

***Blueprints and Vignettes: Pitch-class sets, Serialism and
Intervallicism, and the Integration of Systematic and
Intuitive Music Making***

Exegesis

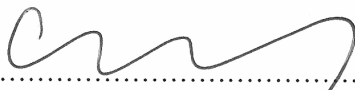
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partial fulfilment of requirements for the degree of
Doctor of Philosophy (Composition)
Sydney Conservatorium of Music
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Statement of Originality

I declare that the research presented here is my own original work and has not been submitted to any other institution for the award of a degree.

Signed:



Date:

25 / 08 / 2017

Abstract

Blueprints and Vignettes: Pitch-class sets, Serialism and Intervallicism, and the Integration of Systematic and Intuitive Music Making examines the interaction of systematic and intuitive elements in my compositional and improvisational practice, and the outcomes of my sustained investigation of pitch-class sets, serialism and intervallicism as creative tools. This submission consists of two parts: a portfolio of compositions, improvisations and recordings, and an accompanying analytical exegesis.

The works in the composition portfolio are a product of three individual projects with three distinct instrumental and aesthetic settings – solo piano, avant-garde jazz quartet and chamber duo – that have occupied my practice over the past five years. Each project also focusses on a particular type of creative methodology, in order to pose answers to several key research questions. How can improvisation generate a composition? How can a composition facilitate improvisation? Does a composition treated in an improvisatory manner maintain its identity? What techniques can be used to assure that it does, or does not? What are the harmonic and melodic possibilities of pitch-class sets, serialism and intervallicism, particularly to musicians with other improvisational or compositional backgrounds? How to these structural devices relate to conventional tonal harmony?

In the exegesis I examine these questions by analyzing the creative processes behind and improvisatory products of the compositions in the portfolio, and in so doing place the works on a theoretical continuum between improvisation and composition similar to the one proposed by Nettl (1974). I discuss my adoption of *comprovisation* (the use of pre-performed or recorded improvisations as compositional seeds or scaffolds) as an integral part of my creative process, and the various ways I incorporate improvisation into my composed works – through techniques such as open notation, aleatory, textual instructions, chord symbols and other systems of facilitating open-ended performance.

This research positions my practice at a nexus of jazz, experimental improvisation and classical modernism, and offers a resource to those interested in systematic improvisation, intuitive composition or the uses of pitch-class sets, serialism and intervallicism.

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Introduction

As a composer and improviser I am constantly searching for new creative tools and ways of organizing or thinking about music. Over the past fifteen or so years of my professional life I've found these insights have from two apparently distinct sources.

Much of my early music education came on the bandstand. Largely self-taught, during my teens in Auckland I was playing jazz gigs regularly with more experienced players and frequently found myself having to think quickly and react instinctively to keep up on unfamiliar tunes or in playing situations outside of my comfort zone. I learned to trust my ears, and like learning a second language picked up a lot of improvisation vocabulary and concepts simply through exposure and osmosis.

On the other hand, during high school I became fascinated by 20th century composition through a study of Bela Bartok's *Concerto for Orchestra* (1945). Inspired by what was to me a new form of harmonic and melodic complexity, I began systematically studying scores and recordings to isolate the structures that caught my ear, and ultimately to use them as stimulus for my own inventions and exercises – a process I've continued to this day in both my compositional and improvisational practice. Pianist, composer and improviser Matt Mitchell describes a similar interaction of systematic research and intuitive performance in his study of improvisation:

Practicing for me is a good time to zero in on really specific things, in such a way that I wouldn't really want to think of in a situation where I'm improvising. When I'm improvising I generally just go, I kind of just barrel forth, you know? I play. Without getting all sort of mystical I try to enter that realm of the unconscious and trying to deal with that. (Mitchell, 2013, 17:40)

In my work today I seek to merge these two passions, by designing music that inspires openness and repeatedly fresh and engaging improvisation while exploring varying degrees of compositional pre-determinacy and notated intricacy. Avant-garde composer, improviser and saxophonist Tim Berne identifies this kind of integral equilibrium of improvised and composed forms in his own music:

The balance of composition and improvisation has always been important to me, to make them coexist in the right way. The only reason to write music is to motivate the improviser. If you're playing a piece of written music, and you get to the end and you're like, "Phew, I'm glad that's over!", then I don't know if it's necessary...You can do it better improvising, you know? - *Composer, improviser and saxophonist Tim Berne* (Iverson, 2009)

By way of this exegesis and the adjacent portfolio of original works, I demonstrate and discuss this meeting of composition and improvisation the ways in which *systematic* and *intuitive* techniques manifest in my practice. At the same time, I unpack my various applications of the three structural techniques that to varying degrees underpin the works: pitch-class sets, serialism and intervallicism.

In Chapter One I offer a review of the literature pertinent to this investigation, and in so doing position my practice amongst a broad field of musical traditions and cultures. I provide an overview of improvisation and composition as ‘ways of working’ and their parallels with my use of the terms *systematic* and *intuitive*. I briefly discuss the history of pitch-class sets, serialism and intervallicism as creative tools, and reference key figures from within the composed and improvised music spheres who have made use of these structural devices. I also discuss the methodology

In Chapters Two, Three and Four I analyze respectively the works for each of the three unique instrumental settings that together constitute my portfolio:

Chapter Two: *Hatch* (solo piano) – 20 works, 114 minutes

Chapter Three: *Blueprints & Vignettes* (trio & quartet) – 8 works, 69 minutes

Chapter Four: *Duologue* (alto saxophone & piano) – 9 works, 59 minutes

Each of the three collections also focusses on a particular type of creative methodology (discussed further in Chapter One and throughout each individual chapter of analysis) in order to pose answers to several key research questions. How can improvisation generate a composition? How can a composition facilitate improvisation? Does a composition treated in an improvisatory manner maintain its identity? What techniques can be used to assure that it does, or does not? What are the harmonic and melodic possibilities of pitch-class sets, serialism and intervallicism, both within my own practice and to musicians with improvisational or compositional backgrounds different to my own? How does my use of these structural devices relate to conventional tonal harmony?

In Chapter Five I detail the potential pedagogical and practical applications of my findings for others interested in the intersection of improvised and composed music, and I

conclude this exegesis with a summary of both the personal and professional insights gained through this project and the impact of this research on my musical aesthetic.

At many points throughout the analysis I have included embedded audio files adjacent to score excerpts for the reader's convenience, and complete audio files for each group of works are also attached to this submission.

Chapter One: Literature Review

This chapter presents an overview of the three main areas of literature pertinent to my research. It is structured as follows:

1. *Improvisation, Composition and Creativity*: a discussion of the interaction of intuitive and systematic processes in both music making practices and the broader arts (drawing primarily on literature and visual art).
2. *Pitch-class sets, Serialism and Intervallicism in Composition and Improvisation*: an overview of the history and contemporary usage of these techniques in improvised music, and a brief preliminary example of the use of each device in my portfolio.
3. *Methodology*: a discussion of *practice-based research* as a mode of contemporary scholarship, including a preliminary examination of the interaction of systematic and intuitive elements in my practice.

By adopting this structure, I position my creative practice at a nexus between the fields of improvised and composed music and establish the parameters for the subsequent analysis of my portfolio throughout Chapters Two, Three and Four.

1.1 Improvisation, Composition and Creativity

There has never been anybody who has blown even two bars worth listening to who didn't have some idea about what he was going to play, before he started.
- *Duke Ellington, jazz composer and pianist* (Rattenbury, 1990, p. 41)

Mystery is a necessary part of process.
- *Modernist composer and proponent of intuitive music, Karlheinz Stockhausen* (Stockhausen, 1989, p. 103)

Ellington and Stockhausen neatly summarize the permeability of improvisation and composition. Taken together, the two musicians lay out one of the core ideas behind this exegesis: in the case of Ellington – one of jazz music's most recognized pioneers – that successful improvisation necessitates some form of prior planning or *systemization*; for Stockhausen – the towering figure of modernist composition – that the composition process is vitally enriched by the mysteries and spontaneity of *intuition*.

A flourishing body of recent musical scholarship continues to paint a vibrant picture of the intersection of improvised and composed processes (Benson, 2003), from the traditional music of Iran (Nettl, 2009; Perks, 2013) and India (Napier, 2006; Widdess, 2013) to baroque

and early classical embellishments (Horsley, 1951; Levin, 1992), 19th century concert preludes (Goertzen, 1998) and parlor concerts (Lin, 2014), the jazz tradition (Berliner, 1994) and contemporary graphic (Kanga, 2014b) and experimental music (van der Schyff, 2013). Recent scholarship has similarly emphasized the multiplicity of forms of musical creativity in contemporary practices from DJ cultures to singer-songwriters and interactive audio design (Burnard, 2012).

Despite this apparent permeability of the two forms, much academic research and discourse nonetheless recognizes some form of delineation between composition and improvisation. In general, *composition*, or “...the discontinuous process of creation and iteration (usually through notation) of musical ideas...” (Sarath, 1996, p. 2) is associated with the use of formal constructive techniques applied and edited over an extended period of time, the ideas of a fixed musical work and sole authorship, and terms such as pre-determined or systematic. On the other hand, *improvisation* is generally associated with the terms spontaneous or intuitive, and “...the spontaneous creation and performance of musical materials in a real-time format, where the reworking of ideas is not possible” (Sarath, 1996, p. 3).

I use return to these terms throughout this literature review and in the analysis of the composition portfolio in Chapters Two, Three and Four. The table below offers a summary of the various terms generally associated with each mode of music making.

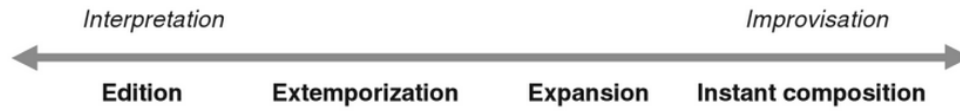
| <i>Composition</i> | <i>Improvisation</i> |
|--|--|
| systematic; pre-determined; discontinuous; edited; iteration; notation; fixed | intuitive; spontaneous; real-time creation |

1.1.1 Improvisation and composition: a spectrum

Following a study of native American Indian musical practices, Nettl (1974) proposed that improvisation and composition be viewed not as distinct acts, but rather two points on a continuum. This view of improvisation and composition as a spectrum has become increasingly prevalent throughout musicological research (Blum, 2009; Lin, 2014). Indeed, Benson (2003) proposed a 11-tier continuum to identify the various ways in which spontaneous and pre-determined elements can be fused, and still confesses that “...by no means is this list meant to

exhaustive” (pp. 26-30). Figure 1 depicts a diagram of this spectrum in church organists’ music-making proposed by Johansson (2012).

Fig. 1: Johansson (2012): spectrum of creative processes between interpretation and improvisation



The term *comprovisation* (and less frequently and more skeptically, *imposition*) have been used to describe the merging of improvised and composed processes (Stewart, 2013). Hannan (2006) uses *comprovisation* to describe his transformation of “intuitive” recorded improvisations into composed works, a process which dates back to at least the Italian composer Giacinto Scelsi - who recorded his improvisations to tape for later reworking as early as the 1950s (Uitti, 1995) – and likely to Béla Bartók’s *Improvisations on Hungarian Peasant Songs, Op. 20* (1920), which Bartók recorded to phonograph wax cylinders in the field in 1907 and later reworked into his harmonically dense interpretations.

Sarath (1996) offers an excellent delineation of improvisation and composition based on the phenomenology of each process. Sarath argues that the improviser creating in real time represents a single-layered temporal directionality towards the present where the “past and future are subordinated” (p. 1), whereas the composer inhabits a “multi-layered temporality” (p. 3) with the ability to review or edit the past and/or plan detailed schematics for the future. Reflecting my own experience as an improviser, Sarath nonetheless identifies the permeability of each temporal plane, noting the existence of compositional techniques in improvised performance, or “systematic improvisation” (2013, p. 41), and improvisatory spontaneity in the creation of fixed or notated musical works, or “extemporaneous composition” (1996, p. 6).

In the following pages I continue to investigate this interaction between improvisation and composition by examining the various roles of systematic processes in generating improvised outcomes, and intuitive processes in generating composed works. This juxtaposition further sets the background for the later discussions of my use of pitch-class sets, serialism and intervallicism, and the methodology I used to investigate these devices.

1.1.2 Systematic approaches to improvisation

Numerous studies have demonstrated the extensive and systematic study, training and practice that performers undertake to be able to improvise with proficiency and, as is generally the goal, idiosyncrasy. In a similar manner as spoken language and conversation (Dobbins, 1980; McMullen & Saffran, 2004; Sawyer, 2001) improvisers seek to internalize a knowledge base of structural information that can be subsequently retrieved during real-time performance (Berkowitz, 2009; Esterhammer, 2016; Johnson-Laird, 1991, 2002; Sawyer, 1992). These learning and pedagogical processes have been observed and documented thoroughly in jazz (Berliner, 1994; Johnson-Laird, 1991, 2002; Norgaard, 2011), the music of India, Egypt (Napier, 2006; Watson, 2012; Widdess, 2013) and Iran (Nettl, 2009; Perks, 2013), within the baroque (Horsley, 1951), church organists (Dodds, 2012; Johansson, 2008, 2012; Leupold, 2012), classical (Goertzen, 1998; Levin, 1992, 2009; Woosley, 2012), and modern experimental music (van der Schyff, 2013). As Azzara (1993) notes:

Spontaneous performance is not the expression of aimless, random tonal and rhythm patterns. It is the meaningful manipulation of tonal and rhythm music content created in ongoing musical thought. Successful improvisation is dependent on the recognition of relationships among tonal, rhythmic, and expressive elements, that is, the assimilation of the syntactic features of the music. A person must create organized musical meaning in his or her thought processes in order to be able to manipulate the structures of music into an organized, spontaneous, meaningful performance. (pp. 329-330)

A number of terminologies have been offered by cognitive musicologists for this set of “syntactic features” identified by Azzara (1993). Pressing (1984, p. 347) coined the term *referent* to describe “a set of cognitive, perceptual, or emotional structures (constraints) that guide and aid in the production of musical materials”. Sloboda (1985) used the term *schemata* to describe a similar process of assimilation and retrieval during improvised performance that has become an integral theory in music psychology and cognition research (see i.e. Lewis, 1996; Widdess, 2013). Referents and schemata take various forms across the world’s musical traditions, and while a detailed comparison of the many complex and varied improvisatory processes that exist is beyond the scope of my research, it is nonetheless necessary to briefly discuss a few notable examples pertinent to my own practice as an improviser.

Iranian traditional music, for example, holds the *radif*, “a repertory of roughly 270 short, mostly nonmetric pieces”, as a referent for improvisation and composition (Nettl, 2009, p. 185). Indian *raga*, “...a fusion of scalar and melodic elements...as well as characteristic melodic figures in which certain intervals are emphasized and attention is focused on particular notes”

(Jairazbhoy, 1995, p. 28), and *tala* (rhythmic cycles) function in a comparable manner. As Jairazbhoy (1995, p. 32) notes:

A *rāg* does not exist in any precise form in the sense that a symphony can be said to exist in score, but is a complex of latent melodic possibilities.

Jazz musicians approach improvisation with a similar ethos: although a musician may play the common jazz standard composition “Body and Soul” hundreds of times in their life, a practiced and internalized tapestry of various melodic systems, structures and alternatives allows them to weave different combinations and approaches with each interpretation (see, e.g. Berliner, 1994). Coming from a slightly different angle, contemporary improvisers often use fixed and/or notated compositions as referents for creative exploration. For example, Australian pianist Tim Steven’s solo album *I’ll tell you later* explores modern extrapolations on themes by Ralph Vaughn Williams to J.S. Bach and Renaissance-era Flemish composer to Jacobus Vaet (Stevens, 2015), while piano trio The Bad Plus has produced a full length interpretation of *The Rite of Spring* (2014), complete with improvisation, electronics, sampling and overdubbing in a digital-age reimagining of Stravinsky’s seminal work. In a similar vein, American pianist Dan Tepfer’s *Goldberg Variations Variations* (2011) juxtaposes Bach’s original variations with Tepfer’s own improvised versions (Tepfer, 2011), while Jean-Michel Pilc’s solo piano record *What is This Thing Called?* (2015) consists entirely of improvised expansions on Cole Porter’s classic 1929 popular song *What Is This Thing Called Love?* Contemporary classical works often require the performer to manipulate notated materials through improvisation in a similar manner, through the use of boxed melodic or rhythmic cells, textual instructions or graphics (see, e.g. Keyes, 2000).

Even the process and products of free improvisation is reflective of performers’ embodied knowledge of musical form and structure, as Bailey (1992) depicts while describing the influences behind his group Joseph Holbrooke’s transition from conventional jazz and modernist classical music into free playing during the 1960s. To draw a parallel to the realm of visual arts, Jackson Pollock’s revolutionary drip paintings, for example, can be seen as an embodiment of randomness and chaos, with their erratically spiralling, criss-crossing contours of line, colour, flecks and blobs; Pollock’s flinging, flicking, pouring and splatting of paint was simultaneously process and product. Yet despite his improvisatory methods, Pollock’s works clearly demonstrate an acute awareness and manner of manipulating colour and space; his use of a wide variety of paint types (oil, enamel, industrial house paint), working implement (brushes, sticks, and trowels), and conceptual techniques (single blobs, multiple layers, varieties

of density) suggest an unique, if even perhaps subconscious intentionality (Coddington & Hickey, 2013).

Incidentally, abstract art and improvised music have often formed a point of association, if not collaboration; Pollock's 1954 work *White Light* featured on the original cover of American saxophonist Ornette Coleman's seminal release *Free Jazz* (1960). Coleman himself identifies an example of the synergy between systematic and intuitive in Pollock's work:

It's not random. He knows what he's doing. He knows when he's finished. But still, it's free-form. (quoted in Kaplan, 2006)

In a similar vein as Jackson Pollock, pianist Keith Jarrett is renowned for his entirely improvised solo concerts. Evidencing his broad background in jazz standards, free improvisation and 20th century classical music, Jarrett's stylistic approach can range from extended simple, diatonic 4-chord passages (i.e. in *The Köln Concert, Part I* (1975) to extreme and virtuosic atonal modernism (i.e. in *The Carnegie Hall Concert Part I* (2006), where Jarrett returns to fragments of a theme in thirds in various iterations throughout, and as bookends to the epic 17-minute improvisation).

I merge intentionality and spontaneity in my practice in a similar manner by integrating pitch-class sets, serialism and intervallicism - as systematic structural techniques - into my vocabulary as an improviser. For example, I often consciously select a certain pitch-class or intervallic structure to form the basis of a melodic line or chordal sequence, particularly in settings of open-ended or free improvisation as way to organise my attention. I may derive material from fragments of a composition if one is in play, and/or freely generate content from my existing knowledge base as an improviser. As my practical grasp of these tools developed over the course of this project, I found myself both aware of a broader variety of available structures, and able to use them, and vitally to *hear* them as desired options in the course of performance with increasing intuition and spontaneity. I discuss and analyse the products of this practice in further detail throughout Chapters Two, Three and Four.

1.1.3 Intuition in the composition process

Composers equally utilize improvisatory processes in the formulation of their written works, even if the work itself may not require or allow for improvisation in its actual performance. Canadian composer Nicholas Gotham depicts a spectrum between systematic and intuitive creative processes in his practice:

Although improvisation will be an important reference point in this discussion, almost no actual improvisation is involved in the performance of the works...Rather, a focus of the discussion will be on relative degrees of preplanning and schematization of form versus a quasi-improvisatory, intuitive or spontaneous mode of note-to-note composition in each project...I will use the term improvisation here in a special sense referring to the way a composer can be said to be improvising if and as they compose without having prepared the note-to-note method of a work's composition. (Gotham, 2012, p. 6)

The term *comprovisation* has emerged to describe the use of improvisatory processes to generate both seed ideas for subsequent crafting into a composed work, and creative products which act more as fixed or 'instant' compositions in their own right (see, e.g. Smith & Dean, 1997, p. 71). Australian pianist Michael Hannan describes his comprovisational practice as combining a "...systematic and extensive collection of research data" (Hannan, 2006, p. 11) with "...a strongly intuitive process of recording freely improvised performances" (Hannan, 2006, p. 3) – again juxtaposing the terms *systematic* and *intuitive* which are a focus of this exegesis.

Wassily Kandinsky similarly recognized this interaction of systematic and intuitive processes in his own practice in the final pages of his treatise *On the Spiritual in Art* (1912 [1946], p. 98):

Improvisations - "intuitive, for the greater part spontaneous expressions of incidents of an inner character, or impressions of the 'inner nature'"

Impressions - "a direct impression of 'outward nature', which is expressed in pure artistic form"

Compositions - "slowly evolved feelings, which have formed within me for a long time, and tested pedantically, developed after they were intuitively conceived. Reason, consciousness, purpose, and adequate law play an overwhelming part. Yet, it is not to be thought of as a mere calculation, since feeling is the decisive factor."

Kandinsky's reference above to "...slowly evolved feelings, which have formed within me for a long time... developed after they were intuitively conceived" is almost identical to Hannan's description of comprovisation. In a recent study, Pohjannoro (2014) summarised the working methods of a reputable (yet unnamed) Finnish academic and composer into ten steps: *imagination, experimentation, incubation, restructuring, rule-based processing, viewing different alternatives, music analytic viewing, setting musical goals, and evaluating* (pp. 187-188) – which taken together demonstrate the frequent interactions between systematic and intuitive modes. Pohjannoro (2014) thus "...explicitates compositional thinking as fluctuations of intuitive and reflective ideation, monitored by metacognitive function" (p. 181).

During the 1960s, composer Lukas Foss took a view of improvisation as a valuable sketch-like working process while clearly delineating the acts of improvisation and composition:

Improvisation is not composition. It relates to composition much in the way a sketch relates to the finished work of art. But is not the very element of incompleteness, of the merely intimated, the momentarily beheld, the barely experienced what attracts us in the sketch? It is work in progress. And so is improvisation as we practise it; it is a spontaneous, sketch-like and - incidentally - un-repeatable expression, full of surprises for the listener and for the performer as well. (Foss, 1962, p. 684)

Foss' point about improvisation as a sketching process is evident my portfolio, particularly throughout the Duologue chapter, where I used pre-recorded improvisations as the basis for subsequent expanded compositions. Nonetheless, Foss's statement that "improvisation is not composition" fails to recognize that improvisation can, and regularly does form the basis of a creative product in its entirety, as the Pollock and Jarrett examples from earlier in this chapter demonstrate, and as Nettl (1983) points out:

Schubert is said to have composed a song while waiting to be served at a restaurant, quickly writing it on the back of the menu; Mozart turned out some of his serenades and sonatas almost overnight; and Theodore Last Star, a Blackfoot Indian, had visions in which, in the space of a minute or two, he learned from a guardian spirit a new song. (Nettl, 1983, p. 26)

Beat poet Jack Kerouac offers a good example of this kind of improvisatory approach to finished product, which he outlined in a 1958 article entitled *Essentials of Spontaneous Prose* after completing his novella *The Subterraneans* (1958) in just three days. Kerouac believed that writers should remain unfettered by the shackles of normative stylistic conventions and attempt to create in a trance-like state where ideas are allowed to flow unfiltered and unedited. Kerouac even compared the process to a jazz musician improvising:

Time being of the essence in the purity of speech, sketching language is undisturbed flow from the mind of personal secret idea-words, blowing (as per jazz musician) on subject of image. (Kerouac, 1958, p. 72)

Fellow beat writer Allen Ginsberg subsequently experimented with spontaneous prose in his *Sunflower Sutra* (1955), while nonetheless finding improvisation insufficient as the sole component of the creative product:

"First thought, best thought," Ginsberg asserted, though he found it difficult to practice. The impulse to revise was too great. It was the thought, he insisted, that had to remain pure and unaltered. (Schumacher, 2015, p. xiii)

It is thus clear that 'composed' and 'improvised' procedures often coexist in a yin-yang-like equilibrium, each informing and guiding the other. Larson (2005) succinctly summarizes the nebulous nature of the relationship:

Some improvisations are best regarded as compositions. Other improvisations are not. Some compositions are best regarded as recorded improvisations. Other compositions are not. (p. 272)

Larson's description can be seen reflected throughout my composition portfolio. For example, the composition *Codify* consists of only 10 treble-staves of material, yet the performance of the piece stretches to 7 minutes after an extensive improvisatory extrapolation; the piece may be regarded more improvisation than composition. On the other side of the coin, both *Organic Melody #1* and *#34* were composed fairly quickly through improvisation, although after dozens of performances I have come to regard them more as fixed compositions. I discuss this permeability of improvised and composed forms in my practice in further detail throughout Chapters Two, Three and Four.

1.2 Pitch-class sets, Serialism and Intervallicism in Composition and Improvisation

Over the following pages I offer a brief overview of the genesis and history of the three structural devices I investigate throughout my portfolio – pitch-class sets, serialism and intervallicism. I review the field surrounding the use of each device in past and contemporary improvised music, and give a brief preliminary example of the use of each device within my compositions.

