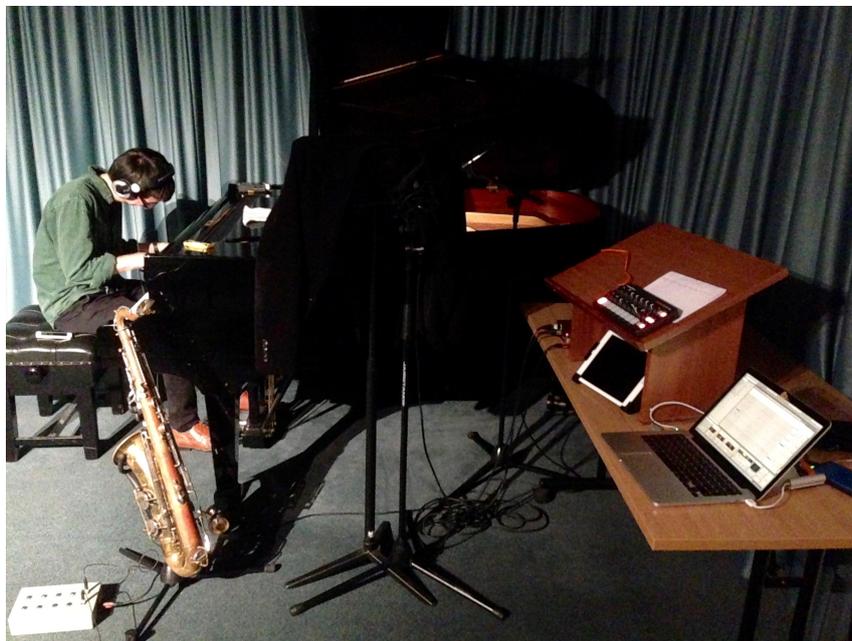


fig. 13. - Set-up for the recording of Emanations.

²⁶ This could be done when holding sustained notes while playing passages that only required the left hand. In the higher register of the tenor saxophone this ranges from concert F4 upwards.

Emanations No. 1

Emanations No. 1 is the only movement that includes studio produced, pre-prepared soundscapes. The entirety of this was formed from recorded acoustic instrumentation that was then manipulated to create melodic, harmonic and percussive layers. To develop the percussive elements, I drew on techniques developed throughout my portfolio - the use of amps and pedalboards first used in *Truth This Way*, noise gates heard in *Part I*, and subtle delays that add rhythmic drive in *Loops*. The basis of the sounds came from sax and flute key clicks that were closely mic'd, taking inspiration from Colin Stetson's unique soundscapes.

Despite the use of pre-prepared material in *No. 1*, in terms of structure, this was not fixed, as each section was prepared as a separate 'cell'. These could be looped and triggered at different times, dependant on the performance, allowing for a sense of freedom within the live environment in that sections weren't bound to a specific time frame. This could be achieved by 'slaving'²⁷ *Ableton* through *Logic*. Through this, the cells could be cued by *Ableton* easily, while allowing *Logic* to carry on continuously and record the live performance.

Although the use of the pre-prepared track gave *No. 1* an overall structure, tempo and tonal centre, the only instruction decided upon as performers was to build with the track to a certain point. On top of the studio produced layers, live electronics would still be applied to the live duo, and so contrasting soundworlds were still formed when comparing different takes. The buses used for the piano and sax varied slightly, but between them included sustained reverb effects, extensive delays, amps and distortion drive pedals. Each channel would be manipulated in realtime through the hardware controller - the *Novation LaunchControl*.

In *Logic*, the hardware controller was mapped to the appropriate parameters using the Controller Assignments window (*fig. 14*). Here, each of the bus sends on the live channel could be assigned to the relative knob, and by changing the automation setting to 'Latch', the information that would be inputted during a recorded performance would be captured.

²⁷ When in 'slave mode', a DAW such as *Ableton* can be played through an auxiliary channel in the master DAW (*Logic*). This can be useful in playing external tracks and using features in *Ableton*, such as the ability to cue new 'cells' live during a performance, while recording a continuous track in *Logic*.