Martin (2008, pp. 12-16) uses the terms *face-value synthesis* and *intuitive synthesis* to compare two distinct techniques of incorporating formal compositional devices (such as the three discussed in the following pages) into improvisatory performance. According to Martin, in *face-value synthesis* the device is used in a simplistic form and does not obviously inform the entire performance, while in *intuitive synthesis* the performer or composer demonstrates a systematic or thorough use of the device. I will reference these two terms throughout this exegesis and point to examples of my use of both forms.

1.2.1 Serialism

By the end of the 19th century, composers had begun to stray increasingly further from the tonal system and harmonic functionality as fundamental structural tenets. Arnold Schoenberg and Josef Matthias Hauer's separate and simultaneous development of systems of twelve-tone composition – in which the 12 tones of the chromatic scale are and treated as equal and ordered through various systematic operations such as retrograde and inversion – liberated

composers from the claustrophobic rules of tonality, and unearthed an immense new landscape of potential melodic lines, chord structures and instrumental textures. As theorist Allen Forte states:

The repertory of atonal music is characterized by the occurrence of pitches in novel combination, as well as by the occurrence of familiar pitch combination in unfamiliar environments. (Forte, 1973, p. 1)

It is interesting to note Schoenberg does not outline any methods for dealing with dodecaphony *per se* in his treatise *Theory of Harmony* (1911 [1983]), despite the fact that the book was published two years after the appearance of his first twelve tone works such as *Drei Klavierstücke* Op.11 (1909). Schoenberg chooses instead to focus techniques for extending the voice-leading principals of conventional major and minor harmony to reach alternate structures of harmonic progression, the creative outcomes of which can be seen clearly in works such as his *String Quartet No. 2* Op.10, particularly in the first movement, which barely clings to notions of tonality. Informed by the likes of Schoenberg, this kind of diligence of voice-leading has long been an integral consideration in my own practice as a improvising pianist, and markedly informed the crafting of the progressions of pitch-class structures seen throughout Chapter Three of this exegesis.

These developments in classical composition theory, made by the likes of Schoenberg, Webern and Berg, inevitably caught the ear of jazz improvisers and composers. During the 1950s, theorist and composer Gunther Schuller proposed *Third Stream* as a new genre that sought to equally merge jazz and classical elements (Schuller, 1989). Although such fusions were not novel *per se* (Duke Ellington had arguably been achieving exactly that with his orchestral scoring for decades), Schuller's works such as *Transformations* (1956) represent one of the earliest successful syntheses of jazz rhythms, melodic language and harmonic forms with formal serial or twelve-tone row constructions, juxtaposing a long passacaglia with embryonic fragments of jazz language.

Such syntheses continued to varying extents throughout the free jazz movement of the 1960s. Legendary saxophonist John Coltrane, for example, having been investigating the melodic structures in Nicolas Slonimsky's *Thesaurus of Scales and Melodic Patterns* (Bair, 2003; Slonimsky, 1947), used a twelve tone-row and its retrograde as the melody of his tune *Miles' Mode*, recorded on his 1962 album *Coltrane* (Impulse!) – although no reference to tone-row constructions is made during either the saxophone or piano solos on the track.

On the other hand, saxophonist Jimmy Giuffre, in his groups the Jimmy Giuffre 3 & 4 presented one of the more advanced and effective (if apparently aesthetically challenging to jazz audiences of the time (see, e.g. Chinen, 2014)) syntheses of jazz improvisation with classical modernism, serialism in particular, in albums such as *Emphasis & Flight* (1961).

Mr. Chambers...said that when he heard [Giuffre's album] "Free Fall," [released in 1963] it connected with the Schoenberg and Webern he'd been studying in college. (Chinen, 2014)

In an example of Martin's (2008) concept of *face-value synthesis*, pianist Bill Evans used a twelve-tone row as the basis for the melody to his *Twelve-Tone-Tune* (1971), which he coloured with conventional jazz harmony. It is this conventional harmonic scaffold that forms the basis of Evans' improvisations, not the structures of the tone-row itself – Evans insisted that "...twelve-tone music (as a pervasive operating language) was incompatible with the art of improvising" (Pettinger, 1998, pp. 204-205). Evans' rejection of twelve-tone music was perhaps pre-emptive and a reflection of his chosen stylistic paradigm of largely interpretations of American songbook repertoire, although it is surprising that with Evans' obvious intellect (see e.g., Evans' eloquent discussion of his process in conversation with his brother in the documentary *The Universal Mind of Bill Evans* (Evans, 1966)) he was not interested in any further or substantial investigation of serialism.

In contrast, Evans' contemporary and fellow pianist Paul Bley recalls that, while his album of free improvisations *12 (+6) In a Row* (1990) did not contain any explicit or compositional use of tone-rows, "...by playing with Viennese musicians and recording in Europe, we had Schoenberg and his school nearby" (Meehan, 2003). Since the 1960s, composer Anthony Braxton has experimented with various forms and fusions of serial procedures and graphic notation as stimulus for improvisation, acting as a nexus between avant-garde jazz, Schoenberg and the graphic music of the likes of Cornelius Cardew. More recently, avant-garde saxophonist John O'Gallagher's excellent book *Twelve-Tone Improvisation: A Method for Using Tone Rows in Jazz* (2015) follows from his re-workings and reimagining of Weber's music on his album *The Anton Webern Project* (2013), and offers a codified method for applying tone-rows to various settings of jazz and experimental improvisation.

I take several different approaches to serialism throughout this portfolio. In some cases, as with *A Dance*, for solo piano, I use tone-rows systematically through set transformative processes such as inversion and retrograde as seen in Figure 2 below. Throughout this exegesis I use the traditional method of analysing tone-row permutations; P_0 is used for the prime form

or the first row encountered in the composition, where R_9 , for example, would represent the retrograde of the P_0 row transposed up 9 semi-tones.

Fig. 2: Excerpt from the exposition of *A Dance* with row forms marked, b.8-15

The musical score for 'A Dance' consists of two systems of piano and bass staves. The first system (measures 8-11) features a piano part with a melodic line and a bass part with a rhythmic accompaniment. Row forms are marked as [P5] above the piano staff in measure 9, [R9] above the piano staff in measure 11, and [P10] below the bass staff in measure 8. Dynamics include *mf* and *p*. A fermata is placed over a note in the bass staff in measure 11. The second system (measures 12-15) continues the piano and bass parts. Row forms [R8] and [R10] are marked above the piano staff in measures 12 and 14 respectively.

In other works, such as *Brighton-Le Sands*, *A.S.P.* or *#34*, for quartet, *Minimal Animal*, for duo, or *Tag!* for solo piano, I take a more intuitive approach, utilising chromatic techniques that imply a tone-row-esque aesthetic while avoiding any intentional use of strict serialism. This process can be seen at the start of *Brighton-Le Sands*, where each chromatic tone is generally played only once in each phrase; as the tune progresses I use the technique with various degrees of elasticity:

Fig. 3: Opening phrases to *Brighton-Le Sands*, with suggested tone-row degrees marked, repeated notes in each row marked with asterisks, b.1-12

The musical score for 'Brighton-Le Sands' shows three systems of piano staves. Each system has suggested tone-row degrees marked above the notes. The first system (measures 1-12) has degrees: 1 2 3 4 5 6 7 3* 8 3* 9 10 3* 6* 11 12. The second system (measures 5-10) has degrees: 1 2 3 2* 4 5 6 2* 7 4* 7* 8 9 10. The third system (measures 9-12) has degrees: 1 2 1* 3 4 5 5* 6 3* 7 3* 6* 8 5* 7* 4* 9. Asterisks indicate repeated notes within the rows.

In these two examples my varied use of systematic and intuitive compositional techniques is reflective of Martin's (2008) notion of *intuitive synthesis*.

1.2.2 Pitch-class sets

One of the primary techniques of atonal composition, pitch-class sets are groups of notes classified and numbered according to their interval structure and relative to the 12-tones of the chromatic scale. For example, the excerpt below demonstrates two permutations of the pitch-class set [0126], the first in prime form and the second in inversion. The final two bars offer respectively two possible realizations of each form of the set.

Fig. 4: Pitch-class set [0126] and possible realizations

The figure shows a musical score in 4/4 time, consisting of two systems of staves. The first system has two staves: a treble clef staff and a bass clef staff. The treble staff contains two measures of music. The first measure is labeled with a bracket above it as [0126] and contains the notes C4, D4, E4, and F4. The second measure is labeled with a bracket above it as [0126i] and contains the notes G4, F4, E4, and D4. The bass staff is empty in both measures. The second system also has two staves: a treble clef staff and a bass clef staff. The treble staff contains two measures of music. The first measure is empty. The second measure contains a single note G4. The bass staff contains two measures of music. The first measure is empty. The second measure contains a single note C4. A long slur connects the G4 in the treble staff of the second measure to the C4 in the bass staff of the second measure.

Introduced by theorist Allen Forte in his *Structure of Atonal Music* (1973), and based on earlier work by Milton Babbitt (Babbitt, 1960, 1961; Barkin, 2001) pitch-class theory was originally developed as an analytical tool for non-tonal music. Nonetheless, composers had been experimenting with various pitch-grouping constructions for some time: Morton Feldman’s *Piano Piece 1952*, for example, uses only a small group of trichord constructions that reflect the pitch sets [012], [016], [024] and [026] (Undreiner, 2009). Off the back of these developments, pitch-class sets quickly developed into an exhaustive and systematic tool for post-tonal pitch manipulation – Forte (1973) compiled a list of all the possible intervallic combinations within two to six note sets, and the list has subsequently expanded to include all of the permutations available in larger sets of seven to twelve notes (a 12-note set being the chromatic scale).

In the final few pages of his *Theory of Harmony*, Schoenberg briefly mentions the concept of “tone colour” (*Klangfarbe*) and ‘tone colour progressions’ writing:

Anyway, our attention to tone colors is becoming more and more active, is moving closer and closer to the possibility of describing and organizing them. At the same time, probably, to restrictive theories, as well. For the present we judge the artistic effect of these relationships only by feeling. How all that relates to the essence of natural sound we do not know, perhaps we can hardly guess at it yet; but we do write progressions of tone colors without a worry, and they do somehow satisfy the sense of beauty. What system underlies these progressions? Tone-color melodies! How acute the senses that would be able to perceive them! (Schoenberg, 1911 [1983], pp. 421-422)

I believe the opaque tonal functions of pitch-class sets offer one answer to Schoenberg's question (for example, no clear tonality can be immediately surmised from the harmonic structure in bar 3 of figure 4 above. The notions of *tone-colour*, *tone colour-progression* and *judgement by feeling* (i.e. intuition) were integral facets of my approach to using pitch-classes throughout this exegesis, and are particularly relevant to my discussion of a spectrum between harmonic *stability* and *volatility* in Chapter Three.

Composer Elliott Carter represents one of the most prolific contributions to the use of pitch-class sets and the exploration of tone colour. Carter began working with pitch-class systems in his *String Quartet No. 2* (1959) and *Double Concerto* (1961), and the composer's working manuscripts from the period were eventually compiled into his invaluable *Harmony Book* (Carter, 2002). Although predominantly a device of 20th century modernism, the *sound* of pitch-class sets can be heard fleetingly in music from previous eras. Chopin, for example, hints ever so briefly at an [0126] pitch-class set in the final phrase of the opening statement to his *Waltz in Ab Major* (Op.69, No.1, 1835), as seen in the 2nd beat of bar 4 of this excerpt:

Fig. 5: Fleeting [0126] pitch-class set in Chopin's *Waltz in Ab Major* (Op.69, No.1, 1835) – b.4, beat 2 of excerpt



In choosing to use the D natural as a melody note simultaneously against the Db in the V⁷ chord in the left hand, Chopin apparently intuitively breaks with Romantic-era harmonic conventions in favour of this distinctive passing semitonal dissonance. It would be another century before the sound of these tensions, and the vast creative potential of pitch-class sets in general began to be treated more expansively. Leonard Bernstein identified this incremental acceptance of increasing degrees of dissonance in compositional practice in his 1973 lectures at Harvard, entitled *The Unanswered Question*. Herbie Hancock similarly depicts his intuitive departure from music theory in the liner notes to his album *Speak Like a Child* (1968):

For the most part, the harmonies in these numbers are freer in the sense that they're not so easily identifiable chordally in the conventional way. I'm more concerned with sounds than chords.

I identify these examples as my own experience with pitch-class materials has been driven largely by aural intuition and my affinity for complex harmony. As a jazz pianist, experimenting and improvising with inversions or variations of dense or chromatic chord voicings forms a major part of my practice routine and performing life, and my discovery of pitch-class theory offered me a codified system with which to explore sounds that were already somewhat familiar to me.

I use pitch-class constructions in a variety of forms throughout my portfolio. The aforementioned set [0126], for example, appears as one of four primary sets in my composition *Hard-Boiled Wonderland*, for solo piano, based on the novel of the same name by Japanese author Haruki Murikami. Figure 6 below demonstrates a sequence of voicings and melodic lines derived from the set [0126]:

Fig. 6: Use of pitch-class set [0126] in *Hard-Boiled Wonderland*, third system.

In jazz, the compositions and improvisations of free jazz pioneers Ornette Coleman and Cecil Taylor have been investigated using pitch-class analysis (Block, 1990, 1991; Pressing, 1983). While intriguing as a mode of analysis, given the large number of different sets identified and the general inconsistencies in their use throughout the selected improvisations, it is difficult to plausibly claim that each improviser was specifically considering pitch-class theory while improvising.

Nonetheless, jazz musicians and experimental improvisers have made increasing and systematic use of pitch-class sets as creative stimulus over recent decades. In particular, American pianist Matt Mitchell has made virtuosic and prolific use of pitch-class sets across his two albums *Fiction* (2012, for piano and drums) and *Vista Accumulation* (2015, for quartet). The opening 3 minutes of Mitchell's *Select Your Existence*, for example, is based on a long series of four-note pitch-classes used both as vertical chord structures and an intersecting melody. Throughout the subsequent 12 minutes Mitchell alternates between sections of free

improvisation based in part on the existing material in the composition, and further compositional contrapuntal and harmonic extrapolations of the content presented in the initial exposition. In *Numb Trudge*, Mitchell takes a similar approach with a series of dense, highly dissonant penta-chord sets attached to a cycling rhythmic scaffold:

Fig. 7: Opening bars to Matt Mitchell's *Numb Trudge*, from the album *Vista Accumulation*, b.1-3, with pitch-class sets marked.

Following multiple cycles of this progression, the piece segues into an extended free improvisation in which Mitchell references and expands this written content. Later in the piece, these sets recapitulate in sequence in a linear form:

Fig. 8: Linear recapitulation of opening pitch-class chord sequence in Matt Mitchell's *Numb Trudge*, 15:15

Mitchell briefly discusses his synthesis of systematic and intuitive processes in his interview with trumpeter Dave Douglas (Mitchell, 2013), although at the time of writing no significant formal analysis of Mitchell's process or prolific output yet exists. Given Mitchell's significant contribution to avant-garde and experimental music this remains a pertinent area for future research.

Having listened extensively to Mitchell's music I began to recognize consistent structures and techniques of motivic development in his working methods, which I found began to appear intuitively in my own music. In *Umbric Symmetry*, for example, I used a collection of

six four-note pitch classes as the basis for a 28-crotchet-beat cycle – similar to that used by Mitchell in *Numb Trudge*. As the piece develops, the melodic line derived from these sets becomes increasingly complex, as seen below:

Fig. 9: First few bars of the third iteration of melodic line to *Umbric Symmetry*, b.17-18.

Throughout this investigation of pitch-class sets I also came to two conclusions that have significant implications for how I approach harmony and harmonic variation as a composer and improviser. I discovered that:

1. Pitch-class chords can be constructed in such a way that they may act, despite an often high degree of chromaticism, as substitutions for or passing chords between orthodox functional chord structures.
2. Thus, with a careful treatment of voice leading, passages of pitch-class chords can be sculpted to suggest functional progressions such as a perfect cadence [V-I], even though the overall landscape may appear for all intents and purposes atonal.

In academic literature, van Egmond and Butler (1997) have applied set theory to diatonic domains, but to the best of my knowledge little formal study or theoretical analysis of this potential tonal functionality of pitch-class sets has been made. I will explore these discoveries in further detail throughout the analysis of my portfolio in Chapters Two, Three and Four, however in the interim Figure 10 below offers one preliminary example of this fusion of pitch-class sets and tonal functionality, taken from bar 39 of the composition *Primed*. In this case, the first chord of the bar could be assumed to be a reflection of the diminished scale, a common choice of jazz musicians when altering a V^7 chord. The lower three voices of the following chord give the impression of a resolution to F_{min}^9 , albeit coloured chromatically with the $F\#$ and in the upper voice and octave E naturals:

Fig. 10: Implied tonal functionality in the use of chromatic pitch class sets in *Primed*, b.39.

The musical score for 'Primed', b.39, is presented in three staves. The top staff is the right hand, featuring a melodic line with triplets and a 5-note phrase. The middle staff is the left hand, showing a bass line with sustained chords and a specific pitch class set [01367] indicated above the first measure. The bottom staff is the right hand, showing a bass line with sustained chords and a specific pitch class set [01234] indicated above the first measure. The score is in 7/8 time and features a complex melodic line with triplets and a bass line with sustained chords.

In reflection of this discovery, the music in this portfolio utilizes the harmonic and melodic versatility of pitch-class sets to frequently blur the line between tonality and atonality, functional and non-functional harmony. In the process, I use my existing knowledge and schemas as a jazz pianist and accompanist as a springboard towards an *intuitive synthesis* of pitch-class sets with tonal theory. In Chapter Five, I offer a more in depth summary of the potential practical applications of this concept.

1.2.3 *Intervallicism*

Intervallicism is a technique of melodic and harmonic construction based on the use of a limited palate of intervals. Composer Jonathan Harvey describes intervallicism as:

...working with intervals as the primary listening object. How intervals follow each other and how they make patterns, whereas spectralism is more about harmony. (Shingleton, 2014, para. 47)

Harvey identifies the nebulous boundaries between intervallicism and spectralism, the technique of composition based on the naturally occurring partials of the harmonic series pioneered by French composers Gérard Grisey and Tristan Murail:

Intervallicism can shade into and out of spectralism, and it is in this ambiguity that much of the richness in this approach lies. (Bossis & Harvey, 2008, p. 9)

Intervallicism can also be closely tied to pitch-class set theory. For example, Morton Feldman used various simple interval structures to create three-note sets in his aforementioned *Piano Piece 1952*. The results can be easily analysed using Forte number terminology, even though pitch-class theory *per se* would not come into formal practice for another decade:

Feldman himself explained his process of creating chords from different Interval-Classes in a speech prior to the premier of his *Triadic Memories*: "...the music is essentially just two kinds of intervals: a minor second, a major second, which of course is also a minor seventh and a major seventh. And it is by superimposing other like intervals that the chord formations are made." (Undreiner, 2009, p. 4)

Feldman's approach undoubtedly provided a reference point for American avant-garde composer, improviser and saxophonist Henry Threadgill, who developed a parallel, unique system of intervallic construction based on the intervals found in three note cells. The C major triad, for example, contains a perfect 5th and a minor and major 3rd in root position, but can also include both major and minor 6^{ths} and a perfect 4th in alternate inversions. Identifying this, Threadgill's system reorders the interval structures of each of the three primary inversions to generate 6 additional three-note structures (Taylor, 2015, pp. 37-38), which he subsequently uses as the basis for melodic lines and chord voicings.

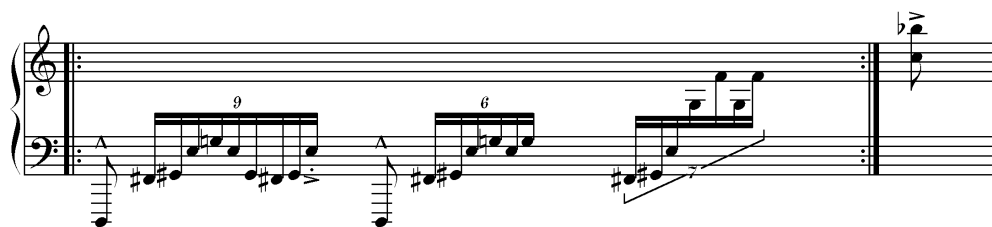
I use intervallicism in various forms throughout this portfolio: *See-saw*, for solo piano, is based almost entirely on major and minor 6^{ths} derived from the parallel use of the A major and A-flat major scales (see Figure 11 below), and *Organic Melody #1*, for quartet, was written using largely major 2nds. Similarly in *Haunted Dreamscape*, for duo, I confined the rhythmically dense melody largely to the chromatic notes found inside the interval of an augmented fourth – a technique I subsequently juxtaposed with an expanding section of sparsely placed piano voicings derived from the wide intervals of stacked major and minor 7^{ths} and 9^{ths}, a la the previous example of Feldman (see Figure 12 below).

Fig. 11: Use of parallel major and minor 6th in *See-Saw*, b.9-12

Fig. 12: Juxtaposition of dense chromatic melodies and sparse, wide intervallic broken chords in *Haunted Dreamscape*, b.7-14

This study of intervallicism also informed my practice in contexts of free improvisation, where used the newfound technique for generating spontaneous structural anchors and thematic continuity. For example, Figure 13 below is a transcribed excerpt from an ensemble free improvisation performed in collaboration with the koto player Michiyo Yagi in Japan in January 2017, where I begin the piece with a recurring intervallic theme. The initial permutation of the theme consists of a compound major third, major second, minor 6th and minor third, and a subsequent extended version introduces two consecutive minor 7^{ths}. The figure itself transforms into the 6-note pitch-class set 6-2 [012346], and at the end of the example the 8-note set and mirror 8-21 [0123468A].

Fig. 13: Excerpt of free improvisation demonstrating use of intervallic structures, (notation of various piano figures approximate)



I found myself incorporating these techniques with increasing intuition into both my improvisation and composition practices over the course of this study. In the following pages I investigate the synergy of these intuitive and systematic modes in more detail with a discussion of the methodology behind this project, and a discussion of practice-based research in general.

1.3 Methodology

To define is to limit. - *Lord Henry to the Duchess of Monmouth in Oscar Wilde's The Picture of Dorian Gray* (Wilde, 1890, p. 170)

The more constraints one imposes, the more one frees one's self of the chains that shackle the spirit. - *Igor Stravinsky* (Stravinsky, 1942, p. 65)

Earlier, quotes by Duke Ellington and Karlheinz Stockhausen referenced an essential equilibrium between improvisatory and compositional process. Here, Igor Stravinsky and Oscar Wilde's character take contrasting perspectives on the optimum balance of freedom and constraint in creative practice. In the case of these two quotes at least, Wilde would seem to take the side of open-ended improvisation or intuition, and Stravinsky that the side of the rule-based or systematic techniques associated with composition.

My methodology throughout this project can be seen as very much a reflection of both of these perspectives. For example, as I depict in the introduction, much of my theoretical knowledge and improvisational vocabulary has been attained through my hands-on experiences as a performer and listener. In this sense, I have generally placed no decisive ‘limits’ on the *modus operandi* of my research beyond those that emerged intuitively as a product of my musical aesthetic (my interest in certain modes of practice or the ethos of a certain ensemble of musicians), and the limited scope of material it is humanly possible to conceptualise or work productively with at any one time. I frequently encounter new musical information through my various performance activities – from straight-ahead jazz to covers bands to contemporary experimental music, as well as the traditional music of Japan, India and Vietnam I encountered during my overseas travels – each of which has a largely undefined osmotic effect on my knowledge base as a practicing musician.

At the same time, my practice has been invaluablely enhanced by constraints that I have set around certain areas of my research, or indeed, from a more systematic investigation of a particular concept or way of working. Many of my biggest creative discoveries or breakthroughs have come this way. For example, Jerry Bergonzi’s *Hexatonics* concept (Bergonzi, 2006) significantly reframed the way I considered playing both ‘inside’ and ‘outside’ chord changes, and as this exegesis analyses, coming across and prolongedly investigating set theory has radically transformed my view of harmony and melody in both tonal and non-tonal contexts.

Smith and Dean (2009) describe these two modes of working as *practice-led research*, and *research-led practice*, respectively. The following pages describe in further details the both methodologies generally associated with these forms of research (which together constitute parts of the academic mode of inquiry now commonly termed *practice-based research*), and my methodological considerations in the execution of this project.

1.3.1 Practice-based research

Until relatively recently, artists’ accounts of their own methodology have often either been overshadowed by finished product or the “Great Work” (Benson, 2003; Burnard, 2012; Goehr, 1992); or been intentionally disguised or withheld by the artist themselves in protection of their ‘secrets’. Edgar Allen Poe observed the kind of romantic mysticism occasionally associated with creative artists, sometimes propagated by the artists themselves:

Most writers - poets in especial - prefer having it understood that they compose by a species of fine frenzy - an ecstatic intuition - and would positively shudder at letting the public take a peep behind the scenes. (quoted in Kleon, 2014, pp. 33-36)

In recent decades, however, practice-based research has become a central paradigm of scholarly inquiry, and artists' critical auto-ethnographic and reflective analyses of their practice and its products have contributed invaluable knowledge to the study of musical creativity:

By virtue of its distinctive context, its studio-based research practice, the specific types of knowledge and understanding it deals with, and its unconventional forms of documentation and dissemination, artistic research occupies its own place in the realm of academic research. (Borgdorff, 2012, p. 145)

In documenting the conceptualisation of and processes behind their creative products, practice-based researchers depict their "...thinking in, through, and with art" (Borgdorff, 2011, p. 44). At the same time, practitioners must match their self-reflexive writing with a somewhat more detached analysis of how their work is situated within past and existing practice. In other words, they must straddle the line between participant and observer, with the mindfulness to eloquently and deeply discuss both sides. As Ellis, Adams, and Bochner (2011, para. 40) note:

Autoethnography, as method, attempts to disrupt the binary of science and art. Autoethnographers believe research can be rigorous, theoretical, and analytical and emotional, therapeutic, and inclusive of personal and social phenomena.