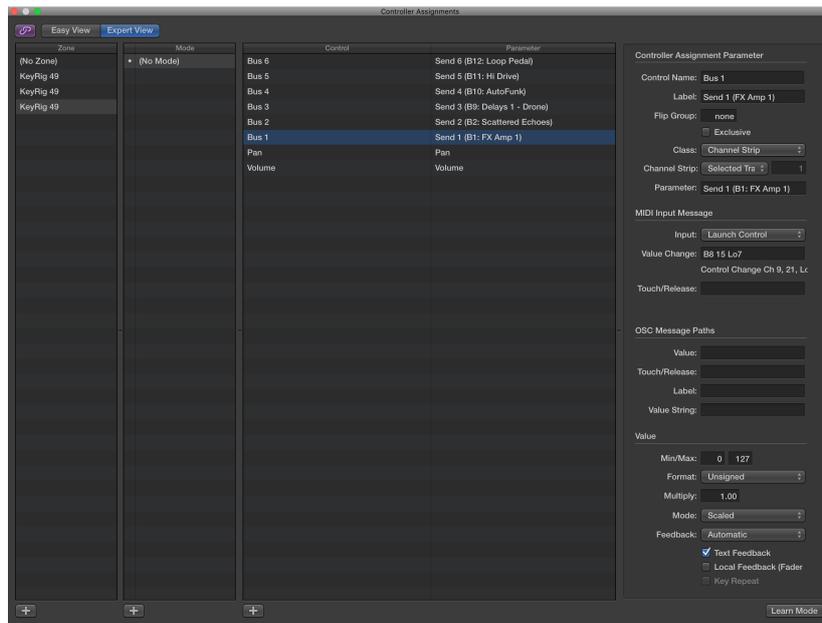


fig. 14. - The assignment control parameters for the hardware controller (Novation LaunchControl). Each bus send was assigned to a knob that could then control the input (dB) level of each bus in realtime.

The intention of using these pre-prepared layers alongside the live performance was to capture a sense of intrigue as to which sounds are being produced in realtime and which are not. I feel this intention was achieved, as the density of the movement at its climactic point makes it almost impossible to decipher the live duo, with pre-recorded sax lines occasionally coming to the fore.

Emanations No. 2

Emanations No. 2 also used bus channels controlled by a hardware controller, but with this movement there was no pre-produced audio. The entirety of the composition was formed from the live performance, and was completely improvised without any discussion of harmony or structure. In the session, we recorded three takes. The first gave me a chance to experiment with the levels to which each effects bus could and should be applied to each acoustic instrument and, despite the take showing promising signs, problems with the loop bus cut us off in our stride. The problems were eradicated in the following takes, either of which would have been suitable to use. I decided on using the final take, as I felt by this point, as a duo, we sounded more comfortable in our performance, and the dynamic shape (seen in the sound wave of *fig. 15.*) offered contrast compositionally.

For *No. 2*, I used less bus effects channels in comparison with the first movement, only using four for each acoustic instrument²⁸. By avoiding making the electronic element overly complicated, it allowed us as a duo to explore fully the potential within the effects used. I found it also allowed me to focus on my improvising without the distraction of having too many options for which effects I could apply in realtime. This limitation actually gave me more freedom to explore the soundscapes being created by the electronics.

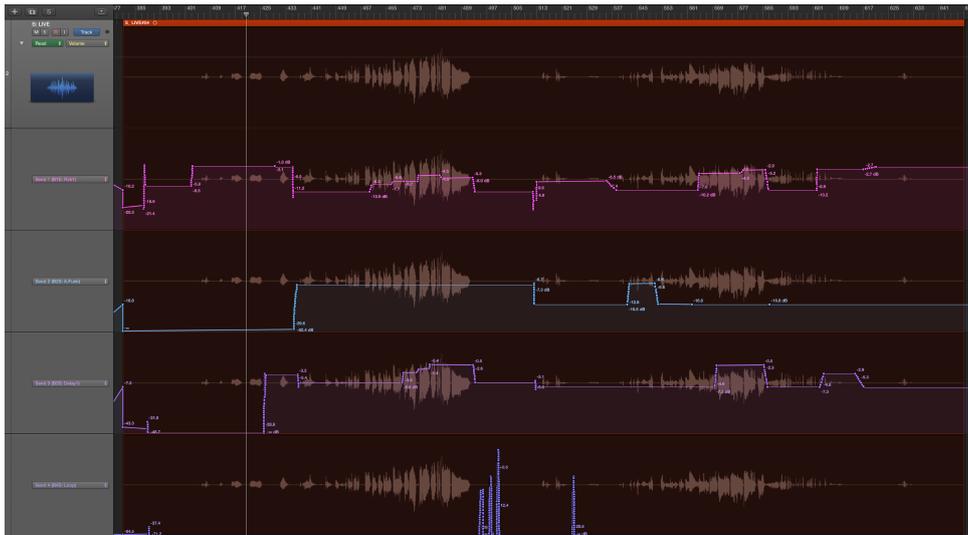


fig. 15. - The automation applied in realtime to the live Sax channel during the recording of Emanations No. 2. Each automation line was controlled by the hardware controller (Novation LaunchControl), assigned in the same way as it was in No. 1 through the Controller Assignments window.

Emanations No. 3

In comparison with the second movement, *Emanations No. 3* took the opposite approach to the degree of control I had over the electronics in realtime, at least through the opening section. The work was once again completely improvised with no pre-prepared audio, but with *No. 3* some form of basic structure was implemented. The work would start with an extended sax cadenza, which would then be looped, allowing me to focus purely on electronically manipulating the duo, particularly the piano. Through the initial cadenza, the pianist was instructed to react to the electronically produced sounds with linear, more percussive lines. Once looped, he could expand this harmonically and melodically, responding to the track in its entirety. Originally, the intention was for the work to end after the first repeat, but during the performance it naturally continued,

²⁸ The four bus effects channel used were - Reverb, Pedalboard, Delay and Loop. Variations of each were used on the two acoustic instruments.

taking it in a new direction before coming to a final concluding point. *No. 3* was recorded in a single take, adding to the spontaneity of the performance, as it removed any temptation to reproduce material from previous passes.

For *No. 3* the DAW *Ableton* was utilised, and one of the most prominent effects applied was the Beat Repeat - a delay effect that has extensive parameters and possibilities. Through this plugin, variations of the parameters can be set to work randomly, creating interesting opportunities for taking control away from both performers. A limitation of using delays in realtime can be predictability, which while useful in creating a steady beat, as performer and researcher David Rothenberg points out, 'quickly becomes expected and listeners figure it out'²⁹. Finding ways of overcoming this has been a challenge in my experimentations, and the Beat Repeat offered a level of variation that could still be both controlled and used randomly to form an extra level of spontaneity.

The greatest advantage of the *Novation LaunchControl* is its compatibility with *Ableton*. Whereas its use with *Logic* is limited to control over the bus channel's dB output, with *Ableton* I was able to manipulate individual plugin parameters with relative ease. Each filter control is automatically assigned to the corresponding eight knobs on the hardware controller seen in *fig. 16*. When used in this mode, further filters could be accessed by changing the bank currently in use through the numbered squares on the device.

Novation LAUNCHCONTROL Filter Controls



Beat Repeat

- 1 Repeat Rate

Interval	Offset	Grid	Variation
Filter Freq.	Filter Width	Volume	Decay
- 2 Gate/Pitch

Chance	Gate	Pitch	Pitch Decay
Filter Freq	Filter Width	Volume	Decay

Autofilter

- 1 Filter

Frequency	Resonance	Env. Attack	Env. Release
Enviv Modulation	LFO Amount	LFO Frequency	LFO Phase
- 2. Filter Extra

Filter Type	LFO Quantise On/Off	LFO Quantise Type	LFO Stereo/Mono
LFO Spin	LFO Sync On/Off	LFO Sync Rate	LFO Offset
- 3 Side chain

	Ext. On/Off	Ext. Mix	Ext. Gain

fig. 16. - Mapping Index of Filter Controls. The 2x4 grids correlate with the eight knobs on the hardware controller. The numbered squares change the Filter Bank that is in use and correlate to the numbered grids on the Mapping Index.

²⁹ Rothenberg, David & Neill, Ben, *Playing into the Machine: Improvising across the Electronic Abyss*, *Leonardo Music Journal*, Volume 20 (MIT Press, 2010) Pg. 19-20

This gave me a vast array of possibilities for how the live audio could be manipulated, and so this is the reason I chose to plan the structure in such a way that meant I could focus purely on the electronic element for part of the composition. By doing this during the extended loop it allowed me to fully explore the potential of the effects parameters used (see *fig. 17.*). It also meant I could react more directly to the piano with the electronics becoming more of an instrument in themselves.



fig. 17. - The plugins used for the tenor sax (top) and piano (bottom) in the live performance. The parameters for each are controlled by the hardware controller Novation LaunchControl.

Despite being a different operating system, there was a sense of similarity in the effects that were used, as fundamentally certain plugins, such as reverbs, will have certain characteristics and parameters that are quite uniform across varying DAW platforms. What *Ableton* allowed me to do was apply these in realtime in much more detail, so while I had used forms of frequency modulation in the first two movements for example, in *Ableton* I was able to apply such modulators in much more depth and with more control.

vi) Encapsulation

Encapsulation consists of three movements and is performed live by a trio of baritone saxophone/ bass flute/live electronics, tenor saxophone and piano. The electronics are used entirely in realtime by the saxophonist, using effects channels that are applied through the use of a hardware controller. While there is no pre-composed written score, melodic fragments for the second movement were initially prepared (*fig. 18.*), although these sections were not included in the final recordings.