Ellis (2004, p. xix) further notes that "autoethnography...usually features concrete action, emotion embodiment, self-consciousness, and introspection." My approach to autoethnography during this project was very much reflective of these characteristics, and of a self-developed practice I've maintained for now well over a decade. As a largely self-taught teenager I started keeping a meticulous music journal: a log of every day's activities at and around the piano, with notes on my experience of each session. These journals are full of discoveries, seeds of compositions, ways of working on concepts, frustrations, creative impasses, self-doubts and self-encouragements. Over time, these logbooks of both technical material and personal reflections have helped me attain a higher degree of mindfulness (as Ellis suggests in the above quote), and guided innumerable useful adjustments and improvements to my practice. This process of data collection also gave me a reliable source of information to refer to when constructing the analysis of the compositions presented in Chapters Two, Three and Four, and the improvisations that formed or were derived from them.

In an interview with the trumpet player Dave Douglas, pianist Matt Mitchell seemingly unwittingly identifies the enhanced self-awareness that can result from this kind of reflection upon one's creative process:

Now that you ask the question...its causing me to frame things...in a little bit more concrete ways...I hadn't really realised that I thought this way. (Mitchell, 2013, p. 17:10)

As Smith & Dean (2009, p. 1) note, the evolution of auto-ethnographic, practice-based research has also led to the emergence of "...dynamic new ways of thinking about research, and new methodologies for conducting it...". This was certainly true with the way my doctoral project unfolded. Candy and Edmonds (2011) have noted that the very methodology of artistic research can in fact be improvisatory: the researcher often begins without a clear plan in mind and comes to embrace theory and formal reflective processes through the act of making and creating their art – an example of the merging of systematic and intuitive methodologies.

...[practice-based research] questions and design criteria are derived through the creation of works and this leads to the development of a theoretical framework which is used in the evaluation of the results of practice. (Candy & Edmonds, 2011, p. 130)

I can relate to this improvisatory approach to methodology. I began this project with the intent to investigate approaches to solo piano improvisation, but without any set framework with which to do this in mind. I also realised a singular focus on solo piano – without the opportunity to explore structural and creative techniques across a range of contexts – would be narrower than I was looking for. Eventually my decision to focus on three specific devices emerged organically from my private research, practice and professional interests and engagements with various ensembles. This process closely aligns with Smith & Dean's (2009) description of research-led practice, where the systematic research process catalyses new ideas and ways of thinking and conceptualising one's creative work.

At the same time, Sullivan (2009) has regarded the kind of open-ended approach to methodology I initially adopted as an effective system for fostering original ideas and creative work:

...[studies suggest] that creative options and new associations occur in situations where there is intense concentration, but within an open landscape of free-range possibility rather than a closed geography of well-trodden pathways. (Sullivan, 2009, p. 48)

As the creativity researcher Keith Sawyer encapsulates:

...most successful creativity [begins] without yet knowing what the real problem is. The parameters aren't clearly specified, the goal isn't clear, and you don't even know what it would look like if you were to solve the problem. Before you can arrive at the right question, you often have to go ahead and make something, then reinterpret it as something very different based on what happened when you made it. (Sawyer, 2013)

My emergent approach to methodology in this study depicted above is reflective of the general concepts of grounded theory developed by Glaser and Strauss (1967), who argued that theory should be constructed from systematic data collection & analysis rather than a “logico-deductive” method of using hypotheses and subsequent experiments to test a pre-existing theory (Ezzy, 2002, pp. 7-8).

In a similar vein to the concepts of practice-led research and research-led practice, Galenson (2006) identifies two distinct, predominant creative methodologies in his study of the lives various notable artists from Rembrandt to James Joyce. Galenson also offers an alternate and pertinent lens through which to view the interaction of composition and improvisation or systematic and intuitive processes that forms the basis of my discussion throughout this exegesis.

1.3.2 The experimental and conceptual models

According to Galenson, *conceptual* artists arrive at new ideas quickly, often making use of an extensive (i.e. systematic) preparatory sketching process or constructing procedures in order to generate a preconceived outcome. On the other hand, *experimental* artists proceed largely through trial-and-error (i.e. intuition), stopping at the often-ambiguous point where the work is deemed to be finished. As Galenson depicts, experimental innovators seek, and conceptual innovators find.

In fitting with the experimentalist model, painter Paul Cézanne constantly refined and re-examined his technique over his lifetime, producing much of his widely regarded work in his later years:

His primary goal was not to create images, but to learn. A fellow painter who once worked with him reported that Cézanne “never ceased declaring that he was not making pictures, but that he was searching for a technique.” (Galenson & Jensen, 2001, pp. 9-10)

Accordingly, Cézanne appears by many accounts as an almost perpetually unsatisfied editor of his work:

When Cézanne was painting a portrait of the critic Gustave Geffroy, he made him endure eighty sittings, over three months, before announcing the project a failure. (The result is one of that string of masterpieces in the Musée d'Orsay). (Gladwell, 2008)

On the other hand, Pablo Picasso, a prodigious conceptualist, often extensively drafted his works; the discovery of 175 notebooks kept by Picasso from 1894 to 1967 include no fewer than eight dedicated solely to sketches for *Les demoiselles d'Avignon*, the masterpiece that heralded the beginning of the Cubist revolution (Gardner, 2011, p. 145). Picasso seems to align himself with the conceptual mode in a 1923 interview with the artist Marius de Zayas, appearing to suggest each work has a pre-imagined form:

I can hardly understand the importance given to the word *research* in connection with modern painting. In my opinion, to search means nothing...to *find* is the thing. When I paint, my object is to show what I have found and not what I am looking for...the several manners I have used in my art must not be considered as an evolution, or as steps toward an unknown ideal of painting. (Picasso, 1923)

Cézanne and Picasso seem to both at points equally reflect the traits of the musical composer and improviser in their various creative activities. Picasso's sketching process - particularly for major works such as *Guernica* (1937) (see, e.g. Gardner, 2011, pp. 163-167) - demonstrates the meticulous development of an idea much in the same way as a composer trials multiple variations of the development of a motif. Nonetheless, Picasso's dismissal of artistic over-analysis in the below quote suggests that spontaneity or improvisation were equally as important to him:

The idea of research has often made painting go astray, and made the artist lose himself in mental lucubrations...all I have ever made was made for the present and with the hope that it will always remain in the present. (Picasso, 1923)

Meanwhile, Cézanne's "searching for a technique" (Galenson & Jensen, 2001, pp. 9-10) clearly evokes the spontaneous, non-censoring nature of improvised performance, yet is balanced by his composer-like system of retrospective revisiting and reworking of existing creations.

Rather than necessarily two distinct modes, as Galenson (2006) suggests, I noticed myself switching frequently between what could be termed *experimental* and *conceptual* creative strategies in my own work. For example, from the outset of the project I formulated a spreadsheet with columns indicating various musical characteristics – tempo, 'key', time signature or shifts thereof, structural basis (i.e. pitch-class, serialism, intervallicism), mood, textural or timbral effect, and so on - which I filled out as each new composition was added to the portfolio. This conceptual process allowed me to keep track of the status of the portfolio, to identify what composition methods or types of improvisation were lacking and to avoid the overuse of any particular technique or trope. At the same time, some compositions emerged

intuitively or experimentally with minimal consideration of this spreadsheet, and were later altered with a more systematic eye to address any obvious repetitions of or gaps in construction in the portfolio.

1.3.3 Systematic and intuitive processes in this portfolio

I often found that pieces in which I set clear and rigid, or systematic constraints from the outset (i.e. a *conceptual* overview), or was responding directly to a piece of imagery or prose, developed far faster than those in which I took a largely intuitive or improvisatory (i.e. experimental) approach. In my composition *Dreamreader*, for example, I set out to emulate the vibrant, ethereal imagery evoked by Haruki Murikami in his novel *Hard-Boiled Wonderland and the End of the World*. To do so, I used a systematic method of generating seed content that narrowed the scope of possibilities: the piece is based entirely on various permutations of a cycle of four pitch-class sets ([0125], [0126], [0127] and [0147]). To generate the seed material each set was transposed up a minor third three times (i.e. through a diminished 7th chord) from its starting ‘key’ before the next set in the series is used, and each subsequent set starts in the ‘key’ a semitone above its precursor. Setting these constraints meant the working pitch material of each pitch-class set was fixed from the outset, eliminating one of the main decision making processes when seeking to configure chord voicings with smooth voice-leading.

I took a similar approach to much of the seed material in the quartet portfolio (in particular, pieces such as *Mammoth*, *Primed* and *In the crepuscular forest of forked paths...*), by first deriving a sequence of pitch-class sets and filling in a scaffold of working material (generally in the form of chord voicings) before beginning to add the rhythmic elements of the music. In this way I arrived more quickly at the finished works much through a conceptual process of clear planning and schematisation, similar to that used by Picasso.

In some cases where this schematisation was less rigid I felt the development of a piece flowed far less easily. For example, *Meander* and *Spire*, for solo piano, are based entirely on opening intervallic statements subsequently developed by ear as opposed to through a systematic process. With these pieces the un-limited scope of possibilities meant the musical decision-making process was often significantly more protracted, involving the trialling of multiple permutations of various phrases, keys of modulation, textures of harmony, density and tempo of melodic line, and so on. In cases such as this, by reducing the compositional

constraints I was *experimentally* searching for the compositional solutions via intuition and improvisation, in a similar way to Galenson's depiction of Cézanne.

That is not to say improvisation did not at times result in the quick emergence of pieces in their entirety. Several of the pieces consisting singularly of melodic statements for open-ended or time-no-changes improvisation – *Brighton Le-Sands, A.S.P.* and *Organic Melody #1* and even the lengthy *Extrap* for duo, for example – were completed in this way, through intuitive processes of the kind identified earlier by Nettle (1983) in Schubert and Mozart.

In a demonstration of the nebulous interaction of systematic and intuitive approaches, even in some pieces in which I had set a strict pre-determined structural system I treated this system with a high degree of flexibility. In the composition of *A Dance*, for example, I intuitively reordered the pitches of each twelve-tone row when I feel that doing so resulted in better melodic and harmonic choices. Figure 14 below offers one such example, where the melodic lines have a cascading effect.

Fig. 14: Flexible recombination of the order of pitches within tone-rows in *A Dance*, b.20-27

This see-sawing between conceptual and experimental, or systematic and intuitive modes is common amongst contemporary composer-improvisers. Saxophonist Anna Weber describes her take on the syntheses of the two forms:

I think it's pretty important for me to always try and listen as if I were just hearing the piece and not be so strict to the system. I tend to be very mathematical and heady when I write music, and I know that if I let that have its way then the music I write is shitty. I really need to use my ear. It tends to be super boxy otherwise; my compositions tend to be really sectional before I've edited them and made sure they sound like music. (Weber, 2014)

This balance of composition and improvisation, the systematic and intuitive, or conceptual and experimental models forms the basis of my analysis of the composition portfolio and audio recordings in Chapters Two, Three and Four. In navigating towards an equilibrium between the two modes, I found, similar to Anna Weber, that my music both maintained a structural integrity and available formula for motivic development, and offered me the creative freedom to be able to break these structural rules in order to lead to what I deemed to be ‘better’ musical choices. At the same time, incorporating improvisation as a core part of the creative process helped me to channel the vitality and surprise I find in spontaneous performance into more focused and developed works and sketches for future use.

The interaction of these processes is particularly obvious in the variety of scoring methods I adopt throughout the portfolio, which I discuss briefly over the following pages.

1.3.4 A note on the ontology of the musical work

Given the open-ended elements in many of these pieces and the frequent juxtaposition of fixed content and calls for improvised performer input, a brief discussion of the identity of musical works, or their ontology, is a necessary component of this analysis. Ontology as a branch of philosophy deals with questions concerning what entities exist or can be said to exist, and how such entities can be grouped, related within a hierarchy, and subdivided according to similarities and differences. In the case of improvisational content in composed music, for example, the pitch content and method of realization, and thus from this perspective, the identity of each interpretation may vary significantly from performance to performance, even if the guiding scores, templates or *referents* (see e.g. Pressing, 1984) or rules of engagement are the same (e.g. in performances of John Zorn's *Game Pieces*, see: van der Schyff, 2013).¹

As one of the secondary research aims of this project, I sought to investigate this impermanence of musical identity by combining various forms of improvisational and compositional pre-determinacy. Some pieces (particularly the works for *Solo Piano*) are fully notated with tempo and expressive articulations, and suggest a precise realization. At other

¹ This depiction of ontology does not consider the perspective of the listener. For example, a person may perceive the identity of a composition to be the same across subsequent performances, even though the pitch content, style of realisation, and so on are found to be different. Such an analysis lies outside the scope of this exegesis.

points I use Feldman-esque open notation, Lutoslawskian aleatory boxes, list voicings to be interpreted melodically, or in the case of my composition *Plink* offer a Cage-like array of notes with only minimal interpretation instructions; each technique positions the score as a vehicle for improvisation with a flexible identity. Figures 15, 16 and 17 below demonstrate preliminary examples of the use of some of these techniques:

Fig. 15: Open notation in *Extrap Part II*, for duo

2 **B** lyrically, with a hint of pulse
ad. lib on subsequent repeats

Fig. 16: Chord voicings for interpretation in the first solo section of *Haecceity*, for quartet, b.52-61

4 **E** solo form

F7(sus4) Cmaj7(b9) F#13(sus4)

E7sus(#11)

E(sus4)/G# Fm11(b13) Dmaj7(b9sus4)

Fig. 17: Time-space notation suggesting interpretive flexibility the opening sequences of *Plink*, for solo piano

In scoring these works in this way, I also set up the possibility of future edits or re-workings of the works based on subsequent improvised interpretations. Similar to Cézanne,

Pierre Boulez returned to and reworked his *Douze Notations pour piano* over more than six decades after its initial scoring at the age of 20. Novelist Vladimir Nabokov would seem to be a kindred spirit:

I have rewritten—often several times—every word I have ever published. My pencils outlast their erasers. (quoted in Temple, 2013)

I embraced this impermanence of score identity in much of the music for the *Duologue* portfolio I wrote for myself and saxophonist Martin Kay, which I describe in Chapter Four. Much in the way that Italian composer Giacinto Scelsi recorded his improvisations to tape and subsequently transcribed and edited them into compositions (Uitti, 1995), and similar to Hannan's (2006) process of comprovisation, I recorded our free improvisations together and derived a series of notated sketches which were subsequently used as stimulus for further improvisation. This circular process between the improvised and the composed could have continued with further editions and refinements of those improvisations into new versions of the sketches, and so on, and is further demonstrative of the interaction of Galenson's conceptual and experimental models, or systematic and intuitive processes.

1.3.5 Analytical frameworks

Throughout Chapters Two, Three and Four I use employ a number of qualitative research and analysis methods to underpin the discussion of my creative practice. To depict the various interactions of systematic and intuitive modes, for example, I utilize a version of Glaser's (1965) *Constant Comparative Method*: in which the comparison and categorization of my generative processes across different works in the portfolio flows on to the delineation of common and contrasting elements and theoretical conclusions and insights based on these observations. Glaser (1965, pp. 439-440) notes the cyclical nature of this approach:

...the constant comparative method is concerned with generating and plausibly suggesting (not provisionally testing) many properties and hypotheses about a general phenomenon. Although this method is a continuous growth process - each stage after a time transforms itself into the next - previous stages remain in operation throughout the analysis and provide continuous development to the following stage until the analysis is terminated.

At the same time, I base my accounts of the creative process on my aforementioned reflective journals, notes and structural markings taken while developing the works (i.e. the various systematic ways I used and transformed pitch-class sets), while also punctuating this analysis with observations constructed in hindsight – a process through which Norman Denzin's (2014) book *Interpretive Autoethnography* provided a valuable resource. In the analytical

process itself I take a lead from the sort of style of cross-referencing and reduction of components (for example, long chords into small rhythmic units or stemless notation for easy of comparison) used by scholars such as Cohn (1996).

1.4 Summary and Portfolio Overview

A man's work is nothing but this slow trek
to rediscover through the detours of art
those two or three great and simple images
in whose presence his heart first opened. – *Philosopher Albert Camus* (quoted in Walker, 1969)

Like Camus eloquently depicts, this exegesis and its adjacent portfolio of creative works represent my attempt to synergise the worlds of jazz improvisation and formal composition that have occupied my fascination in parallel since my teenage years.

In this chapter I explored the intersection of improvisation and composition and the intuitive and systematic lenses, and offered a preliminary analysis of my synthesis of these modes of working through my use of pitch-class sets, serialism and intervallicism as primary working tools. Each of the following chapters of analysis investigates in further detail the interaction of these elements in each body of work, and depicts the variable equilibriums between improvised and composed activity in my practice.

Chapter Two examines a body of music I wrote for solo piano. With extensive detail in articulation, dynamic and performance instruction, this collection is by far the most compositionally intricate collection of works in this portfolio, although many of the pieces nonetheless demonstrate my regard of improvisation as a fundamental element in both the construction and performance process.

Chapter Three presents a group of works for my trio and quartet, in which I largely used pitch-class sets as primary constructions and sought to equally balance improvisation and composition. For example, at points the improvisers are required to work with a set framework of pitch-classes derived from the score, which was a new and challenging concept to the musicians who performed the works.

In Chapter Four I detail my collaboration with the saxophonist Martin Kay, and the series of sketches I derived from my performances in our improvisations together. Intended as templates for flexible interpretation, this collection of scores are by far the most improvisation-

centric of the portfolio, but also the most reflective of a balanced synergy of systematic and intuitive working.

In Chapter Five I outline the potential creative or pedagogical applications of this research and identify areas for future academic inquiry in this area, in the process positioning my research at a nexus between jazz music, post-tonal composition and experimental improvisation. Finally, I conclude this exegesis with a summary report on the findings of the study and impact of this project and on my practice and musical aesthetic.

Chapter Two: *Hatch* - Solo Piano

2.1 Background

Solitude gives birth to the original in us, to beauty unfamiliar and perilous — to poetry.
- *Novelist and social critic Thomas Mann* (1930, p. 24)

You cannot teach a man anything, you can only help him find it within himself.
- *Galileo Galilei, Astronomer* (quoted in Carnegie, 1936, p. 130)

This collection of music for solo piano is the result of my exploration of two parallel interests – the use of serialism and intervallicism as creative tools, and of improvisation as a principal technique for generating and expanding material. At the same time, at 19 pieces and a total running time of close to 2 hours, this music represents some of the more compositionally-focused in the portfolio in the extent and intricacy of notated detail. As such, the works broadly span the spectrum between systematic and intuitive or composed and improvised. They also represent an apex in my search for an original voice alongside the immense body of existing music for piano.

I wrote these pieces with the intent that they sit somewhere between concert performance repertoire, pedagogical tools and calls to action for both non-improvisers and improvisers alike. Each piece systematically explores a different approach to facilitating creative performance by inviting the performer to interpret, recombine, ornament, extend or freely improvise from given structures or instructions, establishing the potentiality for many and varied possible realizations. These calls to improvisatory action offer the performer both an insight into the constructive principals behind each work and optimally, as Galileo would seem to have endorsed, a platform for their own spontaneous creative inventions and explorations.

As an improviser, to me most of these pieces feel incomplete without at least some injection of the openness, unpredictability and surprise of improvisation. As such, they are not intended to be merely interpreted in the way that Sparti (2016, p. 189) sees it:

Interpretation does not imply any deliberate departing from the score (contingency) nor the genesis of any new musical material in the course of a performance (inseparability), nor does it suggest that the musicians break apart and recombine a given text in new musical statements, changing structural properties such as melody, harmony or time.

Assigning such autonomy to the performer may seem risky. Composers during the latter Baroque era began to rail against what they perceived as the tasteless, exaggerated improvised ornamentations made by interpreters of their music. C.P.E. Bach famously exclaimed:

It is this embellishing alone, especially if it is coupled with a long and sometimes bizarrely ornamented cadenza, that often squeezes the bravos out of most listeners. How lamentably are these two adornments of performance misused! (quoted in Ferand, 1961, p. 20)

In part as a result of these qualms, over time the rich tradition of Baroque improvisation and ornamentation faded as composers articulated their music with increasing specificity. However, as my collaboration with pianist and Associate Professor at the Sydney Conservatorium of Music Stephanie McCallum detailed in this chapter demonstrates, it is far from a big leap for intuitive and musical non-improvisers to take on and excel at improvisation. This is what I seek to facilitate with these works.

In recent years contemporary classical musicians have taken exactly this approach by re-embracing improvisation in their realizations of the works of modernist composers, which are either written with improvisation in mind, or particularly tend themselves to creative extrapolation. For example, American pianist Conrad Tao recently recorded improvised takes on the music of Pierre Boulez, Arnold Schoenberg, Morton Feldman and Elliott Carter in collaboration with drummer and professor Tyshawn Sorey. In a similar process albeit poles apart stylistically, pianist Robert Levin identifies the virtues in the ability to produce improvised thoughts from the templates left by composers such as Mozart:

The difference between a performer who prepares embellishments or cadenzas and one who improvises them is analogous to the difference between the beginning language student who can only replicate sentences taken from a phrase book, and one who has progressed to the point at which it is possible to leap into the creative world of defining thoughts within the new language. (Levin, 1992, p. 222)

My compositions in this collection clearly exhibit influences from the diverse milieu of piano music that I've played over the years, and in which I've found inspiration as a composer and improviser:

- *Tag!* and *Canon* divulge a love of counterpoint, marrying the linearity of Bach with free atonality of Hindemith's *Ludus Tonalis*;
- *Mice* echoes Debussy's early 20th century character pieces, with its quirky melody and bi-tonal tendencies;
- *Homage* uses Messiaen's third mode of limited transposition as a stimulus for a grandiose and increasingly harmonically dense melody;

- *Codify*, *Microcosm* and *Loopimal* are platforms for improvisation inspired by the cellular melodies and phasing characteristic of pianist Matt Mitchell's solo pieces and Steve Reich's music respectively;
- *Events* is an open ended template for flexible interpretation similar to Cornelius Cardew's *February Pieces* or Australian pianist and composer Michael Hannan's *Three improvisatory mobiles* (1981);
- *Dreamreader* adopts the stemless notation characteristic of Morton Feldman's piano music while also – for the most part counter to Feldman's aesthetic – calling upon the performer to use the piece's inherent structures for their own personal improvisatory ends.

I drew ideas for methods of facilitating and notating improvisation in these pieces from a range of recent studies in improvisation pedagogy (see, e.g. Chyu, 2004; Yang, 2004), as well as existing bodies of composed material aimed to encourage improvisation such as Ross Lee Finney's *Piano Games* (1968) (see Rodgers, 1991) and Samuel Adler's *Gradus* books.

I use textual instructions for improvisation in many of these pieces in a similar manner to John Zorn's game pieces. I do however avoid any significant exploration of non-conventional or graphic scoring in the style of say, Earle Brown's *December 1952*, or Cornelius Cardew's *Treatise* (1967). I also intentionally avoided any use of prepared piano, which remains an emerging area of interest in my practice, and has otherwise been thoroughly explored by John Cage in his *Sonatas and Interludes* (1948) and more recently in an improvisatory setting by French pianist Benoît Delbecq in his solo piano album *Circles and Calligrams* (2010), American pianist Kris Davis in her recording *Massive Threads* (2013), and at various stages by Australian pianists Eric Griswold, Roger Frampton, Anthony Pateras Cornelis Fuhler.

This collection is split into four parts:

1. A group of eight thematically interrelated pieces that form the *Piano Suite*;
2. A miscellaneous group of distinct works;
3. A series of more open-ended scores I devised to serve as the basis for semi-structured improvisation.
4. In recording this music, I also improvised several short, largely free interludes that are included in the attached audio – some of which echo motifs or constructive

principals used in the composed works of this portfolio, and which I discuss at the end of this chapter.

2.2 The Piano Suite

In studying the serialism canon, I was struck by Milton Babbitt's restrained lyricism in the two-voice counterpoint in the third of his *Three Compositions for Piano* (1947):

Fig. 18: Opening to *III* of Milton Babbitt's *Three Compositions for Piano*, (1947)



My composition *A Dance* in part reflects Babbitt's sense of melodicism and phrasing seen in these opening measures. As the first composition written for this portfolio, *A Dance* acts as a kind of parental overture to the rest of the suite. Nearly all the thematic material used in each subsequent piece was seeded from the tone row established in the opening few bars.

2.2.1 *A Dance*

Evoking the imagery of its title, the melodic contour and downbeat-focused rhythm of the exposition of *A Dance* alludes to the "5, 6, 7, 8" count off cliché used by dance teachers. The row itself contains all the intervals within an octave apart from a major 6th, as seen in Figure 19 below.