Initial Aims and Planning

As a concept *Encapsulation* stems from and continues to build on the work produced in *Emanations*, and represents a culmination of the techniques and soundworlds I have developed throughout my research.

The line-up used was expanded from the duo of piano and tenor sax to a trio, with an additional saxophonist (Riley Stone-Lonergan) being utilised. While Riley would perform on tenor sax, I switched to doubling on both baritone sax and bass flute. The main motivation for the addition of another performer was that it would allow me to have much more freedom and focus on the live electronic element. This would be a vital part of the process, as I wanted to see how much further I could push the ideas I had produced in *Emanations*.

On a technical level, the availability of more advanced hardware equipment (with more inputs) allowed for stereo recording of the piano. This drastically improves the overall sound quality, as I felt one of the limitations of *Emanations* was the single channel mono piano recording. The use of stereo not only expanded the width of the soundscape but also increased it's clarity.

Methods and Experimentation

Part I and *III* are completely freely improvised and produced in a single unedited take. *Part II*, while also freely improvised, was initially based on a suggested melodic and harmonic line that I had composed (*fig. 18.*). The recording heard developed into these ideas, but I felt the scored material in the final section of the take felt contrived in comparison with the other recordings.

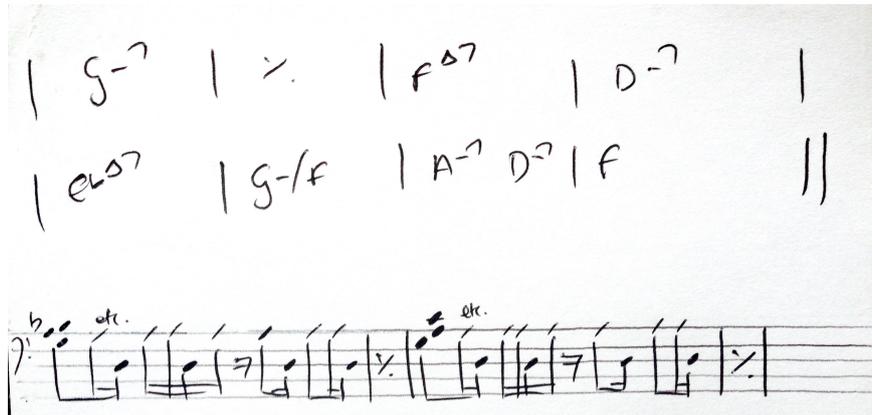


fig. 18. - Initial piano harmonic fragments that were prepared for Part II.

Whereas *Part I* and *III* progressed naturally (both musically and dynamically), the pre-prepared conclusion of *Part II* was too rigid and structured, and seemed to interrupt the flow of the work. It was therefore edited down in post-production to create the movement in its current form, which I felt better complimented the introduction and finale. Very few alterations have been made in post-production besides this, with minor alterations to the levels of the electronics applied live, and some subtle additional effects added where I felt it was appropriate and necessary.

One of the decisive points of departure from *Emanations* was a lack of any set form lengths or pre-recorded sections. This gave a complete sense of freedom in our playing which felt both liberating and exciting as each work developed. It has been fascinating to see what ideas we could explore as a trio. The level of musical understanding that both Vince Webb (piano) and Riley possess allowed the recordings to be pushed into sometimes vastly opposing directions while retaining a cohesive sense of shape and development compositionally. In producing *Encapsulation* I feel I have fulfilled the potential that was offered in *Emanations*, and taken those ideas and approaches to a new level.

4. Compositional & Improvisational Approaches

As my portfolio progressed, the concepts of composition and improvisation became more and more of a single entity. This chapter will look to fully consider how the differing approaches used have affected the final outcomes by comparing significant figures in this field in relation to my own work, within the research context.

The relationship between these two practices is not a new subject of discussion, and its affiliation with jazz is particularly highlighted by the likes of researcher Paul Berliner (1994). The validity of the subject within research as a creative practice however has more recently become a topic of discussion that has been studied in more depth, which composer Michael Hannan has looked to highlight through his own practices, and I will look to compare these with my own processes.

Through my research I have looked into a concept, summarised here by researcher and studio engineer Steve Savage, that considers improvisation to be 'online' (a spontaneous part of the performance) and composition 'offline'¹. When an 'online' improvisation is then rearranged in the 'offline' editing process, the question is raised as to what elements are then improvised and which are composed, as it becomes difficult or impossible for the listener to distinguish between the two. When recorded, improvisations become inherently fixed, despite being intended as a unique construction created 'in the moment'. A reason for this is that they can then be heard repeatedly by the listeners or musicians themselves, and are sometimes re-learned and re-performed by the original improviser².

This can be related to the approaches taken in producing *The Borderline Suite*. Initially, temporary tracks were made that allowed me to work on the suite prior to the eventual live recording session. These included some recorded solos, with one such example being the initial flute solo produced for *Part IV*, which was spontaneously improvised. Once recorded, it was possible to analyse the performance and therefore become influenced by it. As a result, I found myself attempting to emulate this first recorded solo by re-constructing the melodic material. What was originally pure improvisation had now essentially become part of the composition itself.

¹ Savage, Steve, *Bytes and Backbeats* (The University of Michigan Press, 2011) Pg. 110.

² Ibid. Pg 111

This induces another discussion of whether improvising really can be pure or completely free, due to the existing theoretical, harmonic and musical knowledge that a performer would possess, a subject that Derek Bailey (1980) analysed in great detail. Whether consciously or sub-consciously, jazz musicians use improvisation as a reproduction technique of material and influences they have absorbed in their musical background. Scott Simon, a jazz guitarist and researcher surmises that 'spontaneous reproduction of music formed out of the fragments of previously produced music is a process inherent in jazz'³. From this process, musicians also develop their own 'sounds' that can become recognisable and associated with them, such as Nils Petter Molvaer's use of particular modes and extended techniques.

In applying this theory to my processes, I find that as an improvising musician I am consciously drawing on melodic material that I have developed previously with each performance of *The Borderline Suite*, be it a rehearsal or a live performance. These melodic fragments of previously produced solos, originally pure improvisation, are then essentially becoming a fundamental unwritten element of the composition itself. In this sense, I am using the improvisation not just as a spontaneous act, but also as a compositional process.

This process is taken further in *Part V* of the suite, where the improvised audio is transformed through electronics, and then scored for the live ensemble. This was constructed from sections of unused takes for *Part III* that then formed the compositional basis of the introduction to the later work. These were manipulated using reverb techniques and combined with the live horn parts to produce the elongated and serene soundworld heard in the opening. This went on to form the compositional basis for *Part V*'s melodic material, so the process here is actually improvisation, creation of timbres (as opposed to traditional notation) through the use of electronics, and then effectively transcription of this back into traditional notation. The technological and electronic processes have had a profound effect on the compositional outcome in a way that would not have been possible without using the 'online' material in an 'offline' way.

This process can be described as 'comprovisation', a term adopted by Michael Hannan to describe his practice of making new compositions from other recordings.⁴ He contended that although the comprovisation practice has random and intuitive elements, 'it is likely to produce new knowledge

³ Simon, Scott *Antecedents of Digital Reproduction in Jazz Improvisation*, *Leonardo Music Journal*, Volume 18 (MIT Press, 2008) Pg. 41-42

⁴ Hannan, Michael *Interrogating Comprovisation as Practice-led Research* (Speculation and Innovation: applying practice led research in the Creative Industries, 2006) Pg. 1

through its strongly experimental approach, and that it is grounded in the tacit knowledge of professional compositional craft'⁵.

For Hannan's approach, the principle of the composition was to make recordings of individual or sequences of sounds using improvisation and then devise textural and structural concepts for his work drawing on these recordings⁶. I applied similar approaches to both *Truth This Way* and the non-musical sounds used in *The Borderline Suite* album, although here these were not improvised as such, being more accidental or unintentional background sounds whose use only became apparent in the editing process.

The improvisational material that I have incorporated is melodically based, and it is here that my approach differs, which is especially highlighted in *Emanations*. Hannan intentionally built up a library of improvised material that he could draw upon, such as the trumpet recordings of Scott Tinkler for the work *Whale Song* (2012), which involved Tinkler playing through his entire repertoire of extended techniques and improvising short, loud melodic phrases.⁷ With *Emanations*, my intention was to see how the composition could be created in a live performance environment, without the use of the offline process that the structured recording of improvisation requires. I found it fascinating how the live duo would react to the soundscapes formed, and looked at what effect the use of electronics had on our performance within the context of my research.

Creative Control

I wanted to consider how taking away part of the creative control from the improviser affects their performance, and how they react to the electronic elements in this setting within the research framework. For *Emanations*, the pianist was my friend and colleague (and fellow composer) Vince Webb. I have known and played with Vince in a variety of settings for a number of years, and felt that we share a similar musical aesthetic which made him a suitable collaborator for the duo project.