Fig. 19: Exposition of tone-row & suite seed material in *A Dance*, b.1-4

(and 5 and 6 and 7 and 8!)

The piece takes an AABAC, modified sonata form, where each section is clearly segmented by abrupt conclusions of phrase – almost as if the dance is undergoing a stop-start rehearsal under the guidance of a dissatisfied instructor. Each [A] section is split into two distinct themes, characterized respectively by a) the *Dance* theme established in bars 1-4, and b) a conversational interplay of wide-interval rising and falling phrase shapes between the right and left hand, similar although with a narrower range to that used in Babbitt's aforementioned work. Figure 20 shows the first exposition of this b. theme in bars 5-6, while Figure 21 shows its later development throughout bars 20-27:

Fig. 20: Exposition of b) theme of the [A] section of *A Dance*, b.5-6

Fig. 21: Falling phrase shapes and interplay between parts in the development of the b. theme of the [A] section to *A Dance*, b.20-27

Throughout the piece I experimented with a variety of pointillist melodic structures, as seen above particularly in bars 24 and 27 of Figure 21. I also occasionally reordered the pitches in each tone row to accommodate what were, to my ears, better intervallic configurations of the melodic line. Figure 22 below shows the preceding section again, this time with the tone rows and pitch orders marked (tone rows are analyzed using the absolute pitch method – i.e. where P_1 =the prime form of the row starting on the note C).

Fig. 22: Flexible recombination of the order of pitches within tone-rows in *A Dance*, b.20-27

The musical score for Figure 22 consists of two systems of piano music. The first system covers measures 20 to 23. Measure 20 starts with a *subito p* dynamic. Above the treble clef, there are labels [R11] and [P3]. Fingerings (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12) are indicated for various notes. The second system covers measures 24 to 27. Above the treble clef, there are labels [R4] and [P8]. Fingerings (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12) are indicated for various notes.

In thinking this way, I effectively split every tone row into a group of melodic cells within which the notes could be intuitively reordered to create a more interesting melody. Similarly, in reordering the pitches of each row, I sought to mix up the interval vectors of each melodic cell so that each permutation resulted in a different intervallic structure.

As such, *A Dance* is a prime example of my integration of serial, intervallic and pitch-class thinking. As the piece was written earlier in my candidature before I discovered pitch-class sets as a formal theory, it also evidences my intuitive use of the kind of chromatically dense vocabulary that is more fully explored through my systematic investigation of pitch-class sets in Chapters Three, Four and Five. For example, Figure 23 below demonstrates several unique pitch-class like melodic structures found in the opening passage of *A Dance*.

Fig. 23: Pitch-class structures implied in the opening passage of *A Dance*, b.1-19

The musical score for Figure 23 shows the opening passage of *A Dance* in 4/4 time. It features several unique pitch-class structures labeled as [016], [0235], [026], [0246], [0137], [0247], and [0134]. Dynamics like *b.5-6*, *b.8-9*, *b.12-13*, and *b.16-17* are indicated. The score is written for piano with treble and bass clefs.

Throughout *A Dance* I used a form of registral serialism in the construction of each phrase – where possible I avoided using the same note in the same octave across two consecutive melodic cells. In bar 21 of the previous Figure 22, for example, the reordered tone-

row creates a chromatic descent of the final note of the phrase from the previous bar (E to Eb), which continues again into bar 22 with the D on beat 2. I also maintained the see-sawing melodic contour that is characteristic of the piece; Figure 24 below demonstrates the difference in contour between the actual phrases (to the left of the dashed barline) and versions true to the order of the row (to the right of the dashed barline), with the implied pitch-set noted above each excerpt.

Fig. 24: Implied pitch-class sets, and reordering of tone-row pitches for the sake of continuity of melodic contour in *A Dance*, various bars between b.21-25.

Later in the piece, I juxtaposed this see-sawing melodic contour with a tandem appearance of a series of rows as an ambling contrapuntal left-hand accompaniment – the only point in the piece where two tone-rows appear simultaneously.

Fig. 25: Brief tandem use of tone-rows during the development section (B) of *A Dance*, b.77-85

In the final bars of the recapitulation of the [A] section I diminished the rhythmic durations of the accompaniment to set up a hemiola pattern in dotted quavers, while maintaining the same general intervallic contour – offering a brief respite from the previous imitative nature of the bass part. Contrary to the previous example in Figure 25, I returned to using just a single tone row to recapitulate the structural system of the opening bars:

Fig. 26: Hemiola pattern in the final bars of recapitulation of [A] section in *A Dance*, b.110-117.

Following this, the performer is tasked with utilizing material from the body of the work or inventing their own to improvise a brief cadenza. Figure 27 below depicts the selections chosen by pianist Stephanie McCallum in her interpretation of the section. It should be noted that despite having little experience with improvisation, Stephanie intuitively captured and expanded on the essence of the composition with next to no guidance from me beyond that written in the score.

The opening left hand melodies, for example, have similar intervallic shapes (although with unique pitch content) as those found in the bass part of the recapitulation of the [A] section (i.e. from b.95 to before the improvisation section at b.118). Stephanie's reference of other melodic structures from the composition (starting in the second system of the excerpt) also clearly lead her intuitively to improvising her own – establishing a prime example of the potential permeability of improvisation and composition.

Fig. 27: Stephanie McCallum piano improvisation on *A Dance*

improvisation --->

(b.110) (b.111) (b.112) improvisation --->

14

16

pp *f* (b.108)

2.2.2 *Plink*

A Dance spawned several offshoot works. In *Plink*, I used similar a contour of melody and registral serialism as in *A Dance* while exaggerating the latter's pointillist themes. As with *Progeny* from the quartet portfolio, *Plink* uses the same tone row as *A Dance*, and with its stemless time-space notation encourages the performer to take considerable liberty with the order and pacing of their interpretation (see Figure 28 below).

Fig. 28: Extreme pointillism, registral separation and tone row order in *Plink*, opening statements

The image displays a musical score for the opening statements of the piece *Plink*. It is presented in two columns, representing different interpretations. The left column shows the original composition, and the right column shows an improvised version. The score is written for piano, with treble and bass clefs. The original version (left) features a sequence of notes with labels [I10], [RI4], [P5], [P3], and [P8]. The improvised version (right) shows a different ordering and phrasing of these notes, with a speaker icon on the far right.

In my performance I break the piece into a series of movements of various lengths, to give an added element of structure to the otherwise structure-less environment. I recorded two complete passes of the material: the first as a literal time-space rendition with minimal improvisation, and the second with substantial improvised re-ordering, recombination and tempo fluctuations. The audio excerpts adjacent to Figure 28 above juxtapose these two approaches, with the player on the left representing the first pass (i.e. the composition), and the right player representing the second (the improvisation). In the improvised version, for example, the entry of the first two notes has been switched, I introduce a far broader range of phrase shapes and speeds than heard in the first reading, and the overall pace of the material is far quicker. As I discovered, taking this approach raised the prospect of many and varied final outcomes of the piece, each of which would nonetheless still demonstrate, to various degrees of obviousness, fragments of the identity of the original, non-improvised version in the approximated order, note choice, register, and intervallic contour of phrase structures.

2.2.3 *Tag!*

In *Tag!*, rather than use the *A Dance* row in its entirety I took intervallic fragments of the opening theme to create a new melody. Below, Figure 29 identifies these fragments in the opening bars of *Tag!* and Figure 30 marks their place within the row of *A Dance*:

Fig. 29: Theme and seed material of *Tag!*, b.1-6

Fig. 30: Appearance of *Tag!* fragments in exposition of row in *A Dance*, b.1-4

The title of *Tag!* comes from the canonic mirror-imaging technique that underpins the entire piece. As a result of this approach, the opening 19-bar phrase sees the two melodic lines spiral from a perfect 4th apart in b.2 to major 30th (i.e. compound major 2nd) in b.14:

Fig. 31: Continuation of canonic mirror-imaging technique in *Tag!*, b.7-19

The left hand takes the lead in the following section (marked in brackets in Figure 32 below), although here I transposed the entry of the right-hand complement down a semi-tone to maintain a more stable, consonant tonality throughout the following sequence. A few bars later in b.24 I inverted the contour of 3rd note of the mirror image in the treble melody for the same reason – the melody rises by a major third where the rule had suggested it descend. As with the reordering of tone-row pitches in *A Dance*, throughout *Tag!* I freely abandoned the systematic structure where intuition dictated a better melodic or harmonic option.

Fig. 32: Reversal in lead part in the continuation of the canonic mirror-imaging technique in *Tag!*, b.14-31

The musical score for Figure 32 consists of two systems of piano music. The first system, starting at measure 14, shows the left hand (bass clef) taking the lead with a melodic line, while the right hand (treble clef) provides accompaniment. The second system, starting at measure 20, shows the right hand taking the lead. A bracket in the treble staff of the second system highlights a specific melodic change, with the annotation "inversion of contour on 3rd note" written above it.

A similar moment occurs soon afterwards between b.43-44; the lower melody momentarily copies the contour of the upper part, resulting in an implied plagal cadence ([iv-I], or F minor to C major). The mirror imaging soon resumes in b.44, with a brief augmentation of the rhythmic duration of the echoing phrase to realign the two parts to within a bar by b.47. A few bars later in b.52-53 the lower melody once again echoes the contour of the upper line, resulting in a lyrical resolution:

Fig. 33: Momentary breaks of the mirror imaging rule in *Tag!*

The musical score for Figure 33 consists of two systems of piano music. The first system, starting at measure 39, shows the right hand (treble clef) taking the lead with a melodic line, while the left hand (bass clef) provides accompaniment. The second system, starting at measure 46, shows the right hand continuing the melodic line. A bracket in the treble staff of the second system highlights a specific melodic change, with the annotation "rhythmic augmentation..." written below it.

Later in the piece, I recombined a selection of the intervallic structures of the first few bars (major 2^{nds}, diminished 4^{ths}, and major and minor 6^{ths}) to create a wider 4:3 figure, echoing parts of *Plink* and *A Dance*. In Figure 34 the new theme appears both as an imitative canon in b.115-116 and tandem mirror image in b.117, and the excerpt concludes with an obvious resolution to the key of A minor:

Fig. 34: Sequential use of imitative canon and tandem mirror-imaging in *Tag!*, b.115-121

The musical score for Figure 34 is presented in piano notation across two staves (treble and bass clefs). It begins at measure 115. The melody in the treble clef starts with a quarter note G4, followed by quarter notes A4 and B4, and a half note C5. The bass clef accompaniment consists of a steady eighth-note pattern: G3, A3, B3, C4, D4, E4, F4, G4. In measure 116, the treble clef melody continues with quarter notes D5, E5, and F5, followed by a half note G5. The bass clef accompaniment continues with the same eighth-note pattern. In measure 117, the treble clef melody features a descending line: quarter notes G5, F5, E5, and a half note D5. The bass clef accompaniment continues with the eighth-note pattern. In measure 118, the treble clef melody has a quarter note C5, followed by quarter notes B4 and A4, and a half note G4. The bass clef accompaniment continues with the eighth-note pattern. In measure 119, the treble clef melody has a quarter note F4, followed by quarter notes E4 and D4, and a half note C4. The bass clef accompaniment continues with the eighth-note pattern. In measure 120, the treble clef melody has a quarter note B3, followed by quarter notes A3 and G3, and a half note F3. The bass clef accompaniment continues with the eighth-note pattern. In measure 121, the treble clef melody has a quarter note E3, followed by quarter notes D3 and C3, and a half note B2. The bass clef accompaniment continues with the eighth-note pattern. The score includes dynamic markings: *f* (forte) in measure 117 and *p* (piano) in measure 121. There are also articulation marks, including slurs and accents, over the notes in measures 116, 117, and 121.

The improvisation in *Tag!* consists of a return pass of the first section of melody from the start to b.81, where the performer is encouraged to either embellish or extend the written material – much like Baroque ornamentation or improvisation on a plainchant or *cantus firmus*. The audio excerpt below demonstrates the minor improvised embellishments I play in the opening phrases – a restrained interpretation that contrasts the more expansive free-form improvisations in this collection.



2.2.4 Canon

In the same way that *Tag!* was based on fragments of the *A Dance* row, *Canon* evolved through an imitative expansion of the individual fragments of the opening theme of *Tag!* (refer to Figure 35 for the source of the below fragment numbers).

Fig. 35: Exposition of the theme to *Canon*, b.1-4

The musical score for the exposition of the theme to *Canon* (measures 1-4) is presented in a grand staff format. The tempo is marked as quarter note = 72. The upper staff is in treble clef and the lower staff is in bass clef. The key signature is one sharp (F#). The dynamic is mezzo-piano (mp). The score is divided into two systems. The first system contains measures 1-8, and the second system contains measures 9-16. Brackets and boxed numbers identify specific fragments: [2] in measure 1, [1] in measures 2-3, [1] in measure 4, [1] in measure 5, [2a] in measure 6, [2a] in measure 7, [2] in measure 8, [2] in measure 9, [4] in measure 10, [1] in measure 11, [1] in measure 12, [2b] in measure 13, [1] in measure 14, [3] in measure 15, and [4] in measure 16. The piece starts with a mezzo-piano (mp) dynamic.

In the process, the opening fragment 2 – or the pitch-set [015] – was both augmented and diminished to form the sets 2a[014] and 2b[016], while the capricious use and ordering of the four fragments is an obvious result of the improvisatory construction of the theme. As the lower melody of each subsequent four bars in the piece was pre-determined by the leading upper line, I continued to improvise with the intervallic material of the initial theme to generate the complementing upper lead melodies, which in turn created the melody for the next four bars of the bass melody, and so on. Throughout, I targeted the downbeats with consonant intervals to balance the apparent atonality of the piece – in bars 5-8 (see Figure 36 below) for example, I achieve this by using largely themes 1 (or p.c. 013) and 4 (minor 6th interval).

Fig. 36: Development of melodic themes in upper voice and first entry of canon in lower voice in *Canon*, b.5-8

The imitative process only stops in the last few bars, where the two parts align to bring the piece to a close on an implied A minor tonality. In bars 29 & 30, the harmonizing melody part seen on the bottom of the treble clef dyads was added as an afterthought once the piece had been completed – once again I used themes [4] and [1] to further clarify the harmonies implied by the outer two melodies.

Fig. 37: Alignment of lines in the final bars of *Canon*, b.27-31

My improvisation on *Canon* (notated in its entirety on the following page) is an apt case study of how improvisation and composition intersect in my realization of these solo works.

Fig. 38: Piano improvisation on *Canon* (rhythm approximate)

The musical score is presented in six systems, each with a treble and bass clef staff. The key signature is B-flat major (two flats). The time signature is 4/4.

- System 1:** Features a melodic line in the treble staff with eighth-note patterns and a bass line with quarter notes. A dashed line above the treble staff indicates an *8va* (octave up) for the first two measures.
- System 2:** Continues the melodic and bass lines. A circled '8' with a dashed line above it indicates an *8va* for the first measure.
- System 3:** Shows a melodic line with a dashed line above it indicating an *8va* for the first measure. The bass line continues with quarter notes.
- System 4:** Starts at measure 9. The treble staff has a melodic line with a circled '9' above it. Measure 11 is marked with a circled '(b.11)'. The bass line has a circled '9' below it.
- System 5:** Starts at measure 12. The treble staff has a circled '12' above it. The bass line continues with quarter notes.
- System 6:** Starts at measure 14. The treble staff has a circled '14' above it. The bass line has a circled '2' above it. The system concludes with a double bar line and the text "into b.9".

Throughout the score, there are various musical notations including slurs, ties, and dynamic markings. A speaker icon is located on the right side of the page.

Figure 39 below continues the theme of the previous analysis by identifying a selection of the *Canon* themes found in the opening passages of my solo. By juxtaposing the structural principals of the composition with open-ended improvisation, this example demonstrates both the equilibrium of systematic and intuitive approaches in my practice, and the significant creative possibilities that emerge when the entire composed work is treated as a source of improvisational stimulus.

Fig. 39: Analysis of use of *Canon* themes in piano improvisation, first two systems

The image shows two systems of a piano score in 4/4 time. The score is annotated with various labels in brackets and boxes, indicating the use of specific *Canon* themes. The first system consists of two staves. The right staff has a melodic line with several phrases marked: [2c], [2a], [2e], [1], and [1]. Above the first two phrases, there is a dashed line labeled '8va'. Above the last phrase, there is another dashed line labeled '8va'. The left staff has a bass line with phrases marked: [4 - imitation], [4], [2d], [2a], [2d], and [2d]. The second system also consists of two staves. The right staff has phrases marked: [2b], [4], [1], [1], and [1]. Above the first phrase, there is a dashed line labeled '(8)'. The left staff has phrases marked: [4], [4], [1], [1], and [2d] [2d].

2.2.5 Cellular Stoicism

In contrast to *Canon*, *Cellular Stoicism* takes a minimal approach to its seed material: the entire piece is based on solely on the pitch class 3-2[013] found both in b.1 of *Tag!* and the second half of b.3 of *A Dance*. Where these two earlier pieces freely broke the rules set for their structure and development (i.e. mirror-imaging; the order of tone-row pitches respectively) each of the 3 parts in *Cellular Stoicism* adhere systematically to the fixed stepwise intervallic structure of the pitch-set. The result is a series of lyrical scalar statements with similar melodic motion, the constraints of which offer an opportunity to explore a rich harmonic backdrop. The opening theme sets the reflective, ambling mood of the piece:

Fig. 40: Recurrent, singular use of [013] pitch-class in the opening theme of *Cellular Stoicism*, b.1-5

♩ = 60 *expressivo*

pochiss rall. **a tempo**

Cellular Stoicism at times both echoes the contrary motion technique seen in *Tag!* and demonstrates a consistency of contour across the parts. In Figure 41 below, for example, the upper two parts ascend away from the descending bass, before each part reverses direction and winds steadily inwards:

Fig. 41: Contrary motion and use of scalar [013] pitch-set in *Cellular Stoicism*, b.34-41

34

38

pochiss rall.

The intervallic span between the three parts is expanded even further through contrary motion a few bars later, in b.56 of Figure 42 below:

Fig. 42: Contrary motion and wide intervallic span between lines in *Cellular Stoicism*, b.54-58

In the closing bars of *Cellular Stoicism* I take this contrary motion further, by sticking fairly systematically to the original [013] structure across all three parts, while augmenting the pacing of the material to expand the piece slowly out via a similar scalar motion to the outer ethereal reaches of the piano. I do intuitively break with the system at points in the treble (i.e. between b. 101 & 102, b. 105-106) and upper of the two bass clef parts (i.e. the three consecutive semitones between bars 100-106), where doing so resulted more in more satisfying harmonic colours.

Fig. 43: Closing bars of *Cellular Stoicism*, demonstrating rhythmic augmentation of [013] pitch-class

open repeats, ad lib.
fade to *fine*

2.2.6 *Mice*

I sought to explore a new approach to the *A Dance* material with each subsequent piece in the suite. In *Mice*, I evoke the kind of quirky motifs found in Debussy's works for children, particularly in pieces such as the *Serenade for the Doll* and *Golliwogs Cakewalk* from the *Children's Corner Suite* (1906-1908). The theme of *Mice* is based initially on major 6^{ths} – the only interval missing from the original tone-row of *A Dance* – between the upper and lower parts.

Fig. 44: Major 6^{ths} between treble and bass dyads in the introduction to *Mice*, b.1-4

playful, jumpy ♩ = 120

In Figure 44 above, the D major chord at the end of each phrase is coloured by the addition of the semitone underneath the top melody note, setting up a permutation of the pitch-class [0124]. In fact, the voicing sounds relatively consonant due to the previous establishment of the grace-note like structures in the opening bars. In my analysis of the quartet music in Chapter Three, I further explore the potential uses of pitch-sets like these to both suggest harmonic progressions and as substitutions for tonal chords.

As *Mice* continues, I contrast the 6^{ths} in the opening melody with a descending pattern of contrary motion stacked 5^{ths}:

Fig. 45: Stacked 5^{ths} motif in *Mice*, b.5-8

In the following bars, I introduced a folk-like bi-modal melody reminiscent of parts of Bartok's *Mikrokosmos*.

Fig. 46: Black key on white key bimodality in Bartok's Mikrokosmos no.125, from Book 5

125. Прогулка на лодке

Allegretto ♩ = 116

p, sempre legato

mf

Fig. 47: Black-on-white/white-on-black bimodality in *Mice*, b.13-20

13

17

3 sec

I returned to and expanded upon each of these three themes in order throughout *Mice*; where the initial rendition fills 20 bars, the second permutation spans almost three times as long at 58. At this point (bar 79,) the piece dissipates into a section of open-ended improvisation. Here, assuming the chord voicing in the left hand is the combined 3rd and 4th partials of a theoretical C2 and D2 fundamental, the aleatoric boxed notes represent the combined 8th to 16th partials of the harmonic series. The performer is expected to improvise using these shapes while sustaining the chord in the left hand, resulting in a layered milieu of overtones while continuing the grace-note style of the *Mice* theme. In my improvisation, I continue the theme of the folk-like melody introduced in the introduction, which in this case largely centres around

a G pentatonic melody with the addition of disguising chromatic passing tones (i.e. G#, A#, C#).

Fig. 48: Improvisation section in *Mice*

79

open improvisation
keep LH chord sustained by targeting overtones
use melodically
anti-metrical, wind into b.80

Around the time of writing *Mice* I had become more interested in long overlapping polyrhythmic phrase structures. I had had Ligeti's *Piano Etudes* playing on repeat and was struck by his use of rhythmic cycles; *Étude 8: Fém* starts with an 18/16 quaver cycle, while in *Étude 13: L'escalier du diable* Ligeti freely overlaps contrapuntal quaver phrases in 2s, 3s, 4s and 5s throughout the three desperately ascending pages towards the climax midway through the piece. In *Mice*, I recapitulated the bi-modal theme at the end of the piece with a recurring 7/9 quaver figure, which I conclude shortly after one complete 63-quaver cycle.

Fig. 49: 7/9 quaver polyrhythm over 2/4 in the final bars of *Mice*, b.136-144

7 quavers
8^{va}-----7

135

9 quavers

139

(8)

143

2.2.7 Avian Bagatelle & Odd-time Bagatelle

I used a similar polymetric figure in the brief development section of *Avian Bagatelle*, this time adopting a recurring 7/5 quaver pattern:

Fig. 50: Use of 7/5 quaver pattern in *Avian Bagatelle*, b.35-42

The musical score for Figure 50 shows measures 34-42 of *Avian Bagatelle*. The piece is in 5/8 time. The treble clef part begins at measure 34 with a mezzo-piano (*mp*) dynamic. The bass clef part has a steady eighth-note accompaniment. Brackets and a dashed line labeled '8vb' indicate the polymetric relationship between the two parts.

As an example of the permeability of themes and structural devices across the pieces in the *Piano Suite*, this polymetric technique appears again in the middle of *Odd-time Bagatelle*: this time as a cyclical pattern of a 5-quaver-unit ostinato over a 4-quaver-unit melody intervallically reminiscent of those found in *A Dance*. To systematically expand on a previously used technique, I took the same approach to targeting consonant intervals as in *Canon* and harmonized the treble ostinato using major and minor 3rds and 6ths, producing the 11-note row seen in bars 30-34 of Figure 51 below.

Fig. 51: 5/4 quaver pattern in *Odd-time Bagatelle* b.29-36

The musical score for Figure 51 shows measures 29-36 of *Odd-time Bagatelle*. The piece is in 5/4 time. The treble clef part has a cyclical pattern of a 5-quaver-unit ostinato. The bass clef part has a 4-quaver-unit melody.

To continue the systematic treatment of these rhythmic structures, I changed the style of this 5/4 polyrhythm near the end of *Odd-time Bagatelle* - where in Figure 51 the treble clef melody contained a melodic ostinato, Figure 52 contains two cycling melodic ostinato patterns.

Fig. 52: Variation on 5/4 polyrhythm in *Odd-time Bagatelle*, b.48-51

My use of these 7/9, 7/5 and 5/4 quaver patterns in *Odd-time Bagatelle* and *Avian Bagatelle* is demonstrative of the broad and systematic exploration of concepts I outline as an aim in the methodology – in this case the use of polyrhythmic structures.

Both the *Odd-time Bagatelle* and *Avian Bagatelle* also exhibit remnants of other themes from the suite: the major 6ths, major 2nds and perfect intervals in the opening ostinato in *Odd-time Bagatelle* echo the intervallic structure of the wide-interval phrases in *Tag!*, while *Avian Bagatelle* begins with a tandem use of the [013] pitch class seen at the start of *Tag!* and which forms the sole melodic basis of *Suite IV*:



Fig. 53: Permeability of *Piano Suite* themes: [013] pitch class in the opening bars of *Avian Bagatelle*, b.1-8

Both *Odd-time Bagatelle* and *Avian Bagatelle* contain sections of open improvisation, where I in each case take a similar approach to spontaneous thematic development as seen in the case

study of *Canon*. In *Odd-time Bagatelle*, the boxed notes in the opening bar (seen in Figure 54 and the adjacent audio excerpt below) catalyzes a lengthy prelude in which I quickly stray from the notated material while continuing to reference it throughout. Through recombinations of the pitch material and the adoption of the contour of the cell as an organizational guide, I clearly demonstrate the merging of systematic (i.e. the boxed notes and intervallic structures contained within) and intuitive (i.e. free transposition, addition of material from my own improvisatory vocabulary) processes.