Following on from our recording of *Emanations* I conducted an interview to discuss various parameters of our recording session. I began by asking how the electronics affected the way he responded to my playing, and was surprised by his initial response:

⁵ Ibid Pg. 1

⁶ Ibid Pg. 5

⁷ Ibid Pg. 7

“In a way, not at all - I heard what you were playing and heard a certain intention which I responded to, just as if you were playing without FX. However maybe the FX enabled various intentions to be conveyed in a new way (e.g. aggressiveness or assertiveness through distortion/attack/volume) as well as create opportunities to take things in a direction which would not have been possible without them. For instance the sensation of largeness through layering and of distance through reverb and delays.”⁸

I found it interesting that despite the more pervasive use of electronics in this performance environment, the musical intention was still interpreted in a way, at least at first, that would not have greatly differed from an acoustic setting. What they did achieve was an enhanced soundscape in which new sonic possibilities could be formed. As I have previously stated, my motive for the inclusion and use of electronics has always been to enhance the soundworld in which the musicians can then perform and react. For the duo project, it allowed us to push the various intentions further than would have been possible in an acoustic setting.

I went on to ask Vince in what ways did me taking over creative control of the electronics applied to the piano affect his own playing, and whether it changed the way he responded to his own ideas:

“Unlike playing through a self-controlled fx pedal - I found I was able to respond to the sounds more like I would to a player. The sense of ownership of the sounds was largely gone - since the resulting sound was presented in a totally new way and this was creatively liberating. The differences between what I heard and what I might have decided to do enabled a stream of communication that felt both new and familiar. It felt similar to the way a good engineer picks up on details in a performance that perhaps even the player isn't consciously aware of.”⁹

I felt this response echoed the importance for me of having a strong sense of interaction in the performance, whether reacting to each other directly or through the processed sounds that were being created. In discussing his approaches to music creation in his live duo with Bugge Wesseltoft, Henrik Schwarz stated that ‘the improvisation part is about reacting, reacting as a human being’¹⁰. That human element is what is so important in such a performance. The electronics can be pre-

⁸ Interview conducted with Vince Webb, discussing the processes of recording Emanations (Sept, 2016)

⁹ Ibid.

¹⁰ Schwarz, Henrik *How Technology Empowers Collaboration & Improvisation* (Transcript) Loop Festival 2015

prepared, processed or programmed in a certain way (either to react randomly or predictably), but the human performer's reaction to this process is what forms the truly improvised or spontaneous performance.

Chapter Conclusions

The electronics used in *The Borderline Suite* are intended to enhance my compositions, not to overpower them. This is one of the reasons for not using the likes of *Max MSP*. I didn't want the technology to take control in these pieces, instead they were intended to enhance the soundworld that the ensemble can respond to, a premise outlined by David Rothenberg and Ben Neill, who suggest that 'the initial reason we play into machines is for the enhancement that basic sound effects offer.'¹¹ The limitations of using fixed media (tape) are overridden by the ensemble's ability to continually explore the sonic possibilities within the music.

In *Emanations* I push this as far as I can. I use the electronics to create a composition out of the improvisation, in realtime. Here I again did not want to relinquish control to the computer, but I wanted the electronics to have a more pervasive and fundamental impact on how the compositions were shaped. Ultimately they are used to form a spontaneous soundscape from the improvisation of the duo which they can then react to in a way that would not be possible without the electronics, such as the elongating of notes from a linear source that then forms chords, or the unpredictability of the delay settings used in *Ableton* that forces the duo to react spontaneously.

The article from Rothenberg and Neill raises a number of interesting points of discussion, and in many ways they reaffirm my approach and justify why I have used the technology in the way I have.

"One reason the brilliant sonic programming language Max has not appealed to us is that much of what is composed using it sounds like the computer is making too many decisions, taking too much control. The classic sound effect is simple at its root, easier to connect to the sound that comes into it, so the hand and breath of the player is more clear than in more purely computer music, when a greater aesthetic of the machine shines through."¹²

¹¹ Rothenberg, David & Neill, Ben, *Playing into the Machine: Improvising across the Electronic Abyss*, *Leonardo Music Journal*, Volume 20 (MIT Press, 2010) Pg. 19-20

¹² *Ibid.*

There are of course a number of musicians who use technology and electronics in a more complicated way, but this is not the reason I employ them in my work. I don't want the computer to take too much control, instead I have wanted to use it to expand the landscape of my compositions and widen the possibilities of the acoustic instruments that I am performing on. The approaches I have taken have allowed me to keep an element of human control in the performance.