Fig. 54: Improvisation section in *Odd-time Bagatelle*

♩=220 brisk, playful
open improv

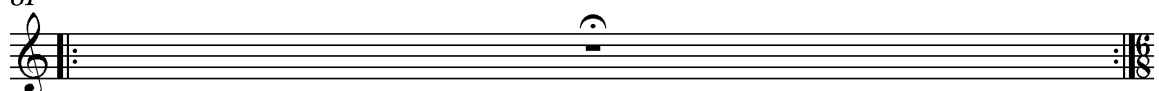




In contrast, the two improvisation sections in *Avian Bagatelle* appear in the middle and end of the piece, and continue the free-tonality counterpoint established by the composition – first in the upper registers at a quiet dynamic, and concluding with a brief but explosive passage in the lower register. These two sections can be heard in the audio below, and further depict my intuitive adoption and improvisatory expansion of the themes of a composition.

Fig. 55: Guide text to the two improvisation sections in *Avian Bagatelle*



short improvisation
start pianissimo
two lines as per head (freely borrow)
in upper registers
dissipate and fade to nothing

81

open improvisation
start forte
two lines as per head (freely borrow)
in lower registers
finish with a bang!

99

2.3 Miscellaneous Works for Piano

This portfolio also contains a group of standalone pieces that explore techniques not used in the *Piano Suite*. Each piece is for the most part based on a distinct intervallic system, and a few of the pieces take inspiration from literary sources.

2.3.1 *Dreamreader*

Dreamreader is inspired by the vivid, mystical imagery evoked by Haruki Murikami in his novel *Hard-Boiled Wonderland and the End of the World* (1985). Split into two parallel narratives set respectively in a Kafkaesque modern day Tokyo and walled village surrounded by foreboding forests and golden beasts, Murikami explores the nature of consciousness and the self through each protagonist's journey through their respective worlds.

In much of the music for quartet discussed in Chapter Three, I use a sequence of distinct pitch-class sets to generate seed material for each composition. I took the same approach in *Dreamreader*, by adopting a restrained group of just four closely related sets.

Pitch-class set seeds of *Dreamreader*: 4-4[0125], 4-18[0147], 4-5[0126], 4-2[0124]

In formulating the textural aesthetic of the piece, I sought to emulate various aspects of the ethereal landscape of “the End of the World”, and the narrator's slow assimilation into it and gradual comprehension of its nature and function. In doing so I took a great deal of inspiration from Toru Takemitsu's music, particularly the spacious fragility and variability of phrase paces and melodic and harmonic structures in his solo piano and chamber pieces such as *Rain Spell* (1982) and *Litany* (1989). The opening iterations of the pitch-classes, with the exposition of a series of widely spread chord voicings, set the scene of the deceptively docile Town, surrounded by the ominous Woods and the story's metaphorical, impenetrable walls:

Fig. 56: Opening theme of *Dreamreader*: (“the Town”)

fragile, haunting
freely, with spaciousness
adhere to note durations
slurs mark phrases
barlines mark end of sections

"the Town"

As with many of the works for quartet discussed in Chapter Three, in *Dreamreader I* explore the various permutations of intervallic structures and harmonic colours possible within each seed pitch-class set. I used a thoroughly systematic process of transposition throughout the piece:

1. The ‘key’ or transposition of the notes in the first pitch class in a sequence is derived through improvisation, with a consideration of the voice leading from the previous event.
2. This pitch class is then inverted within itself (i.e. the outer two notes of the cell remain constant). Together, step 1 & 2 result in one prime and one inverted form of the initial pitch-class.
3. Each pair of pitch-class cells is then transposed up by a minor 3rd, three times (outlining a diminished 7 chord, and forming four groups of two pairs of pitch-class cells)
4. The intervallic structures within each subsequent pair of pitch-class cells is freely reordered, and with a consideration of voice-leading, arranged to form a series of chord voicings, all permutations of the same pitch-class.
5. Steps 1-4 are then repeated for each subsequent pitch-class set in the sequence, and the starting note or the ‘key’ for that collection of voicings is transposed up a semitone from that of the first cell pair of the previous pitch-class.
6. Each sequence of the composition uses 3 of the 4 pitch-classes, in the order seen below:
 - [0125], [0147], [0126]
 - [0126], [0125], [0124]
 - [0124], [0126], [0125], (with the addition of [0147])
 - D.C. (partial chronological recapitulation)

The piece begins in the ‘key’ of C, and so by the 3rd system has progressed upwards by two semitones. Figure 57 below marks each pair of cells in brackets – each a permutation of the pitch-class [0126] – and demonstrates the minor 3rd transposition of the ‘key’ of each pair.

Fig. 57: Third system of *Dreamreader*: (“the Town”), with cell pairs in brackets and transpositions marked

The image shows a musical score for the third system of *Dreamreader*. It consists of two staves, a treble clef on top and a bass clef on the bottom. The music is written in a key signature of two sharps (D major). The score is divided into four measures, each containing a pair of pitch-class cells. Above each pair of cells, a bracket indicates the pitch-class set: [D] for the first pair, [F] for the second, [Ab] for the third, and [B] for the fourth. The notes are primarily eighth and sixteenth notes, with some rests. The bass staff has a few longer notes, including a half note and a whole note. The overall texture is dense and rhythmic.

In the 4th system (i.e. the beginning of sequence 2) I introduce the theme of “the Birds” – seemingly the only animal capable of surmounting the walls around the Town - with a fluttering, Messiaen-like rendering of the first pair [0126] pitch-set cells, followed by a brief intrusion of “the Pool” theme. Characterized here by a quick, spiraling melodic line, the whirlpool represents the only apparent escape route from the End of the World. Although the narrator himself is unaware of its existence until much later in the tale, it nonetheless peeks through the fabric of the piece. Throughout *Dreamreader I* sought to systematically characterize

each theme with a different structural device, intervallic structure or mood of realization – as can be seen clearly in the juxtaposing of the two themes in Figure 58 below.

Fig. 58: Introduction of “the Birds” and “the Pool” themes, with remnants of “the Town”, 4th and 5th systems of *Dreamreader*

A few systems later a series of spectral chords herald the entry of the “the Shadow” theme: a representation of the narrators vestigial alter-ego separated from him upon his entry to the Town.

Something has summoned me here. Something intractable. And for this, I have forfeited by shadow and my memory. – *the Narrator, End of the World*

Fig. 59: “The Shadow” theme in *Dreamreader*, 11-13th events

The use of spectralism at this point required a period of systematic of study. For example, each of the spectral chords in Figure 59 above contain one of the four four-note pitch-class sets that form the basis of the composition (i.e. the upper four notes of the chord in the first bar of the excerpt constitute an [0126]; similarly the upper three notes and lowest note in

the chord in bar 3 of the excerpt constitute an [0125]). Using an online harmonic series calculator, I first located these structures in close position from amongst the upper partials of a harmonic series (using the “key” of the composition at that point as the fundamental), and subsequently added additional pitch material in both the treble and bass staves designed to active or further enhance these harmonics. I based this material around the lower, more resonant partials of the series while intuitively adding additional notes at will from outside the systems of the piece.

For example, in Figure 59 above, the chord is formed from the 9th, 12th, 15th, 16th and 17th partials of an F fundamental: the subsequent line in the bass clef activates the upper harmonics with the 5rd(A), 6th(C), and 7th(Eb) partials, masked by the the addition of two chromatic passing tones (G# and Bb). Similarly, in the third bar the treble stave chord represents the 7th, 9th, 11th and 15th partials (with the 13th raised a semitone from a G to a G#) of the B fundamental heard shortly afterwards in the bass. Here, the Ab-G dyad added from outside the series again masks the obvious tonality of the subsequent 5rd, 6th and 7th partials (i.e. 3rd, 5th, and 7th of the chord) within the line.

At the end of the tale, the narrator and the Shadow sneak through the woods and trudge through the snow to the Pool, where the narrator ultimately changes his mind about their escape and bids his adamant shadow farewell, heading back Town to further understand the mysteries of the End of the World:

Fig. 60: Recapitulation of “the Pool” and “The Town” themes at the end of *Dreamreader*

The musical score for Figure 60 consists of two systems of staves. The first system has a treble clef staff on top and a bass clef staff on the bottom. The treble staff contains a melodic line with a slur over the first four notes and a fermata over the fifth. The bass staff contains a bass line with a slur over the first four notes and a fermata over the fifth. The second system has a treble clef staff on top and a bass clef staff on the bottom. The treble staff contains a melodic line with a slur over the first four notes and a fermata over the fifth. The bass staff contains a bass line with a slur over the first four notes and a fermata over the fifth. The text "spaciously, as per start" is written between the two systems.

Improvisation appears in two forms in *Dreamreader*. The first consists of the brief improvised embellishments or repeats of individual events I added in my performance, as heard in the below excerpt of the recording of event 6.

Fig. 61: Improvised embellishment and extension in my performance of *Dreamreader*

The musical score for Figure 61 consists of two staves, treble and bass clef. The treble staff begins with a measure marked '6'. The music features wide intervals and some chromatic movement. A speaker icon is positioned to the right of the score.

The second is the longer cadenza section marked near the end of the piece. As with the improvisations discussed throughout this chapter, I grab fragments of material from the body of the composition to act as creative stimulus. Throughout, my use of each fragment ranges from verbatim referencing (i.e. systematic) to substantial expansion, where the seed material provides just a basic shape of melodic contour, or an intervallic structure for chord voicings (i.e. an intuitive process). In the audio excerpt below I begin my improvisation by continuing the upper-register wide-interval lines, gradually morph into selections of material from the same page, before returning to the cadenza system to bookend the solo.

The musical score for Figure 62 is a longer section starting at measure 23. It features complex rhythmic patterns and wide intervals in both staves. A speaker icon is positioned to the right of the score.

***optional open cadenza
freely select material from this system or the rest of the piece.**

2.3.2 *Events*

Similar to *Dreamreader*, *Events* occurs entirely in a timeless environment, and while the notated durations offer a guide to the speed of each phrase, the performer is free to explore varied interpretations of each segment. Guided by the insights gleaned from the previously discussed pieces, in the construction of the work I used improvisation to explore the various melodic, harmonic and textural possibilities of the two distinct themes established with the exposition of the tone-row in the opening few bars.

Fig. 62: Exposition of the tone-row in *Events*, opening bars

In the improvisation section near the end of the piece, the performer is encouraged to gradually blur the entries and content of each triad or hexachord by transposing, fragmenting, inverting or otherwise expanding the notated chords both harmonically and by inventing their own linking melodies. As a further example of my synthesis of systematic and intuitive processes, I derived the notated content of each bar through improvisation with the selected tone row – each bar represents one possible arrangement of the pitch material of the row. As with *Dreamreader*, this section segues into a free improvisation based on any fragment or entirety of previous material, which in turn heralds the recapitulation of the opening three motifs to conclude the piece.

As the instructions suggest, in the audio excerpt below I freely merge each cell and vary the pacing of the use of the material – at points breezing through longer strings of content, at points stopping to explore an interesting combination or idea come across in the course of the performance. As with the time-space notation in *Plink*, through this process of recombination and reordering *Events* potentially facilitates many and varied outcomes of this improvisation section, and accordingly examples of the merging of systematic and intuitive approaches.

Fig. 63: Improvisation section of *Events*

28 3

loop and vary rhythm
ad lib. & lyrically merge cells
freely reorder material

31

rit. * rit. * rit. * rit. * rit. * rit. *



2.3.3 *Spire*

Spire grew largely out of an initial few bars of material that I discovered during an open-ended improvisation. Figure 64 below demonstrates the first expansion of the descending triadic melodic motif seen on beat 3 of the opening bar, through a sequence of subsequent triads and harmonizing root notes:

Fig. 64: Opening theme of *Spire*, b.1-7

♩ = 90 animated

mp

f

ped * ped * ped *

4 poco decresc...

mf

mp

ped * ped * ped * ped *

This opening theme reoccurs four times throughout the piece, each time in a slightly varied permutation. For example, in the second form of the theme I used different intervallic relationships between the upper and lower parts, while maintaining their original structure and contour: at the start of the second bar of the second permutation I used a C/Ab over the original B/C, at the start of the third bar I used a Bm/A in the place of the Bbm/Eb of the original. In each case the new combination was derived through improvisation, by experimenting with the various colours of triads over root notes while considering the voice-leading of the passage:

Fig. 65: Second permutation of opening theme in *Spire*, b.8-10

8

ped sim ad lib. throughout

Later in the piece, I used two melodic fragments from the first bar of the second permutation (marked in brackets in Figure 66 below) to generate a spiraling series of imitative lines in the piano's upper register. In Figure 67, each 4-note cell in the treble staff is a translation of the second fragment in Figure 66, while each melodic cell in the bass staff is a translation of the first fragment in Figure 66. Each cell appears in a different transposition throughout the passage, while the overlapping lines and rapidly shifting time signatures reflect the improvisation technique I adopted in the process:

Fig. 66: Second permutation of opening theme in *Spire*, b.8

Fig. 67: Development of fragment of second permutation in *Spire*, b.51-56

This passage transitions into a climactic sequence of registrally expanded, cascading melodic lines, reversing the ascendant contour of the previous section. Once again I took melodic structures from parts of the opening theme: b.71 uses an expanded 5-note fragment of b.8, and b.74 uses a 6-note fragment taken from the end of b.8 and start of b.9 – these two examples are shown in Figures 68 and 69 below.

Fig. 68: Further reworking of seed themes in *Spire*, b.71-76

slightly faster

15va 8va 15va 8va

71 *ped.* * *ped.* *

74 *ped.* * *ped sim.*

Fig. 69: Seed themes for Figure 68 (above) in *Spire*, b.8-9

8 b.71

ped sim ad lib. throughout b.74

The seed themes are similarly reworked a few bars later using fragments from b.1-2. Where I had previously used fragments in their chronological form, in this case I instead reordered the pitches of the fragment to set up an alternate intervallic structure. Figures 70 and 71 identify this fragment and demonstrate its later use in b.91:

Fig. 70: Seed theme for passage at b.91 in the opening bar of *Spire*

♩ = 90 animated

mp *f*

ped sim ad lib. throughout b.91

Fig. 71: Expanded use of seed theme identified in Fig. 55, b.91-92 of *Spire*

In b.93 I transformed the material again by taking a fragment of the re-ordered fragment seen in b.91. I considered this new 5-note cell to be the pitch-class [01367] and transformed it through transposition and re-ordering of its intervallic structures over the subsequent bars, while maintaining fluid transitions between the voices of individual cells:

Fig. 72: Derivation and development of the pitch class [01367] from a fragment of b.93

By intuitively switching between and developing new constructive techniques throughout my composition of *Spire*, the piece stands in contrast to a work such as *Dreamreader* where I implemented a systematic plan for the work's development from the outset. As I mentioned in the introduction, I found this open-ended, relatively plan-less approach to composition to in fact be the most creatively unpredictable and difficult to reach a satisfactory outcome; I continued to edit and rework sections of *Spire* over a roughly two-year period from its inception until I submitted this exegesis, whereas *Dreamreader* was completed within a span of a few weeks and left fundamentally unchanged. My improvisation on *Spire* takes a similar form to the other works in this collection – it begins with the notated guide structures (seen in Figure 73 below) and transitions into an open-ended re-imagining of material from the body of the work.

Fig. 73: Guide structures at the opening of the improvisation section in *Spire*, b.114



2.3.4 *Meander*

Meander grew out of an initial bar of melody in a similar way to *Spire*, and the fundamental contours of the two seeds motifs are similar by inversion. Yet the two pieces exhibit markedly different moods and approaches to thematic development; contrary to the active agitation of *Spire*, *Meander* ambles gently along in three contrapuntal parts – a step-wise accompaniment and slightly more ranging melody. As with several of the other pieces in this collection I came to the theme of *Meander* through improvisation, and the initial 9 bars emerged fairly intuitively in its entirety. Figure 74 below identifies the intervallic structure of the first bar that frequently returns throughout the piece, and the implied [V-i] into Ab minor that concludes the opening theme.

Fig. 74: Opening themes in *Meander*, b.1-9

♩ = 70 misterioso, espressivo

The musical score for the opening of *Meander* (measures 1-9) is presented in a grand staff. The tempo is marked as **♩ = 70 misterioso, espressivo**. The music is in 4/4 time and the key signature is one flat (Ab minor). The first bar (b.1) is marked **mp** and is highlighted with a bracket. The score concludes at measure 9.

Two consecutive statements of the intervallic structure of b.1 herald the entry of the second [A] section, as seen in Figure 75 below.

Fig. 75: Appearance of theme in the left hand in *Meander*, b.15-17

The musical score for the appearance of the theme in the left hand (measures 15-17) is presented in a grand staff. The music is in 4/4 time and the key signature is one flat (Ab minor). The left hand plays a melodic line that mirrors the intervallic structure of the first bar, while the right hand provides a more active accompaniment.

Later in the piece I used the same structure in contrary motion in anticipation of the recapitulation of the opening theme.

Fig. 76: Contrary motion use of the opening theme leading to recapitulation in *Meander*, b.50-55

a tempo

In my improvisation on *Meander* I maintained the ambling lyrical melodicism of the composition and used the implied harmonies of the opening 9-bar statement as a stimulus for a quasi-tonal, almost Classical-era interlude; echoing b.8-9, I conclude the final phrase of the solo with effectively a II-V-i into Bb minor – the F#m triad in the penultimate bar functions in this context as a V⁷(#5#9). In fact, the first two bars can also be interpreted as part of a longer V-of-V-of-V-of-V-I progression – in jazz practice, Eb^{min7} – Ab^{m6} leading into C major is a common re-harmonization of a II-V-I, as the chord scales and 3rd and 7th of the two sequences (i.e. the two tones that dictate chord quality) are practically identical. I was surprised to uncover this logic in this improvisation, as I can attest that in performance this sequence was entirely intuitive, with the exception perhaps of the final V-i.

Fig. 77: Final phrases of piano improvisation on *Meander*, echoing the implied functional harmony of the composition

2.3.5 *See-Saw*

As with pieces like *Cellular Stoicism* and *Organic Melody #1*, in *See-saw* I used a single simple interval as a structural seed. In this case each bar is split into two 4-note broken-chords, each consisting of a combination of two major or minor 6ths: one derived from the Ab major scale and one from the A major scale. *See-Saw* grew intuitively out of a protracted improvisation with this structure: I experimented with various combinations of 6ths from the two keys until I came upon a sequence that was both melodically and harmonically satisfying. Figure 78 demonstrates the resulting frequent shifts in the position (i.e. in the treble or bass clef) of each parent major scale (relative to each scale the notes sometimes appear as enharmonically incorrect in the interest of the legibility and consistency of each passage):

Fig. 78: Opening bars of *See-Saw*, demonstrating broken chord technique and with parent scale of melodic shapes marked

The musical score for Figure 78 shows the opening bars of *See-Saw*. It is written in 4/4 time and consists of two staves: a treble clef staff and a bass clef staff. The music is characterized by broken chords and melodic lines. Above the treble staff, brackets indicate the parent major scale for each melodic shape: Abmaj, Amaj, Amaj, Amaj, Abmaj, and Abmaj. Below the bass staff, brackets indicate the parent major scale for each broken chord: Amaj, Abmaj, Abmaj, Abmaj, Amaj, and Amaj. The notes are often enharmonically incorrect relative to the parent scale. At the bottom of the score, there are markings: 'Ped.' under the first Amaj chord, an asterisk under the first Abmaj chord, 'Ped.' under the second Abmaj chord, an asterisk under the second Abmaj chord, 'Ped.' under the third Abmaj chord, an asterisk under the third Abmaj chord, 'Ped.' under the first Amaj chord, an asterisk under the first Amaj chord, and 'ped cont sim.' under the second Amaj chord.

I continued the technique throughout the first 40 or so bars before gradually phasing it out. By bar 65, for example, I had left the strict bitonality behind in favour of a series of shifting single-scale chord colours. For the sake of notational clarity, I refer to the stemless score I made for myself used as a performance guide – as the broken chord structure does not change throughout, realizing the piece is simply a matter of consistently applying the technique.

Fig. 79: Transition to simple single modality in chord structures of *See-Saw*

The musical score for Figure 79 shows the transition to simple single modality in chord structures of *See-Saw*, starting at bar 65. It is written in 4/4 time and consists of two staves: a treble clef staff and a bass clef staff. The music is characterized by simple single modality in chord structures. The notes are often enharmonically incorrect relative to the parent scale.

The improvisation section at the start of the piece takes the upper line of the opening melody as a call to action. I noticed that any more than three repeats of this melody started to veer this section towards being a piece unto itself, rather than a simple exposition. Nonetheless, in the audio excerpt below I intuitively venture relatively far from the notated material through the addition surrounding chromatic and scale tones.

Fig. 80: Seed melodies for improvisation at the start of *See-Saw*

**freely, ad. lib.
vary tempo
single line only
no more than 3 times**

2.3.6 *Homage*

I took a similar approach to the guided improvisation in *Homage*. Here, the performer is required to freely extend and harmonically colour the aleatoric hexachord melody boxes, gradually synthesizing the two boxes across both hands if desired.

Fig. 81: Aleatoric hexachords and textual instruction for open-ended realisation in *Homage*.

33

**This melody is based on two hexachords
Use these as stimulus for an open-ended free improv
Freely merge the two sets
Notes may be played in any order
Experiment with varied paces and moods
(i.e. shift between sombre and quirky, close position and pointilist, legato and staccato)
Dynamic shift over course of solo from pp - ff - pp
Transition musically to next page**

The piece reveals the topic of its dedication in the following section with a harmonization of the opening original melody in dense Messiaen-like chords. Figure 83 below demonstrates another example of the merging of systematic and intuitive processes. Although I had fixed the base scale system underpinning these chords (Messiaen's third mode of limited

transposition), I intuitively altered the ‘key’ of the parent scale to explore different harmonic colours, letting my ears guide the choice of the next chord in the sequence.

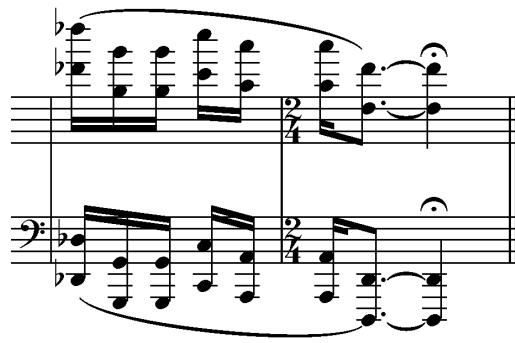
Fig. 82: Messiaen’s third mode of limited transposition, in the ‘key’ of C



Fig. 83: Harmonisation of the melody of *Homage* using Messiaen’s third mode of limited transposition, with ‘key’ centers marked above in brackets

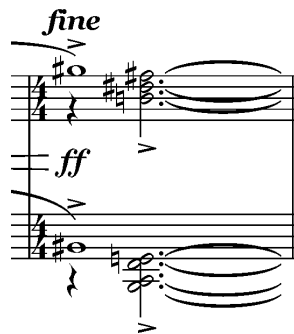
In hindsight, this intuitive composition process was particularly revealing of my interest in voice-leading – by and large each note within each chord has a logical, if not stepwise motion through the progression. In this sense, *Homage* indicates a preliminary example of the kind of systematic voice-leading considerations that guided my methodology throughout the composition of the trio & quartet works in Chapter Three.

When the opening melody returns in four octaves at the end of the piece, in performance I branched into another improvisation by intuitively selecting and restating the previous chord structures, joining them lyrically to building towards a concluding fortissimo over thundering octaves of the final note in the low register. Figure 84 below depicts a fragment of this grandiose final melody.

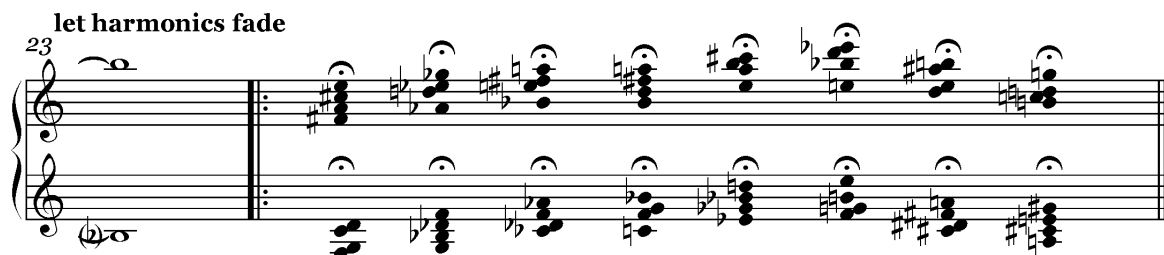
Fig. 84: Return of octave melody technique at the end of *Homage*

2.3.7 Roundabouts

Similar to the Messiaen-like structures in *Homage*, in *Roundabouts* I used dense 8-note pitch-set (8-14 [02345789]) as the basis of the improvisation section, which I derived from the final chord of the two grandiose opening passages.

Fig. 85: Final chord of the second section of *Roundabouts*

Here, the composed material morphs through a passage of dense chromatic voicings that form the basis of an improvisation section. In performance, I retain the order of the material fairly systematically, while intuitively fragmenting and expanding the structures into wide melodic lines and ethereal textures.

Fig. 86: Guide chord structures in the improvisation section of *Roundabouts*

2.4 Sketches and Free Improvisations for Solo Piano

In addition to the longer composed works in this collection, I also composed a series of short sketch-like scaffolds for improvisation, and recorded several free improvisations in which I integrated the various techniques of pitch-class sets, serialism and intervallicism explored throughout this exegesis. I analyse here a selection of these improvisations and the structures that underlie them.

2.4.1 *Codify*

As a brief three-sectional sketch based on a series of three pitch-class sets, the composition *Codify* offers an open-ended template for improvisation. As with many of these works, the rhythmic content of the piece was derived intuitively, without any set system of development other than my attempt to maintain thematic unity (for example, in the first bar of each section). Figure 87 below outlines the first section of the piece, demonstrating each 6-note set split into various triads, dyads and single note lines:

Fig. 87: Pitch-class [013458] transposed and ordered in the opening section of *Codify*

The image shows a musical score for the opening section of 'Codify'. It is written on a single staff in treble clef, starting with a 3/4 time signature. The notation is divided into several measures, with brackets and numbers (3, 5, 7) indicating groupings of notes. A box labeled 'A' is placed above the first measure. The piece concludes with a double bar line and the instruction 'open repeat, ad lib'. There are speaker icons on both the left and right sides of the score.

As heard on the included audio track, *Codify* spirals out to a 7-minute odyssey in which I explore the vast number of creative possibilities and effects available through the free recombination and extension of the material in each system. In the audio excerpt to the left, for example, I transfer the notated line to the left hand in a series of dyadic chord structures, while suggesting a broad palate harmonic zones in the wide-ranging right hand improvisation.

In the audio excerpt on the right I carry over the final melody note of the last chord of the piece as a pedal tone in the upper register, and build a series of ethereal 4-note chord structures around it – once again each chord is based on a chronological reading of the notated material of the [A] section.

2.4.2 *Microcosm*

The final piece to be added to the portfolio, *Microcosm* uses a series of 5-note pitch-classes I found I had not yet used within other works for solo piano or quartet.

Fig. 88: Seed pitch-class sets and voicings for *Microcosm*

The figure displays two systems of musical notation, each consisting of a treble and bass clef staff. Above each staff, a set of five pitch classes is listed in square brackets, followed by a voicing in square brackets with a lowercase 'i'. The first system contains six pairs: [01256] [i], [02346] [i], [01356] [i], [01248] [i], [01268] [i]. The second system contains four pairs: [01378] [i], [01478] [i], [01357] [i], [02458] [i]. The notation shows various voicings of these sets across the two staves.

Much the same as *Codify*, in *Microcosm* I sculpted this material into a series of openly repeated sections intended to be the stimulus for a liberal improvisation. In somewhat of a contrast to *Codify*, however, in my initial improvisation on *Microcosm* I stick fairly systematically to the notated material and instead shift the rhythmic alignment of the two parts, so that each repeat section undergoes a process of gradual disintegration and reintegration. This cycling and stretching of the material can be heard particularly clearly in the audio excerpt attached to Figure 89 below.

Fig. 89: First system of *Microcosm*, and use of material from first four bars of seed material in Figure 88 above

The figure shows the first system of musical notation for *Microcosm*, in 4/4 time. It features complex rhythmic patterns with fingerings (5, 7, 3) and articulation marks. The piece concludes with a double bar line and repeat dots. A speaker icon is visible on the right side of the page.

2.4.3 *Loopimal*

Loopimal offers a different takes again on the fragmentation concept seen in *Codify* and *Mammoth*, this time using even less material – in this case cycles of 3 unique sets of intervallic structures spanning roughly a bar. The composition was one of the last I added to the portfolio, and having by this point been experimenting with pitch-classes, serialism and intervallicism for some time, I generated all the pitch material entirely intuitively through improvisation. Nonetheless, I systematically structured both the rhythmic components within each cycle, and the entries of the start of each cycle to gradually morph and displace the character of the pattern over time; in the excerpt in Figure 90 below, for example, the cycles constitute lengths of 9, 9, 10, and 9 quavers. While this approach to displacement was intentional it largely took shape as a composition through further improvisation, and in performance the piece is based entirely on further intuitive reworkings of the notated material. The audio player attached to Figure 90 below depicts a passage of this expansion of the first section of material.

Fig. 90: First repeat section of *Loopimal*

The musical score for the first repeat section of *Loopimal* consists of two systems of piano accompaniment. Each system has a treble clef staff and a bass clef staff. The first system contains three measures of music. The second system begins with a measure number '4' and contains three measures of music. The piece concludes with a double bar line and repeat dots. The notation includes various rhythmic values such as eighth notes, quarter notes, and rests, along with sharp accidentals. The key signature is one sharp (F#).

repeat ad lib.

2.5 Summary

In this chapter I demonstrated the interaction of systematic and intuitive elements in my composition and improvisation of works for solo piano, at several points across the spectrum. In particular, I drew attention to the broad range of creative outcomes resulting from these various processes – from intricately notated works (i.e. *Canon*) to, in the case of *Microcosm*, 7-minute largely improvised performances.

Analyses of pieces such as *Plink* and *Codify* depicted the permeability of improvisation and composition, in particular the broad creative potential inherent in treating every part of a composition as a possible stimulus for improvisation.

Works such as *Spire* and *Avian Bagatelle* depict the vital role that intuitive improvisation and improvisation play in my compositional practice, while works such as *Dreamreader*, *Tag!* and *A Dance?*, with their respective pitch-class, intervallic and serial structural foundations, are demonstrative of the systematic compositional strategies I adopted at various points throughout this collection.

The analysis in this chapter has also examined the various degrees of performer autonomy I allocate across this collection of pieces – from sections of free improvisation in *Odd-time Bagatelle* to the open-ended, time-space notation of *Plink*, to the composed intricacy of *A Dance* – and the range of techniques I utilise to achieve these ends – from aleatory boxes to textual instructions.

For the most part, this music has focussed on serialism and intervallicm as primary organisational tenets. In the next chapter I discuss my comprehensive exploration of pitch-class sets that formed the basis for a body of music for my trio and quartet, and offer further demonstrations of the interaction of systematic and intuitive making in my practice.

Chapter Three: *Blueprints & Vignettes* – Trio & Quartet

3.1 Background

This group of works for trio & quartet encompasses a broad spectrum of creative methodologies, alternating at points between (at opposite poles) free or minimally scripted improvisation and intricate composed passages. The compositional strategies I used in this music represent some of the more systematic approaches taken in this portfolio – for example, the use of prime numbers as rhythmic durations and chance operations as the selection of the order of pitch-class sets – but they are nonetheless balanced by my use of semi-structured improvisation or ‘free play’ (to use Nachmanovitch’s (1991) term) in the generation, manipulation and later expansion of the material in performance.

Throughout this collection I sought to merge pitch-class theory, serialism and intervallicism with the melodic lyricism and harmonic colour of the contemporary jazz vernacular, in which I have been engaged for the past ten or so years of my professional life. As such, the analysis of these works is split into two major sections that reflect the two primary facets that have occupied my work as a pianist, improviser and composer:

- Chord structure and harmonic accompaniment (i.e. the ability to generate chord voicings and progressions from lead sheets)
- Melodic line construction (i.e. in improvising over jazz standards)

In the first section of this chapter (3.2) I analyze my use of pitch-class sets as harmonic frameworks, and subsequently my use of pitch-class sets, serialism and intervallicism in the construction of melodic lines forms the focus of section (3.3). I punctuate both sections with excerpts from the sketching and crafting process of the compositions and recordings of improvisations based on them, which demonstrates the possibilities of re-working the notated material in real-time. In so doing, I also further analyze the permeability of systematic and intuitive modes in my practice that is particularly evident in my approach to these works.

I conclude this chapter with an examination of a series of free improvisations I performed in Japan in January 2017 with a quintet featuring the *koto* player and experimental improviser Michiyo Yagi (section 3.4), which demonstrates both my *intuitive synthesis* of the techniques explored throughout this chapter, the possible applications of pitch-class, serial and

intervallic material to settings of free or non-scripted performance, and the manner in which systematic and intuitive modes appear and interact in such a setting.

3.2 Pitch-class sets as Harmonic Frameworks

I began most of the pieces in this collection by first isolating a short series of pitch-class sets to act as seed material, either by picking sets directly from a table of pitch-classes or by generating pitch-class-like chord voicings or melodic lines through improvisation. Once this seed material had been chosen, I would spend some time improvising with various possible intervallic structures and densities contained within each set while noting the interesting permutations that emerged. In this section 3.2 I examine the various techniques of composition and improvisation I used to generate and craft this seed material – both into the composed work and within the improvisations based on it. This discussion highlights my conceptualization of pitch-class sets as fulfilling a form of dissonant but nonetheless harmonic functionality, and further highlights my integration of systematic and intuitive modes of practice.

3.2.1 *Primed*

I used two contrasting processes in the composition of *Primed*, for example: one systematically indeterminate and one intuitively improvisatory. I generated the seed material by first isolating all the five-note pitch-classes with a Forte number as a prime number or a multiple of 5:

Primed seed sets: 5-1[01234], 5-3[01245], 5-5[01237], 5-7[01267], 5-10[01346], 5-11[02347], 5-13[01248], 5-15[01268], 5-17[01348], 5-19[01367], 5-20[01568], 5-23[02357], 5-25[02358], 5-29[01368], 5-30[01468], 5-31[01369], 5-35[02479], 5-37[03458]

I then wrote each of the prime numbers up to 31 onto separate slips of paper:

[1,2,3,5,7,11,13,17,19,23,29,31]

To create the structural scaffold, one prime number and one of these 18 pitch-sets were pulled at random from two hats. With the prime number representing the duration for which the chord would last, I sculpted each selected pitch-class set into a chord voicing through improvisation – for example, through fragmenting, transposing, inverting, or rearranging its intervallic structures.

As every subsequent pitch-set was drawn I was mindful to create lyrical voice-leading between each chord. To do this, I considered the position of each chord within the set rhythmic structure of the piece, and shifted the transposition of intervals within in each chord to give an impression of either more *volatility* (for example, in the middle of a rhythmic phrase), or *stability* (for example, at the end of a phrase, or during a longer duration). In the process, I found that often the slightest transposition, re-ordering of pitches or re-assignment of the root note of a chord could drastically change its perceived quality. This concept of a spectrum between *stability* and *volatility* in post-tonal harmony is at the base of much of the discussion in this chapter.

It is interesting to note here that although my initial derivation of the chordal structures through this chapter was systematic, my perception of, and adjustments in the structures in response to *stability* and *volatility* were almost entirely intuitive. That is to say, I largely relied on my ear and emotional response to various available permutations guide my choices.

In *Primed*, I initially based each drawn prime-number chord duration largely on quavers, although I used longer subdivisions where the flow of a passage dictated a longer pause on a certain chord. With time signatures shifting every bar, the resulting score looked convoluted:

Fig. 91: *Primed*, initial score format.

The image displays a musical score for 'Primed' in its initial format. It consists of three systems of piano accompaniment, each with a treble and bass clef. The score is marked with a box 'A' at the beginning. Above the first system, five chord durations are listed: 01267, 02357, 01245, 01237, and 01348. The second system lists five durations: 01369, 02347, 01368, 01367, and 01234. The third system lists five durations: 03458, 01378, 01346, 01369, and 01268. The time signatures change frequently, including 8/8, 7/8, 4/4, 3/4, 6/4, 3/2, 2/4, and 4/4. The notation features complex chordal structures with various intervals and voicings, often spanning multiple lines of the staff.

For the sake of legibility, I thus decided to place the structures into a 4/4 grid. Figure 92 below demonstrates this new format, with each chord duration now halved. As will become

common throughout this analysis, bars 7-10 and 11-14 of the example are demonstrative of my effort to facilitate logical, smooth transitions between these dense textures.

Fig. 92: Voice-leading between harmonic structures in *Primed*, b.7-14.

In this first permutation of the sets I had largely utilized prime forms over inverted (an unconscious choice via my intuitive decision making), so a second group of sets and durations were pulled out of the two hats to generate further content and cover this gap in the methodology. I used each set in the second series in the opposite form to its sibling in the first series – if a set had been in prime form it became inverted and vis versa. At the same time, I broke up the dense chordal structures with the first interjections of linear material in the piece thus far.

Fig. 93: *Primed*: sketch of second section of content, utilising largely inversions of pitch-classes and interjections of linear material (inversions marked “i”).

A final drawing of pitch-sets and prime numbers generated material for a coda section:

Fig. 94: Coda section to *Primed*

Once scored, the three sections represented shortening lengths over the course of the piece – the equivalent of 242/16 [C], 195/16 [D], and 160/16 [G] – which, in juxtaposition with the static crotchet ride cymbal pattern played by the drums, provides a subtle impression of momentum and the piece develops.

As the first piece written for this collection, this approach to the generation and manipulation of seed material in *Primed* impressed on me the vast creative potential of the pitch-class material, which I sought to explore in subsequent works. Working with groups of seeds sets in this way also catalyzed a new perspective on methods of organizing pitch material – in particular, the potential of using systematic transformative operations (i.e. transposition, inversion, expansion and contraction, re-arrangement of intervals, and so on) in intuitive or improvisatory performance.

3.2.2 *Mammoth*

Like *Primed*, *Mammoth* is based on a sequence of 5-note pitch-class sets – this time with nine members – which I selected by identifying sets with closely related Forte numbers (i.e. with 3 or 4 pitch-classes in common). As with *Primed*, I sculpted the chosen sets into an initial series of nine chord structures through improvisation; by listening to the melody outlined by the top note of the voicings, the tonality of the chord implied by the root note, and the voice-leading outlined by the internal voices, I sought to balance the chromatic dissonances of the pitch-sets with lyrical melodic movement of each voice. Through these improvisations, two sets were accidentally used twice in the final sequence: [01267] was accidentally doubled and the first instance of [01457] was mistakenly labeled as [02367]:

Mammoth seed sets: 5-14[01257], 5-7[01267], 5-Z36[01247], [5-2]01235, **5-7[01267]**, 5-Z18[01457], 5-9[01246], **5-Z18[01457]**, 5-Z38[01258]

I had also selected these sets to make two distinct groups with closely related interval vectors (identified below with underscores and *italics* respectively), as well as one Z-complementary pair between 5-Z18[01457] and 5-Z38[01258], maintaining a degree of structural uniformity across the set sequence:

Interval vectors: [221131], [*310132*], [222121], [*332110*], [*310132*], [212221], [*231211*], [212221], [212221]

Mammoth is entirely derived from re-voicings, transpositions, editions and linear expansions of this initial improvisation-derived series of pitch-set voicings:

Fig. 95: Opening pitch-class chord array of *Mammoth*

[01257] [01267] [01247] [01235] [01267] [01457] [01246] [01457] [01258]

In *Primed*, the slow tempo (c=56) had meant that the piece felt complete after the use of only a small number of the potential forms of each seed set (a total of just three permutations, taking place at [C], [D] and [G] in the score). *Mammoth* expands on this approach by systematically permutating each individual set eight times in the “exposition” [A] and [B] sections alone (the piece runs to a rehearsal mark [I]). As a result, *Mammoth* is a dense mosaic

of chord structures that investigates the various intervallic combinations and thus *tone colours* and degrees of stability and volatility possible with each set. While *Mammoth* contains far fewer set types than *Primed*, because of this technique it exhibits dozens more unique intervallic chord structures.

For example, Figure 96 below demonstrates the eight forms that the first chord – the pitch-class set 5-14[01257] – takes throughout the opening [A] and [B] sections of *Mammoth*. In pointedly varying the intervallic structure of each chord, each permutation implies a distinct harmonic quality, which I considered and constructed based on the note that appears in the bass. For example, chord two suggests (in jazz chord symbol terminology) a $\text{Dbmaj}^7(\text{b}9\#\text{11})$ tonality; chord five a $\text{G}^7_{\text{sus}(\#\text{9})}$; chord six a $\text{F}\#\text{9}_{\text{sus}(\#\text{11})}$:

Fig. 96: Permutations of chord structures derived from pitch-class [01257] in A & B sections of *Mammoth*

In *Mammoth*, the A section is based on four cycles of the initial pitch-class set sequence. To create a different ordering of the sets with each pass (and thus, a different order of *tone colours* and possible *chord qualities*) I numbered each pitch-class set in the original sequence chronologically and used an online number sequence generator to form the three further set ‘rows’:

2nd row: [8,3,4,9,2,5,7,6,1], 3rd row: [2,1,7,4,8,6,9,5,3], 4th row: [7,9,5,8,6,3,1,4,2]

Where the use of inverted or prime forms of each set had been intuitively selected in *Primed*, in *Mammoth* I intentionally chose to use entirely prime forms in the [A] section and inverted forms in the subsequent [B].

With this new order of the seed sets came further recognition that I could voice nearly every pitch-class set as a chord structure that would imply a kind of chromatically embellished tonic chord. Each of the four phrases that make up the [A] section of *Mammoth* conclude with examples of this technique. Figure 97 below depicts the last chord of each of these phrases: the first chord spells out a Dmaj^7 with a nestled $\text{b}9$ in the centre (the chord could also be heard as an $\text{A}^6_{\text{sus}(\#\text{11})}$ given the A in the bass, although the intervallic structure is more strongly aligned

to the harmonic series of a D fundamental); the chord second is Dbmaj^7 with a $\sharp 11$ and $\flat 9$; the third a $\text{G}^{\text{(add2)}}$ again with a $\flat 9$ (or a $\text{D}^{\text{6sus}(\sharp 11)}$); and the fourth is a $\text{Gmaj}^{\text{7sus}(\sharp 6)}$.

Fig. 97: Pitch sets chords functioning as tonics at the ends of phrases in the A section of *Mammoth*

The image shows four chords in a grand staff (treble and bass clefs). Above each chord is its intervallic structure in square brackets: [01258], [01257], [01247], and [01267]. The chords are written as block chords with notes on both staves.

I softened the dissonances in each of these chords through a form of *tonicisation* by a preceding chord. To settle on each quasi-functional progression, I improvised with each fragment of two or three chords by freely transposing each set or rearranging interval structures within a voicing. By listening attentively to the shifts in chord *colour* and the balance of *stability* and *volatility* within and between each permutation, an agreeable form of each set in within each sequence would eventually manifest.

Figure 98 below clearly demonstrates this form of tonicisation in action at the end of the [A] section to *Mammoth*. The labeled chord in bar 17 can be considered a kind of Eb tonality (although the lack of a major or minor third and presence of both the major and minor 6ths makes its functionality ambiguous), while the first chord in bar 18 can be heard as a Ab^{13sus} (with the addition of a major 7th); taken together the two effectively establish a veiled [V-I] progression. The *suspended-altered* nature of this first chord in bar 18 carries a high degree of volatility, which is subsequently resolved to the $\text{Gmaj}^{\text{7sus}(\sharp 6)}$ to conclude the phrase – in this context a relatively stable voicing.

Fig. 98: Veiled harmonic functionality in phrase conclusions of *Mammoth*, b.17-19

The image shows three chords in a grand staff, labeled with their intervallic structures: [01257], [01235], and [01267]. The first chord is in bar 17, and the second and third are in bar 18. The notation includes notes on both staves and some slurs.

At the same time, the first chord of bar 18 could be interpreted as a *tri-tone substitution*² of a D⁷, the V⁷ of the final Gmaj^{7sus(#6)}. One could apply the same interpretation to the marked chord in bar 17 as being a tri-tone substitution of an A⁷, in which case this entire sequence is a highly chromatic II⁷-V⁷-I.

In the [B] section of *Mammoth* I mixed up the generative process by using only the original sequence of the first 9 pitch-class sets to create a further four permutations. Once I had derived a series of chord voicings, I let the *colour* and impression of stability or volatility in each chord dictate the rhythmic content and length of each phrase – this sometimes meant that chords were leant or borrowed from adjacent 9-chord rows in order to reach a harmonically satisfactory or lyrical end to a phrase. As a result, the [B] section of *Mammoth* contains a new assortment of new, less obviously grouped phrase lengths: (as numbers of pitch-classes in a phrase) 7, 8, 3, 4, 5, 7, 3. In contrast, each of the four phrases in the A section of *Mammoth* use all 9 seed sets.

I also discovered that seemingly volatile or dissonant voicing structures could be re-configured or placed into context in such a way to make them appear as a stable rest point relative to a preceding chord or chords. The set [01235] for example, which in its prime form contains 3 nestled semitones, appears twice as a tonic chord, the first of which is shown in the below Figure 99.

Fig. 99: Chromatically dense set [01235] acting as a tonic at the end of a phrase in *Mammoth*, b.31

4

² A popular technique of re-harmonisation in jazz, that functions due to the fact that dominant 7th chords a tri-tone away share the same guide-tones (i.e. 3rd and 7th).

In this example, the dissonance of the [01235] is masked both due to the arrangement of its pitches as well as the step-wise voice-leading from the preceding chord – the bass clef dyad expands outwards in contrary motion, while the voices in the treble stave move smoothly in tones (the outer voices) and a minor third (the inner voice). Another instance of [01235] as a “tonic” chord occurs a few bars later:

Fig. 100: Chromatically dense set [01235] acting as a tonic at the end of a phrase in *Mammoth*, b.37

The musical score for Figure 100 is in 3/4 time. It consists of two staves: a treble staff and a bass staff. The treble staff begins with a whole rest in bar 35, followed by a half note G4 in bar 36, and a quarter note G#4 in bar 37. The bass staff shows a chromatic progression of dyads: in bar 35, the notes are F#3 and G3; in bar 36, the notes are G3 and A3; in bar 37, the notes are A3 and B3. The final chord in bar 37 is labeled [01235] and consists of the notes G#3, A3, B3, and C4.

In Figure 100 above the voice-leading is less obvious, although the progression between bars 35 and 36 to bar 37 implies an extended chromatic plagal cadence – in this instance a $F^{9sus(b9)}$ to a $Cmaj^{13(b9)}$.

Interestingly, due to the arrangement of intervals within these two [01235] chords, the example in Figure 100 actually sounds subtly more stable than its precursor in Figure 99 – evidence that the spectrum between volatility and stability continues to apply even when chords appear to be tonics. This may be in part due to the relationship between the voicing and the harmonic series. In the case of the set [01235] in Figure 100, the voicing represents, from the bass upwards, the 8th, 15th, 17th, 27th and 36th partials of a C fundamental – with each partial only a few cents detuned, if at all. In the case of Figure 99, the voicing represents, from the bass upwards, the 5th, 8th, 19th, 21st, and 36th partials of a theoretical Eb fundamental, a less balanced voicing where the bass note (G) is significantly (-14 cents) detuned from the harmonic series and the upper three voices appear an octave below their actual position in the series.

Through my lens as an improviser and jazz player, what is fascinating about this harmonic system is the almost quantum properties of each set. As Schrödinger may have concluded if he had been a music theorist, every pitch-class set has the potential to fulfil a volatile, dominant-esque function as well as a more stable tonic-esque one, and the perception

of the state of a pitch-class set chord is largely dictated by its context – the voice-leading to and from it and its duration within a phrase structure.

After a free improvisation at the end of the [B] section, both the [A] and [B] sections are revisited and reworked in new combinations. In the [G] section for example, rather than the dense 5-note chord structures of the introduction I chose to evenly split the 5-notes between chord structure and melody. By also using higher register than previously seen in other chord structures in the piece, the [G] section gives an impression of fragility after the tumultuous [E] section.

Fig. 101: Recapitulation of [B] section material at [G] in *Mammoth*, b.95

95 **G** ♩=90 more sparse, fragile

Once again, all the melodic, vertical chordal and rhythmic content for the concluding [G,] [H] and [I] sections were created intuitively through improvisations with the pre-set seed material. As such, certain phrases suggest characteristics carried over from my familiarity with the jazz vernacular. For example, the [H] section, with its three phrases of increasing length (4 to 5 to 8 beats), is reminiscent of the type of question-question-answer phrase structure typical in a 12-bar blues.

Fig. 102: Question-question-answer style phrasing in the H section of *Mammoth*, b.102.

8 **H**

102

104 **I**



The improvisation section at [C] in *Mammoth* (an audio excerpt of which appears below) demonstrates my spontaneous selection, expansion and fragmentation of the chord structures from the [A] section of the composition, to create an ethereal textural accompaniment to the bass solo.