Although it is not an example of control being exercised by the computer element, the role of *Truth This Way* in my portfolio is to serve almost as a reference point in the context of my research, due to the nature in which it was recorded. The limitations that resulted in the acoustic parts having to be recorded separately and the use of a sampled drum part has meant it highlights the role that interaction within the ensemble has on the overall sound, and that ability to react is fundamental to the development of the compositions through improvising in *Emanations*.

5. Conclusions

A number of further instances have become apparent while undertaking the essential issues of the research. These have included -

- What effect have the compositional and improvisational approaches had on the ensemble's performance?
- How can the performance/composition differ when reproduced in various environments?
- What are the limitations of using preset channels and 'tapes' for the work?

Although the electronic elements of *The Borderline Suite* were not controlled or manipulated in realtime¹, I found that their addition had a direct influence on the performance of the ensemble during the recording session. This can be seen in a noticeable comparison of the effect that their inclusion had on the ensemble through the studio recording process. As described in Chapter 3², the instrumental layers used in *Part III*, such as the sampled strings, are very subtle, forming an underscore on which the live ensemble textures are built. *Part I* also utilises similar sampled instrumentation, but the additional percussive lines layered on top of this are much stronger, such as the harsh and abrupt interjections of the processed cymbal effects, making the electronics more intrusive of the ensemble's performance.

It could be considered therefore that this impacted the way in which the composition and solo section of *Part I* built, as the intensity of this soundworld pushed the ensemble in to reacting to the sampled material. From a comparative analysis of two performances undertaken by the ensemble I was able to look at this possibility more conclusively. The quintet performed at the Bull's Head³ on two occasions in 2016. On the first, *The Borderline Suite* was performed with the electronics tape⁴, cued by the drummer from a laptop, with a click track sent to the live ensemble via headphone fold-

¹ Pre-prepared tracks were used for the entirety of *Part I* and *III*, and through the introduction and opening solos of *Part IV* and *V*.

² See Chapter 3: pg. 25-27 & 30-33

³ Bull's Head (Barnes, London) dates: Performance with Electronics - 26th July 2016. Acoustic Performance - 27th November 2016

⁴ The tape prepared included most of the additional electronics heard on the studio album. Some effects, such as delays and ringshifters, that were applied directly to the live ensemble in post production could not be included. The tape parts were cued through *Ableton*.

back. For the second the acoustic version of the suite was performed, with no additional tape or click track. It is worth noting the acoustic parts were the same for both performances, as the suite is written to work in both scenarios.

The absence of the tape did not necessarily change the way in which the ensemble approached the works themselves, but it allowed them the possibility of pushing the works in different directions. One such example was through the removal of the click track, as subtle changes in tempo could occur in an acoustic setting as the intensity would change. In the context of *Part I*, the pianist (Chris Eldred) became more inclined to provide a harmonic basis through the improvised sections in the acoustic performance, as well as respond to the soloist. The inclusion of the tape provides a constant underscore of harmonic accompaniment in the form of string sustains, allowing Chris the opportunity to take on a different role within the composition. I found that he played more sparingly when the tape was present, and focused his attentions on creating colours to enhance the overall soundscape. As the intensity of the tape track for *Part I* increased, the ensemble also became more drawn into the soundworld. I noticed that the drummer (Joe Evans) for example would react to the patterns created by the percussive electronics by incorporating them into his performance.

It could be suggested that as the tape is pre-prepared and has been heard by the ensemble, this reaction is contrived, as the spontaneity is removed and the responses have become 'composed' through repeated listening and performance. Although the ensemble's musicians did develop some recognisable responses as a result of repeated performances, such as Joe's reactions to the percussive effects, it was intriguing to see that they found subtly different ways of interacting with the track through rehearsals and different takes during the session. Despite the electronic element being fixed, the ensemble looked to explore new ideas and approaches with the result sounding anything but contrived.

For *Emanations*, a conscious decision was taken by my collaborator Vince Webb (piano) and myself prior to the recording to not choose a specific genre in which to perform, a factor most notable in *No. 2* and *No. 3*. The lack of musical constraint therefore contributed to the resulting soundscapes that were created. Although the plugins and bus channels had to be constructed and prepared, the way in which they were then used was entirely spontaneous. The improvisatory nature of the performance inherently lends itself to suggestions of jazz, but it can be considered that the absence of genre concerns allowed for more freedom of the direction in which the work developed. For Vince, in this sense it was similar to how it felt when beginning a new composition, and in using this approach, he sees no distinction between the two disciplines.