3.2.3 *Grind*

In [I] section of *Grind* I used a harmonic and rhythmic density of pitch-class sets similar to that seen in the [A] and [B] sections of *Mammoth*. Here the seed material is another group of pitch-class sets, this time with 7 members:

Grind seed sets: 4-2[0124], 4-4[0125], 4-Z29[0137], 4-3[0134], 4-10[0235], 4-17[0347], 4-24[0248]

In Figure 103 below, these seed sets are coupled with the rhythmic row of preset durations [4,2,3,5,1] that provides a systematic undercurrent throughout the piece (used at this point in quaver units). In this example, the row starts from the second duration of the row (2 quavers):

Fig. 103: Rhythmic density of pitch-class chords in *Grind*, b.37-44

The image displays two systems of musical notation for piano. The first system begins at measure 37, marked with a boxed 'I'. It consists of two staves (treble and bass clef) with a 4/4 time signature. The music is characterized by dense, overlapping chords and complex rhythmic patterns, including many beamed notes and rests. The second system starts at measure 41 and continues with similar dense harmonic and rhythmic textures. A speaker icon is positioned to the right of the first system.

I came upon on the intervallic structure and ‘key’ of each chord in Figure 103 once again through improvisatory experimentation with various voice leading movements between pitch-set chords. Like the approach I took in *Primed*, where the rhythmic row of *Grind* landed on its longer durations (i.e. 4 or 5 quavers), I leant more towards a permutation of chord voicing that implied a degree of resolution from a preceding volatility towards stability.

It is important to note that this spectrum between stability and volatility does not necessary always equate to a parallel spectrum between *consonance* and *dissonance*. For example, between the second and third chords of bar 38 in Figure 103 above (if the tied chord from the previous bar is taken as the first), the third chord, as the intended stable resolution of the first

phrase, is arguably more dissonant than its preceding chord with a minor 9th between the upper voices of the treble and bass clef dyads. Nonetheless, the falling motion of the progression and the balanced intervallic structure of the 2nd chord (i.e. wide intervals on either side of a narrow interval), give the impression of an albeit dissonant tonic.

In a following few bars of the [I] section, the combination of the rhythmic row and the pitch-class set row continues to play out in unique phrase lengths and subsequent re-voicings of the individual sets, as seen in Figure 104 below. This time the rhythmic row begins on the duration [1]:

Fig. 104: Continuation of homophonic texture and overlapping rhythmic and pitch-class set rows in *Grind*, b. 45-

53

The image shows two systems of musical notation for piano. The first system, labeled '45' at the beginning, spans measures 45 to 53. It features a treble and bass clef with complex, overlapping rhythmic patterns and pitch-class set rows. A bracket above the system indicates a measure count of 3. The second system, labeled '49' at the beginning, spans measures 49 to 51 and is marked 'fine'. It continues the overlapping rhythmic and pitch-class set rows from the first system.

As this cycling of the two rows could continue perpetually, I drew the section to a close by cutting both rows short in bar 51 at one of the more consonant pitch-classes ([0235]) – at this point implying a plagal cadence between the volatile $D^{13sus(b9)}$ and the stable $A_{maj}^{13(omit\ 3)}$.

In the improvisation section of *Grind*, I removed one pitch-class from each of the original sets to form a series of sparser, generally consonant three-note chords, to which I then assigned a conventional jazz chord symbol. The segment of the first solo section at [J] in Figure 105 below demonstrates the resulting array of voicings. Here, the original sequence of sets is maintained, while the rhythmic row is used in further augmented durations of crotchets.

Fig. 105: Segment of improvisation section at [J] in *Grind*, b.59

[014] [026] [014] [024] [012]

59 Eb⁷(^{#11}_{b9}) C^{#m}11(^{b13}) A^bmaj⁷(^{#11}_{#9}) B¹³(sus4) Gmaj⁷(^{#6})

In performance, each soloist is featured on a different permutation of the improvisation section, in which the harmonic rhythm shifts modes in the same way as the opening melodies of the composition. The soloist uses both the notated three-note chords and their own vocabulary to interpret the chord symbols.

3.2.4 *Haecceity* and ...forked paths

Throughout this project, experimenting with the different rhythmic and harmonic densities of pitch-class sets frequently opened doors to novel harmonic structures and manipulative techniques. For example, I used alternate forms of the same group of five 4-note seed sets in two separate pieces: *In the crepuscular forest of forked paths* & *Haecceity*. Again, these sets were chosen for their interrelated interval vectors.

Seed sets: 4-14[0237], 4-4[0125], 4-11[0135], 4-5[0126], 4-16[0157]
Interval vectors: [111120], [211110], [121110], [210111], [110121]

As with *Mammoth*, to form the seed material I permuted each set four times in prime form and four times in inversion; by using each pitch-class once as a root note, I systematically investigated the possible intervallic chord structures and tonalities of each set.

Fig. 106: Seed material for *Haecceity*

The figure displays four systems of musical notation, each representing a different voicing of the seed material. Each system contains ten chords, labeled with their respective intervallic set names above the staff. The chords are: [0237i], [0125i], [0135], [0126i], [0157i], [0237], [0125], [0135i], [0126], and [0157]. The notation uses treble and bass clefs with various accidentals to represent the pitch classes of each set.

By adopting this approach using 4-note pitch-classes, *Haecceity* generated a further 40 unique voicings seen in Figure 106 above. Read as a table, each column contains the four

variations of the pitch class noted on the top system. Similar to *Mammoth*, in *Haecceity I* let the colour of each chord dictate its rhythmic duration and position within a phrase structure, which I derived through improvisation:

Fig. 107: Phrases of different bar lengths/numbers of sets in the opening bars of *Haecceity*, b.1-12

A

Later in *Haecceity I* used a broken chord technique to get away from the static planting of the sets as chord voicings. In the process I realized I had accidentally used an [0125] instead of an [0126] in this particularly section when deriving the seed sets – I kept it nonetheless.

Fig. 108: Broken chords in *Haecceity*, b.35-40

C

34 [0237] [0125] [0237] [0125] 3

D

37 [0135] [0125!] [0135] [0125!]

In the crepuscular forest of forked paths (hereafter simplified to ...*forked paths*) is based on the exact same set-order and chord structures as *Haecceity*, but in retrograde and inverted chromatically around middle C. As a result, the new material preserves the intervallic structure of each treble and bass clef dyad, yet each chord exhibits a markedly different *colour* due to the shifting intervallic relationship between the upper and lower pairs. Where a chord had carried a minor-esque tonality it now appeared major and vis versa. For example, the first chord of bar 3 of Figure 109 sees the Eb⁶ chord of *Haecceity* become a Dm⁷ in ...*forked paths*; the interval between the upper and lower dyads has shifted from a major 2nd to a minor 6th.

Fig. 109: Similarities between chord structures of ...*forked paths* and *Haecceity*

Seed material - *In the crepuscular forest of forked paths* - first few bars

Seed material - *Haecceity* - last few bars in retrograde

This technique is reminiscent of the concept of negative harmony discussed by theorist Ernst Levy in his book *A Theory of Harmony* (Levy & Levarie, 1985) and saxophonist Steve Coleman's pioneering application of the theory in melodic improvisation through his Symmetrical Movement Concept.³ Once again, I used relative stability or volatility of each of the new chord structures in ...*forked paths* to determine the phrase structure. Figure 110 below depicts this consideration in practice in the three main phrases of the opening passage, each of which concludes by establishing a tonic-like chord after a more volatile one; choices which were likely guided by my familiarity with non-functional jazz harmony (particularly in the music of Wayne Shorter (see, e.g. Julien, 2001; Waters, 2011). The first minim chord gives the impression of a of Bb^{min7(b13)}, the second an A^(susadd2) and the third, in contrast, a clear B^{min13}.

³ <http://m-base.com/essays/symmetrical-movement-concept/>

Fig. 110: Opening phrase structures of ...*forked paths*

The image displays two systems of musical notation for piano accompaniment. The first system features a treble clef staff with a melodic line and a bass clef staff with a harmonic accompaniment. The second system continues the melodic and harmonic development. A speaker icon is located to the right of the first system.

It is interesting to note that common amongst this group of volatile structures is the use of inherently less consonant intervals – minor 9^{ths} or stacked major 7^{ths}. The piece nonetheless maintains a lyrical quality, which in tandem with the free rhythm arguably sounds more consonant than the overall impression of the parallel material in *Haecceity*.

3.2.5 *Umbric Symmetry*

I continued to explore the myriad possible tone colours of pitch-classes in *Umbric Symmetry*, which, as its name suggests, exhibits a denser and darker use of pitch-class harmony. I settled on a group of six symmetrical or non-invertible pitch classes (i.e. each set has only 12, rather than 24 forms), and chose first those sets that had not yet been used within the portfolio. Each set mostly contains at least two semitone intervals, and this higher level of dissonance made them difficult to use in any kind of tonal manner.

Umbric Symmetry seed sets: 4-8[0156], 4-6[0127], 4-1[0123], 4-17[0347], 4-18[0147], 4-7[0145]

Given the symmetrical nature of the sets, only 4 permutations of each set were possible if with each individual class were to act as a root. Further permutations (i.e. by re-ordering the intervallic structure of the upper voices) and transpositions were possible, but relative to the static root these would still maintain the same essential character or colour.

Despite the highly chromatic nature of its seed sets, *Umbric Symmetry* nonetheless contains a number of points of veiled harmonic functionality. The voice leading through the second and third chords of bar two, for example, vaguely suggest a V-of-V progression (F^{dim7} being a common substitution for a E^{7(b9)}; to an effective A7^(b13#9)/C) in anticipation of the Dmaj^{7sus} at the start of bar 3. Throughout the piece I balanced the inherent dissonance of each pitch-class chord by stringing together sequences of chords with a consistent upper voice.

Fig. 111: Veiled harmonic functionality (marked) and sequences of continuity of upper voice in chord structures in *Umbric Symmetry*, b.1-3

A

The musical score shows three bars of music. The first bar begins with a double bar line and a repeat sign. The upper voice (treble clef) starts with a chord containing notes G, B, D, and F. The lower voice (bass clef) starts with a chord containing notes C, E, G, and B. The second bar continues the sequence, with the upper voice moving to a chord containing notes A, C, E, and G, and the lower voice moving to a chord containing notes C, E, G, and B. The third bar shows the upper voice moving to a chord containing notes A, C, E, and G, and the lower voice moving to a chord containing notes C, E, G, and B. A bracket above the second and third bars indicates a V-of-V progression.

Given the dissonances in and unconventional use of these pitch-class structures, analyzing this music using terms of functional harmony or standard chord symbol notation is somewhat impractical – nonetheless, I intend such an approach to offer an insight into how I hear and have used these chords. At the same time, this approach posits potential methods by which pitch-class structures can be used as chord substitutes in more traditional tonal settings; I offer a consolidated series of such examples in the conclusion of this exegesis in Chapter Five.

3.2.6 *Pareto Principle*

Pareto Principle explores the possibilities of 6-note pitch classes. Given the larger size of each set, this time I decided to use fewer individual sets – the smallest group of the quartet portfolio at only 5. Again, I selected the sets based on their similar interval vectors:

Pareto Principle seed sets: 6-Z50(12)[014679], 6-Z24[013468], 6-Z39[023458], 6-Z17[012478], 6-Z41[012368]

Interval vectors: 224232, 233331, 333321, 322332, 332232

The sets were first arranged into a contrapuntal accompaniment for the bass and piano:

Fig. 112: Initial sequence of harmonic accompaniment, and the ‘key’ of *Pareto Principle*, using the set [014679]



I then built two groups of similar ostinato patterns using the remainder of the sets, this time with only **one** permutation in prime form and **one** in inverted (in both cases, out of the possible 6), to give a sequence of 10 individual ostinato sections. To complement this horizontal-style realisation of the sets, I subsequently broke each seed set into two 3-note sets to generate material for an introduction section. My intent was to present a sparse contrast to the rest of the piece, while exploring the various 3-note intervallic structures and voice-leading movements possible within each set. Bar 1 of Figure 113 below demonstrated this horizontal treatment of the set [014679] from Figure 112, and the audio excerpt below also depicts saxophonist Jeremy Rose’s initial melodic improvisation derived from each chord structure:

Fig. 113: Introduction to *Pareto Principle* using 3-note sets derived from the seed 6-note sets, b.1-11

A

3.2.7 Slonimsky

The [E] and [F] sections of *Slonimsky* similarly demonstrate this partitioning of parent sets into halves. In this case, each seed set is based on a melodic pattern taken from the Slonimsky's *Thesaurus of Scales and Melodic Patterns* (1947) and considered through the lens of pitch-class theory. In Figure 114 below, each bar represents a single unique set:

Fig. 114: Dyads derived from 4-note pitch-class sets/melodic cells in *Slonimsky*, E section

E

band out! pno only

The bass and left hand of the piano enter in the subsequent [F] section, outlining a tonality in each bar of dyads through the addition of root note; each root was decided through improvisation in the left hand while playing the right hand sets and considering the progression of the implied tonalities between each 4-note set. In most cases, the root note was intentionally chosen from outside of the existing 4-note set, and chord symbols were used as shorthand for the resultant tonality as in the solo sections of *Grind*.

Fig. 115: Addition of root note to outline tonality of each bar of dyads in *Slonimsky*

F 1st x: rhythm section
2nd, 3rd x: melody

3.2.8 *Insen*

I used a similar process of harmonizing pitch-classes in *Insen*; the piece is based almost entirely on melodic and harmonic uses of its eponymous Japanese pentatonic scale:

Fig. 116: The *insen* scale, or pitch-class [01368]



One could consider this scale to be the pitch-class [01368] in set theory. In this case, I used the scale as the basis for a melody, which is underpinned by the sort of non-functional harmony common in the music of jazz saxophonist Wayne Shorter (see Strunk, 2005). The first four bars of *Insen*, for example, are based entirely on melodic phrases derived from the *insen* scale; in this excerpt the *Insen* scale has been transposed down a tone in the 4th bar.

Fig. 117: *Insen*, b. 1-4



As in most situations of jazz performance, the realisation of the harmony is left to the interpretation of the pianist. Figure 118 below demonstrates one possible interpretation:

Fig. 118: Potential realisation of the harmony to *Insen*, b. 1-4



Despite this freedom of realization, the frequent shifts of harmony in the [A] section suggest a somewhat more prescriptive interpretation than those in the [B] section, where a series of two-bar chord durations create the possibility for more extensive melodic or textural treatment. The four chord structures in the [B] section are also based on *Insen* scales, or in the

case of the third bar of Figure 119 below, the scale superimposed over a chromatic root note to extend the available harmonic palate.

Fig. 119: Insen scales (lower stave) suggesting jazz chord symbols in *Insen*

The figure displays two systems of musical notation, each consisting of a treble clef staff and a bass clef staff, both in 4/4 time. The first system is labeled with 'Fmaj7(#11)' above the first bar and 'Db7alt.' above the second bar. The treble staff contains a melodic line with eighth and quarter notes, and the bass staff contains a chromatic root line with a '5' above the first two bars. The second system is labeled with 'Gbm13' above the first bar and 'Ebmaj7(#11)' above the second bar. The treble staff contains a melodic line with eighth and quarter notes, and the bass staff contains a chromatic root line with a '5' above the first two bars.

3.2.9 *Kanji*

Kanji was derived using the same technique – beginning with a 4-note seed melody, which was sequenced and each cell later set to a root note to suggest a progression of non-functional harmony. Although the piece was not intentionally generated using pitch-class theory, there are clear consistencies between these 4-note melodic cells and those used throughout the other pieces in the portfolio, and an obvious implicit intention to use a unique intervallic structure (i.e. pitch-class) with each permutation:

Kanji b.1-10 (retrospective pitch-class analysis): 4-26(12)[0358], 4-Z29[0137], 4-14[0237], 4-22[0247], 4-23(12)[0257], 4-22[0247], 4-3[0134] – b.11-15: 4-20(12)[0158], 4-14[0237]

Fig. 120: Melodic development and non-functional harmony as chord symbols in *Kanji*, b.1-10

Chord symbols for Fig. 120:

- Measure 1: D \flat maj7(#11)
- Measure 2: Am¹³
- Measure 3: B \flat m7(b6)
- Measure 4: C \flat maj7(#11)
- Measure 5: G7(sus4)
- Measure 6: A \flat m7(b6)
- Measure 7: E \flat maj7(#5)
- Measure 8: N.C.

The anacrusis statement in b.17-18 of *Kanji* was derived intuitively through intervallic improvisation, but can nonetheless be analyzed using pitch-class theory as the sets 4-8(12)[0156] and 5-27[01358] (if splitting the line at the inflection of its contour):

Fig. 121: Intuitive pitch-class constructions in the anacrusis to *Kanji*, b.17-18

Chord symbols for Fig. 121:

- Measure 17: Dm⁷
- Measure 18: N.C. (Dm⁷ solos)

3.3 Pitch-sets, Serialism and Intervallicism as Melodic Frameworks

I spent countless hours of my undergraduate years in the practice room studying and transcribing melodic lines from recordings and scores, and inventing my own for later use in performance. Like the approach taken in many Renaissance, Baroque and Classical era treatises of improvised counterpoint (see, e.g. Apel, 1997; Horsley, 1951), I chronicled each unit into a notebook with summaries of its uses, that today runs to dozens of pages. The systematic exploration of pitch-class sets, serialism and intervallicism I undertook in this study follows on from this early philosophy of practice, and has in turn further expanded the way I conceive of melodic line construction.

In the ethos of jazz, much emphasis is placed on “playing what you hear”: a kind of improvisatory truth-seeking in which the performer relies on their practice and instincts to try to let improvisatory melodies to flow with minimal conscious interference – much the same as Kerouac’s idea of spontaneous prose. In addition, there is an I would suggest romantic notion that conscious involvement in the process of improvisation somehow dilutes this purity of expression.

Nonetheless, over now more than 15 years practicing and performing improvisation I’ve noticed how often I switch back and forward between intuitive or reactive, and conscious or systematic cognitive states. I’ve witnessed the permeability of ‘improvised’ and ‘composed’ in my own improvisation practice, particularly when it comes to melodic line. For example, my focused study of melody (particularly throughout this project) has opened my ears to realms of previously untapped melodic potential, which has gradually filtered subconsciously into my improvisations. At the same time, I still regularly make conscious decisions while improvising to use certain intervallic or pitch-class like structures, especially, as my concluding remarks in Chapter Five (section 5.3) demonstrate, in free or open-ended contexts. As with chord structures and harmonic progressions, I also discovered pitch-class sets have vast potential as templates for the improvisation and composition of melodic lines.

3.3.1 *Primed*

In *Primed*, for example, I used the pitch material outlined in the adjacent pitch-class chords to fill in space between and around the entries of chords in the [C] & [D] sections. Figure 122 below shows the melody dancing around the entry of each vertical chord, sometimes anticipating its entry, sometimes starting in tandem with it:

Fig. 122: Melodic content derived from vertical chord structures in *Primed*, b.28-30

In the composition process, while the notes of these melodies themselves were systematically set by the pre-determined structure of the piece, the rhythms were derived largely intuitively - that is to say, with no consistent considerations in mind beyond meeting various alignment points with the entries of the chord structures. It is interesting to note that this process was completed fairly quickly, almost improvisatorially, and took far less time than the choosing of the intervallic structure and 'key' of each chordal shape.

Once melodies had been added to their adjacent chords, I generated a separate introduction section to act as a linear, rubato exposition of the sets, seen in Figure 123 below. Throughout this introduction, the bass and drums provide an ethereal background texture: the bass with extended techniques and upper harmonics generated by the bow and based roughly on two fundamentals, the notes C (in the [A] section) & A (in the [B] section); and the drums with complimentary miscellaneous percussion paraphernalia.

Fig. 123: Sketch for melodic content for the introduction to *Primed*

The image shows two sections of musical notation, labeled A and B. Section A is composed of three staves of music. The first staff begins with a treble clef, a key signature of one sharp (F#), and a 4/4 time signature. It contains a sequence of notes with various accidentals (sharps, naturals, flats) and rests. The second and third staves continue this melodic line. Section B is composed of two staves of music, continuing the melodic development with similar notation and accidentals.

To construct this series of melodies, I removed the fundamental note implied by the bass from any of the sets in which it appeared; the ‘key’ of each set was chosen with consideration of the resultant *tonality* it would imply when heard in sequence against the improvisation on the fundamental in the bass. Figure 123 above shows the sketch of this process: first the notes themselves were generated in order, then joined together in various phrase lengths to give a lyricism and flow to the melody. I later added a second section of melody in a pointillist style to further showcase the tone and range of the bass clarinet; once again the pitch material was taken chronologically from the pitch-class chord structures of the [C] section. Once again, while the pitch material was set in these cases, the rhythmic content or in the case of Figure 124 below, the octave displacements, were chosen intuitively.

Fig. 124: Pointillist approach to melody in opening sections of *Primed* (concert pitch)

The image shows two staves of musical notation, labeled 21 and 23. Both staves begin with a treble clef and a 4/4 time signature. The notation features a series of notes with various accidentals (sharps, naturals, flats) and rests, illustrating a pointillist approach to melody. The notes are often beamed together in groups, and there are occasional longer note values with accents. A speaker icon is visible on the right side of the page.

In the improvisation section to *Primed*, each soloist creates a further linear rendering of the material from the [C] and [D] sections. The soloist is supplied with a reference chart with the full chord structures, and can freely expand or embellish this guide material as desired. In a sense, this approach is reminiscent of early Renaissance improvisation on a *cantus firmus*, where the performer used a guide bass line as a reference point.

Figure 125 below depicts a section of bass clarinetist Jeremy Rose's solo on *Primed*, relative to the guide score. Despite this complex array, Rose expertly navigates through and references the chord structures with a variety of lyrical phrase shapes, melodic contours and ranges – spanning nearly three octaves from D1 to Bb4 in this excerpt. In the process, Rose excellently demonstrates the interaction of systematic (in the pre-set pitch content referent) and intuitive (in the precise rhythm/combinations of the notes) modes of music-making.

Fig. 125: Jeremy Rose bass clarinet solo on *Primed*, using guide voicings as melodic material

6 **E**

57 bs. clari

pno.

60

63 solo continues...

The musical score is presented in three systems. The first system (measures 57-59) features a bass clarinet line with triplets and a piano accompaniment with sustained chords. The second system (measures 60-62) continues the bass clarinet line with a quintuplet and piano accompaniment. The third system (measures 63-65) shows the bass clarinet line with a quintuplet and piano accompaniment, ending with the text 'solo continues...'. A speaker icon is located to the right of the first system.

3.3.2 *Mammoth*

I used a similar technique of nestling melodies in *Mammoth*. Given the significantly faster tempo and speed of transition between chord voicings in this piece, I picked only a couple of notes from each chord/pitch-class to form a lyrical and thematically consistent melody. Figure 126 demonstrates this technique over the first 6 bars of *Mammoth*; only in the first bar do two notes appear from outside the adjacent chord structures – these were deemed better choices for the contour and colour of the line. As with *Primed*, the melody is structured to both align with and dance around the existing rhythmic scaffold, and was generated fairly intuitively and improvisatorially from the underlying system of the composition.

Fig. 126: Selective use of notes from chord sets as melodic material in *Mammoth*, b.1-3

Later on in *Mammoth* the sets of the [A] section appear in full in a linear permutation, at this point as an alto and piano accompaniment to the bass solo. Compare Figure 127 below with the chord voicings in the opening bars of the previous Figure 126, which together with Figure 128 below outline my systematic reworking and reimagining of the intervallic material fixed in just the first few bars of the composition.

Fig. 127: Use of [A] section sets in complete form as linear material during the bass solo on *Mammoth*, b.43-55

D pno, sax mel behind bass solo
bass continues free solo, optional catch melodies

Throughout the [D] section the soloist continues to improvise both on the final pitch-class cell of the preceding [B] section as well as flexibly utilizing material from the alto melody of the [A] section, establishing a vague correlation between the improvisation and melodic accompaniment. The bass, piano and alto align once again in the subsequent [E] section for yet another chronological permutation of the pitch-class material from the [A] section:

Fig. 128: Bass and piano L.H. melody in the [E] section of *Mammoth*, b.71-80

E



This time, the melody in the bass and left hand of the piano is accompanied by a series of 2 or 3 note cells. One again this section was put together through improvisatory trial and error; with the fixed principle of the 2/3 note cell chords in the treble stave I was able to intuitively experiment with different contours of melodic line and implied harmonies of intervallic chord structures. This process generated a subsequent group of subset pitch-classes: the chord on beat 3 of bar 74 in Figure 128 derives an [0124] from the seed [01246]; the final

two beats of bar 79 and start of bar 80 in Figure 128 similarly see an [0126] and an [0127] (quickly shifting to an [0237] on beat 2 of bar 80) respectively form from the intersection of the seeds [01267] and [01246]. The only exception is where the Eb of the last chord in bar 7 of the seed material from the A section in Figure 129 below has been replaced through the improvisation by a Bb in the last chord of bar 79 Figure 128, which I thought was a more interesting choice from a voice-leading perspective.

Fig. 129: [01267] and [01246] pitch sets in the second and third chords of bar 7 in the A section to *Mammoth*



As with many other points in this portfolio, the alto sax and piano free improvisation in the [F] section is based on previously stated material, in this case the melody and chord structures of the [B] section. In performance, Jeremy Rose and I dance our way through the material liberally, following the source material roughly chronologically while freely selecting and embellishing selections at will – once again balancing systematic and intuitive approaches to improvisation. In the below excerpt of the opening exchanges of the improvisation, Jeremy plays the [B] melody verbatim until the second system, where he springboards into an improvisation based on the melodic contour of that bar in the composition. In contrast, I focus on exploring various register shifts and embellishments of the opening two notes, and in the process set up two overlapping ‘pulses’ of interpretation of the material.