“For me composition is improvisation. The best thing I ever did for my composition studies was learn jazz piano. Learning about harmonic and rhythmic concepts while gaining a level of spontaneous melodic fluency - these things fed directly into my work as a composer. Not only because of the nature of modern DAWs and the fact that you can literally improvise in a melody, but because the act of learning jazz was a kind of self exploration. It was about developing a foundation for making musical judgements, developing some sort of personal musical value system which I apply to both composition and improvising.”⁵

The conclusions and research I have undertaken are surmised from how both I and my ensembles have performed the works produced. It must be considered however that the works are not intended solely for my own ensemble, and that if *The Borderline Suite* or *Emanations* were to be performed by other musicians it is plausible to suggest the resulting soundworlds would differ. This can be supported from performances within my own quintet, as there have been occasions when core members have not been available. On one such occasion at the Marlborough Jazz Festival (2016) the personnel featured a change from the regular line-up on both the bass and drums. I could feel a noticeable difference in their interpretation⁶, and at times this pushed the music into subtly new directions.

Final Conclusions

The use of electronic techniques had a profound effect on the way in which improvisational material was used as part of the compositional process. As discussed in Chapter 4⁷, their application allowed for the construction of the work *Truth This Way* through the use of ‘comprivisation’. The techniques used for the manipulation of recorded improvisational passages to form new compositional material⁸ were then applied to *The Borderline Suite*. This then influenced the notated scores produced for the live ensemble, such as the opening of *Part V*⁹, with the processed audio material being used as the basis for the live ensemble notation.

⁵ Interview conducted with Vince Webb, discussing the processes of recording *Emanations* (Sept, 2016)

⁶ During this performance the acoustic version of *The Borderline Suite* was performed.

⁷ See Chapter 3: pg. 52-53

⁸ This refers to application of Space Designers to elongate the soundworlds, particularly in *Part III* and *V*.

⁹ See Chapter 3: pg. 52-53

The realtime manipulation of improvisation in both *Emanations* and its succeeding work *Encapsulation*, and the resulting reaction of the performers to these processes fully integrated composition and improvisation as one singular process. While the boundaries of experimentation and innovation in *The Borderline Suite* are explored in the post-production environment, the electronics in their current form are fixed and unaffected by the ensemble's performance. It is only when all elements of the work are manipulated in realtime, as they are in *Emanations* and *Encapsulation*, that the processes of interaction between both practices can be more fully considered, and within this context the compositional and improvisational approaches are no longer separate entities, but are essential to one another for the creation of that work.

I would suggest that this research has introduced new techniques in terms of how improvisational material can be used as a compositional process. I have looked to pursue ways of drawing unique sounds from the recorded ensemble through these techniques of elongating, manipulating and processing the audio sources. This has then been used as the basis of some of my compositional methods, as opposed to traditional compositional notation. By contributing to the discipline with these approaches I am providing possible ways in which the combination of the genres of contemporary jazz and experimental electronics can be further explored in future.

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- Koop: *Koop* (Playground Music, 2006)
- Lemon Jelly: *Lost Horizons* (XL Recordings/Impotent Fury, 2002)
- Mark de Clive-Lowe: *Church* (Ropeadope, 2014)
- Mehdau, B: *Mehliana: Taming The Dragon* (Nonesuch Records, 2014)
- Molvaer, N P: *Hamada* (Sula Records, 2009)
- Molvaer, N P: *NP3* (Sula Records, 2002)
- Molvaer, N P: *Switch* (Okeh/Sony Music, 2014)
- Nicks, Stevie: *Bella Donna* (Modern Records, 1981)
- Noto, A, Sakamoto, R: *Insen* (Rastor-Noton 2005)
- Reich, S: *Different Trains/Electric Counterpoint* (Elektra Nonesuch, 1989)
- Revolution Void: *The Politics of Desire* (Jonah Dempcy, 2008)

- Skalpel: *Konfusion* (Ninja Tune, 2005)
- St Germain: *Tourist* (Blue Note, 2000)
- Tied & Tickled Trio: *Aelita* (Morr Music, 2007)
- Tobin, A: *Bricolage* (Ninja Tune, 1997)
- Truffaz, E: *Arkbangelsk* (Blue Note, 2007)
- Truffaz, E: *Bending New Corners* (Blue Note, 1999)
- Truffaz, E: *In Between* (Blue Note, 2010)
- Truffaz, E: *Saloua* (Blue Note, 2005)
- Wesseltoft, B: *Im* (Universal, 2007)
- Wesseltof, B, Schwarz, H : *Wesseltoft Schwarz Duo* (Jazzland Recordings, 2011)
- Xploding Plastix: *Amateur Girlfriends Go Proskirt Agents* (Beatservice Records, 2001)