Fig. 130: Opening exchanges in alto and piano duo improvisation in [F] section of *Mammoth* (notation approximate)



3.3.3 *Umbric Symmetry*

In *Umbric Symmetry* I employed a combination of the approaches to melodic line taken in *Primed* and *Mammoth*. Here, the melody gradually expands from a 1-note to 4-note linear realization of the adjacent seed pitch-class chords with each cycle of the set sequence. Figure 131 shows this increasing density of line with a comparison of first three bars of each section [A], [B] and [C]:

Fig. 131: Increasing density of melodic line with gradual addition of notes from pitch-classes in *Umbric Symmetry*,

b.1-3

The figure displays a musical score for three sections: C melody, B melody, and A melody, along with piano voicings. The score is written in 4/4 time and spans three bars. The C melody (top staff) is the most complex, featuring a sequence of notes that gradually adds pitch classes. The B melody (middle staff) is simpler, and the A melody (bottom staff) is the simplest, consisting of a few notes. The piano voicings (bottom two staves) provide harmonic support for each section.

In performance, *Umbric Symmetry* begins with an open-ended drum and piano improvisation, in which I once again systematically borrow and intuitively explore and extend material from the chord structures of the composition. Figure 132 below depicts two such quick-fire melodic renderings in the opening few seconds of the track. In the audio excerpt, drummer Dave Goodman echoes the rhythmic structure of the second bar.

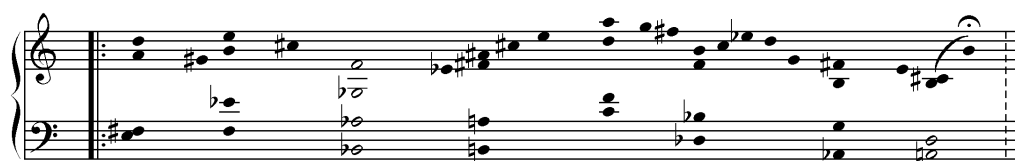
Fig. 132: Improvisatory melodic rendering of chord structures in *Umbric Symmetry*, opening seconds

The figure shows a comparison between an improvisation and the composition. The improvisation (top staff) is marked with a '7' and a '7' over the notes, indicating a specific rhythmic or melodic structure. The composition (bottom staff) shows the corresponding chord structures. The improvisation is marked with a time signature of 0:01 and 0:06. A speaker icon is located to the right of the score.

3.3.4 ...forked paths

In ...*forked paths*, I created nested melodies intuitively by ear through improvisation rather than theoretically from the systematically fixed adjacent pitch-class set. With the top note of each voicing acting as part of the melody, each 4-note pitch-class chord in Figure 133 below is surround by this comprovisation-derived melodic content in cells of 1-4 notes:

Fig. 133: Opening phrase of ...*forked paths*, demonstrating melodic content added through improvisation between composed pitch-class chords



In ...*forked paths* I improvise over cycles of the opening [A] section, expanding on the composed structures with spontaneous interpretations of their implied tonalities and associated scales. In Figure 134 below, for example, I begin by statically stating the left-hand dyads while and begin to depart from the right hand melodic content of the composition in the middle of the first system. In exploring the various implied hues of each chord structure over the course of my improvisation, I sought to evoke the title of the composition; to depict the many shapes and tints of light and shadow one encounters when wandering through a forest at dusk.

Fig. 134: Opening phrases of piano improvisation on ...*forked paths* (durations approximate)



As the solo progresses, I further expand each set of dyads into wide, contrapuntal Debussy-esque flowing lines, which eventually wind back into stillness at the end of the [A] form.

3.3.5 *Grind*

In *Grind* I took the reverse approach as in ...*forked paths*, by using a series of 4-note pitch-classes as the sole source of melodic content. After generating a series of melodic cells through improvisation, I analyzed and altered each as necessary to form lyrical progression of 7 distinct pitch-sets:

Grind seed sets: 4-2[0124], 4-4[0125], 4-Z29[0137], 4-3[0134], 4-10[0235], 4-17[0347], 4-24[0248]

Figure 135 demonstrates the initial conception of the first melodic cell, as the set [0124], in conjunction with the aforementioned systematic rhythmic row that underpins the piece – in the case a semiquaver pattern in the order [4,2,3,5,1]. This 5-value rhythmic row was initially coupled with a repeated section of four cycles of the melody of each pitch-class set:

Fig. 135: Initial conception of 4-note pitch sets and 5-value rhythmic row in *Grind* b.1-4,



In this initial form, each single pass equated a single bar of the time signature 49/16; with the repeat section the complete A section equates to a total duration of 49/8. Given the difficulty of keeping track of these shifting time signatures in this form, I reset the presentation of the rhythm to a conventional 4/4 grid:

Fig. 136: 4-note pitch sets and 5-value rhythmic row in *Grind* b.1-6, re-written for ease of legibility

As the piece progresses, the rhythmic row systematically displaces by one degree with the entry of each subsequent pitch-class set melody. For example, in Figure 137 below the

rhythmic row has become [2,3,5,1,4], having transitioned from [4,2,3,5,1] in the previous Figure 136.

Fig. 137: Shift in relationship between pitch-class set pattern and rhythmic row in *Grind*, b.7-12

The figure shows two staves of musical notation in 4/4 time. The first staff begins at bar 7 and contains a melodic line with a boxed letter 'B' above the first measure. Brackets above the notes group the melody into four distinct units. The second staff begins at bar 10, marked with a Roman numeral 'II' above the first measure. It continues the melodic line with similar bracketing. The staff concludes with the text 'next melody begins'.

It's important to note here that the rhythmic row continues to be structured as a repeated section of 4 units of the melody, not a single section of 8 units; given the structure of the rhythmic row the cycle is thusly bookended by the same duration (as seen previously in Figure 136 above). In Figure 137 above, the cycles of the melodic set are marked in brackets, and the start of the second section of 4 units of melody is marked at the start of bar 10.

3.3.6 Progeny

Progeny represents a fusion of serialism and free improvisation, in the form of an exercise in chromatic counterpoint for my trio. True to its name, *Progeny* uses the same tone-row as *A Dance* (for solo piano), and was created from a complete and almost chronological and systematic retrograde of the row order of the first 60 bars of that composition.

Fig. 138: Exposition of the tone-row of *A Dance*, b.1-4 (for solo piano or chamber duo)

Figure 139 demonstrates the row system behind the first few statements of *Progeny*, with the intervallic structures of the opening of *A Dance* evident in the transposed prime form of the tone-row seen in the bass clef:

Fig. 139: Opening statements of *Progeny*

Improvisation played an integral role in the composition of *Progeny*. As the order of the rows had been roughly set, I was free to experiment with various pacings of melodic development. Through improvisation I intuitively stretched and contracted the rhythmic structure of the two tandem rows to align to sonorous intervals, particularly at the ends of

phrases. Given the open-ended nature of this process, finding a satisfying combination took a significant period of heuristic trial and error. At the end of the first line of Figure 113 above, for example, the contrary motion quaver line implies a harmonic motion between A minor to B major, confirmed by the third that appears in the bass. I maintained and developed the structure of these opening themes throughout the piece. For example, the bass clef figure at bar 23 in Figure 140 below has been reversed to descend in perfect 5^{ths}, instead of the perfect 4^{ths} seen in bar 1 in Figure 139 above:

Fig. 140: Melodic development in *Progeny*, b.23

The regular interjection of quintuplet lines adds to the motivic structure; each quintuplet phrase maintains an up-down-up-down contour of line that perpetuates the motivic integrity. I was also interested in the oblique sound of the quaver quintuplet against crotchet triplet rhythm (5/3, in 4/4), as seen above at the end of Figure 140 above, and below in Figure 141:

Fig. 141: Quintuplet over triplet polyrhythm in *Progeny*, b.16

As the piece develops the bass part becomes more active, imitating the treble at several points in Figure 142 and 143:

Fig. 142: Quintuplet over triplet polyrhythm and imitation in inversion in *Progeny*, b.29

Fig. 143: Quintuplet over triplet polyrhythm and imitation in *Progeny*, b.50

Figure 143 shows a musical score for piano. The piece is in 7/8 time and C major. The right hand (RH) starts at measure 50 with a quintuplet of eighth notes (labeled R11) and a triplet of eighth notes (labeled P7). The left hand (LH) has a triplet of eighth notes (labeled P8) and a quintuplet of eighth notes (labeled I4). The score includes various accidentals and articulation marks.

I also investigated various permutations of the wide interval melodic leaps suggested by the major 7th and minor 9th intervals of the seed row. Figures 143 above and 144 below demonstrate several of these in quick succession – by this point the contour of these intervals has become part of the core motivic structure of the piece:

Fig. 144: Quintuplet motif and imitation in *Progeny*, from b.55

Figure 144 shows a musical score for piano. The piece is in 7/8 time and C major. The right hand (RH) starts at measure 55 with a quintuplet of eighth notes (labeled 5) and a triplet of eighth notes (labeled R8). The left hand (LH) has a quintuplet of eighth notes (labeled 5) and a triplet of eighth notes (labeled Ro). The score includes various accidentals and articulation marks.

Interestingly, when consolidated vertically many of the structures found in *Progeny* resemble the material derived using pitch-class sets in other works in the portfolio, again offering an example of my intuitive synthesis of pitch-class theory with my existing working methods. Figure 145 below demonstrates a selection of these pitch-class like shapes, with their location within *Progeny*:

Fig. 145: Example of pitch-class structures found at various point within *Progeny*

Figure 145 shows six pitch-class structures in a piano score format. The structures are labeled with pitch-class sets: [01257], [02468], [01234], [0127], [0347], and [0145]. The structures are shown in a piano score format with treble and bass clefs. Below the score, the locations of these structures are listed:

| Pitch-class set | Location |
|-----------------|-----------------------------------|
| [01257] | first system first beat |
| [02468] | second system fifth beat |
| [01234] | third system fifth beat |
| [0127] | seventh system last two beats |
| [0347] | final chord of B section |
| [0145] | middle of first system third page |

The improvisation on *Progeny* takes two forms. The first is a single pass of the [A] and [B] sections, with the drums, bass and left hand of the piano maintaining the form while the right hand of the piano solos around the given material. In the below excerpt, for example, I quickly deviate from the composition near the start of the solo form, while maintaining a tether to the original implied tonalities. At points I clearly reference the composition; in bar 2 I stretch the rhythm of the composition and immediately move to an alternate improvised melody; in bar 6 & 7 I both echo the rhythm of the composition and invert the melodic contour of bar 7; and in bar 10 I create a rhythmically complex embellishment of the dyad in the composition. This excerpt clearly depicts the interplay between the systematic (i.e. the fixed bass line) and intuitive (i.e. the improvised treble melody) modes that underpin this analysis.

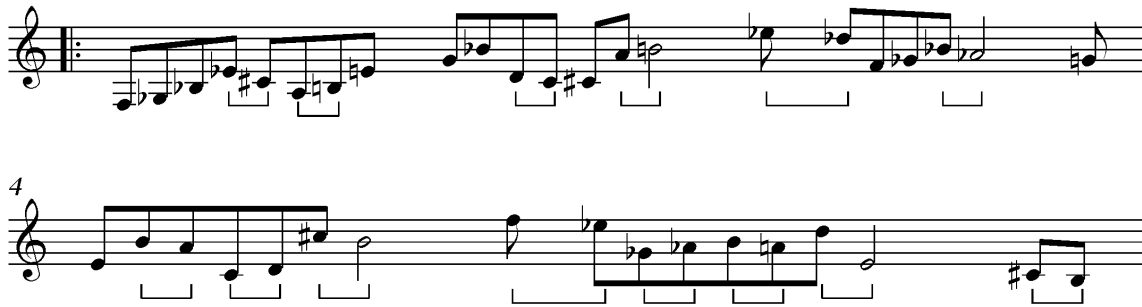
Fig. 146: Opening bars of piano improvisation on [A] section of *Progeny*

The musical score for piano improvisation on the [A] section of *Progeny* is presented in three systems. Each system consists of three staves: a treble clef staff, a middle staff, and a bass clef staff. The first system is labeled 'composition' and 'improvisation'. The second system starts at bar 5, and the third system starts at bar 9. The score includes various musical notations such as notes, rests, and fingerings (e.g., 3, 5, 6). A speaker icon is located to the right of the first system.

3.3.7 Organic Melody #1

Once again true to its name, *Organic Melody #1* was written relatively intuitively through improvisation over the course of about half an hour. Based primarily on the interval of a major 2nd, the melody twists via octave displacement through a range of implied key centers:

Fig. 148: *Organic Melody #1*, opening phrases with major 2^{nds} marked in brackets



In another example of the role of intuition in my composition practice, a reference to Ornette Coleman’s composition “Peace” from the seminal free-jazz album *The Shape of Jazz to Come* (1959) crept its way into the last few phrases: the two phrases in Figure 149 below are nearly direct transpositions of Coleman’s melodies seen at the end of each line of Figure 150:

Fig. 149: *Organic Melody #1*, “bar” 11.



Fig. 150: Ornette Coleman’s *Peace*, from *The Shape of Jazz to Come* (1959)

The image shows two systems of musical notation for Ornette Coleman's "Peace". Each system consists of a grand staff (treble and bass clefs). The first system is marked "STRAIGHT 4/4". The melody is primarily in the treble clef, with some bass clef accompaniment. The second system continues the melody and accompaniment. The notation includes various musical symbols such as slurs, accents, and dynamic markings.

The improvisation on *Organic Melody #1* is freely based on the melodic structures of the piece and occurs within an open-ended, generally tempo-less environment. Figure 151 below is taken from my improvisation on the included recording of a trio performance of the piece, and demonstrates the extensive, spiraling potential of these melodic structures - in this case based solely on the last phrase of the melody:

Fig. 151: Improvisation based on material from the composition in *Organic Melody #1*, opening phrases

...final phrases of composition

improvisation begins...

3

A few bars later I intuitively invert the contour of the line, as seen in the 2nd bar of Figure 152 onwards:

Fig. 152: Inversion of melodic motif in the improvisation on *Organic Melody #1*

improvisation continues...

My repeated permutations of this single melodic fragment is particularly demonstrative of the dialogue between improvisation and composition: any one of the above improvised melodies could be conceivably incorporated into the notated “composition”, which in turn may be then used for further improvisation in subsequent performances, and so on.

Figure 152 above concludes with a sparsely embellished recapitulation of the head melody, which I use to cue the return to the start of the composition to the trio. In the audio excerpt below, echoes of the composition can be heard amongst the spiraling lines and intensifying energy of the ensemble, as I extensively embellish the recapitulation of the melody.

Fig. 153: Score to *Organic Melody #1*, as reference for improvisation on recapitulation of melody



The musical score for *Organic Melody #1* is presented in a single system with eight staves of music. The notation is in treble clef and includes a double bar line at the beginning. The key signature changes to one flat (B-flat) at the start of the second staff. The score features various rhythmic patterns, including eighth and sixteenth notes, and rests. A 'fine' marking is placed above the staff at measure 18, with a key signature change to A-flat (Ab) indicated below it. A speaker icon is located to the right of the score.

3.3.8 #34

Consisting largely of melodic lines spiraling from the core motivic intervals of a major and minor 6th, #34 fuses “time no changes” with intervallicism and is particularly reminiscent of the kind of tonally ambiguous melodic themes popularized by free jazz pioneers Ornette Coleman and Paul Bley. The technique of “time no changes” eschews the cycles of harmonic progression in conventional jazz improvisation in favour of a tonally ambiguous walking bass line and an open-ended form, which aids in liberating improvisers from the confines of pre-determined tonality and the gravitational pull of the bebop vernacular. Yet time-no-changes can be a double-edged creative sword – the freedom of the style is counterbalanced by the lack of the safety net of harmony and form, requiring a focused individual and collaborative awareness of musical structure and impetus. As with my improvisatory embellishment of the melodic lines in *Organic Melody #1*, in #34 I suggest the performers generate a sense of continuity in the structure of their improvisations by utilizing passages from, or fragments or abstractions of the composition itself.

For example, the audio excerpt below demonstrates the first few seconds of the bass clarinet and piano solos over #34, with both Jeremy Rose and I utilizing in various forms the motifs and structures from the notated melody in Figure 154.

Fig. 154: Opening bars of #34, as reference for audio excerpt of improvisation below

The figure shows three staves of musical notation in bass clef, 4/4 time, with a key signature of one sharp (F#). The first staff begins with a box labeled 'A' around the first measure. The second staff starts at measure 5. The third staff starts at measure 8 and is labeled 'drums'.



Similar to the alto and piano duo improvisation in *Mammoth*, #34 is an opportunity for the entire ensemble to spontaneously reimagine the material of the composition. Like many of the companion works in this collection, this technique can result in distinct styles of realization from one take to the next; one take of #34 found the ensemble maintaining regular time from start to finish, where in another we abandoned all sense of pulse entirely.

3.4 Free Improvisation

I conclude this chapter with two final examples of my intuitive use of pitch-class sets, serialism and intervallicism, taken from a collaboration with the *koto* player and experimental improviser Michiyo Yagi which formed towards the end of my candidature in January 2017. Under the banner of *Orbiturtle*, a not-for-profit, cross-cultural artist collective I co-founded with Australian saxophonist Dave Jackson and Japanese drummer and *tabla* player Ko Omura, we undertook a 3-day workshopping and recording session in the Joganji Buddhist temple in Osaka and a series of performances across Japan. Our performances were entirely free form improvisations; the workshop process consisted of a series of improvisations of various lengths with very little to no pre-determined content or extensive discussion of the creative process itself. Nonetheless, as a group we quickly discovered an intuitive and empathetic collective approach to music making, and upon later listening I noticed many of the concepts of improvisation discussed throughout this analysis appear in my contributions.

For example, I begin one improvisation with a 4-note voicing in a pulsating quaver rhythm harmonic structure as the pitch class [0123] – also a permutation of the third set and third voicing structure in the sequence underlying *Umbric Symmetry*. As the performance unfolds, each of the members of the ensemble begin to target various fragments of this voicing or add their own interpretations of its suggested tonality – the third fragment played by the cello confirms this tonality temporarily as major with the addition of the F# over the D in the bottom of the piano voicing:

Fig. 155: Excerpt of *Joganji Improvisation #5*, opening sequence

The musical score is presented on a grand staff with three systems of staves. The first system includes a piano part (treble and bass clefs), a koto part (treble clef), and an alto part (treble clef). The second system continues the piano and koto parts, with a cello #1 part (bass clef) and a cello #2 part (bass clef). The third system shows the piano part continuing, and the cello #3 part (bass clef) playing a note. Labels above the staves indicate 'piano', 'koto enters', and 'alto'. Labels below the staves indicate 'cello #1', 'cello #2', and 'cello #3'. The piano part has 'cont...' written below it. The koto part has '(pizz)' written below it. The alto part has a single note with a sharp sign. The cello #3 part has a single note with a sharp sign. A speaker icon is located to the right of the score.

I began another improvisation from a live performance with a spiraling melodic line structured in a collection of narrow interval dyads – a compound major 3rd between the low D and F#, major 2nd between F# and G#, and a minor 3rd between E and G. Later in the passage I continue to add intervallic structures by expanding the initial resulting minor 6th between the G# and E into two minor 7^{ths} between G and F, C and Bb. Interestingly, the excerpt itself

constitutes an 8-note row, or the symmetrical pitch class 8-21[0123468A]; further expansion into a full 12-note row by following the logic of the excerpt could come by the addition of the notes B, A, C# and D# – which would add a minor 9th (i.e. compound semitone) and major 7th to the existing collection of intervals.

Fig. 156: Excerpt of piano improvisation from live performance with Orbiturtle, with possible composed extension

improvisation

possible extension (12-tone chord)

D#
C#
A
B
A#
C
F
G
E
G#
F#
D

These examples echo the compositional strategies I used throughout the trio & quartet works in this chapter, and demonstrate my integration of pitch-class sets, serialism and intervallicism into my working vocabulary as an improviser. The expanded improvisational capacity I developed throughout this investigation also created further possibilities in the process of improvisation, as the new ideas and sounds I stumbled upon had the potential to, and often did act as seeds for future compositional edition and refinement. This is ultimately demonstrated in the pieces I wrote for myself and Martin Kay depicted in Chapter Four.

3.5 Summary

In Chapter Two I depicted the interactions between systematic and intuitive modes of working in both my composition and improvisation for solo piano, and outlined several of examples of my varied uses of pitch-class sets, serialism and intervallicism as underlying structural devices. As I demonstrated with transcriptions of my improvisations on these pieces, treating an entire composed work as a potential source of creative content (much in the way Classical-era performers improvised cadenzas) established a broad, systematically grounded basis for subsequent intuitive performance.

Chapter Three continued and expanded on this approach within the context of the trio and quartet. In the process I further unpacked my highly conceptual approach to working with set theory and revealed the vast possibilities of pitch-class sets, in particular by drawing attention to the existence, to my ears, of a spectrum of tone colours between stability and volatility in the various intervallic permutations of both harmonic and melodic structures. I discussed my intuitive, aural approach to experimenting with these permutations, and at the same time my concentration on thoroughly investigating the intervallic properties of the systematic theory on which they were based – as seen particularly in my discussions of *Primed*, *Mammoth* and *Progeny*. I also referenced the manner in which these discoveries align with existing tonal theory, by at points adopting a conventional chord-symbol labelling technique.

As an ensemble, our improvisatory interactions derived from these compositions also yielded different creative outcomes to those possible as a solo pianist. For example, an intuitive, conversational approach to score realisation can be seen especially clearly in the case of the improvisations of Jeremy Rose and I in the open-ended solo section of *Mammoth*, where we derived and spontaneously and collaboratively reworked the content from a previous notated section of the composition. In a similar manner to that seen in solo works such as *Plink*, each take of the improvisation we recorded resulted in a unique musical outcome, though nonetheless one that echoed to various degrees the source material upon which it was based.

This intuitive and co-operative ethos also played out in myriad other ways throughout the collection. For example, I wrote no specific drum parts to give drummer Dave Goodman complete freedom to intuitively generate his own improvisatory accompaniments based on or dancing around the complex melodic and rhythmic scaffolds of the scores – a task that he navigated with aplomb. In a similar vein, the free improvisation at the opening of *Primed* was

captured in a single take, with each member responding with acute sensitivity to my notated and verbal suggestions.

Additionally, several notational elements of the works changed throughout the rehearsal process from their original forms, as I discovered ways to represent my desired outcomes in ways that were easier to read. The layout of *Primed* and the cycling ostinato sections in *Grind* shifted from time signatures changing every bar to a simple 4/4, for example. In hearing the works realised by the ensemble for the first time, I also made several edits to the works themselves – extending or shortening bars or rewriting melodies, and so on – that I felt resulted in better musical flow. This practice echoes the experimental style described in the Chapter One the working methods of Cézanne.

Finally, throughout the whole journey from rehearsal to recording, our discussions about the music as a band and feedback from each of the members was integral to shaping the final forms and approaches to performance, and I am deeply grateful to Dave Goodman, Max Alduca and Jeremy Rose for their invaluable input and musicality.

Following on from the collaborative theme of this chapter, Chapter Four investigates in further detail the musical outcomes possible between two improvising musicians. I analyse a series of composed works that sought to facilitate one-on-one musical conversation and establish a platform for wide-ranging, open-ended realisation.

Chapter Four: *Duologue*

4.1 Background

As a middle ground between the solo piano works in Chapter Two and the trio and quartet works in Chapter Three, in this chapter I dissect the creative processes behind and products from my duo collaboration with Sydney-based saxophonist Martin Kay.

Over the past few years I've discovered a unique creative energy working in improvising duos. Having been a part of improvising ensembles ranging in size from a trio to big band, I noticed that, as in conversation, it generally becomes easier for each member of a group to actively contribute musical ideas to an emerging performance as the size of the communicating group decreases. In duo, the intimacy and immediacy in the musical conversation means that collaborative decisions and pivots in the emerging performance (for example, tempo or volume changes, shifts in harmonic or melodic zone of focus) can be executed with greater spontaneity, fluidity and agility. Renowned saxophonist Wayne Shorter eloquently depicts the potential of the duo setting in an interview together with his longstanding comrade and pianist Herbie Hancock:

Well the duo, you say two - binary. The idea of binary incites an infinite number, or an infinite quantity of possibilities. The binary system...day and night, this and that, the same nor different...two people are neither the same, nor different.
- *Wayne Shorter* (Hancock & Shorter, 2014)

Recent research across disciplines has observed the essential role of collaborative partnerships in fostering creativity and innovation, challenging the Romantic-era mythology of the solitary genius toiling in isolation (see, e.g. John-Steiner, 2000; Kleon, 2012; Sawyer, 2008; Shenk, 2014b).

We canonize stories of rare geniuses—the ones who made the Sistine Chapel or *Hamlet*, the lightbulb or the iPod. On closer inspection, however, the primary creative unit is actually the pair. Whether it's Marie and Pierre Curie, or Tiger Woods and his caddy [Steve Williams], a dyad is the most fluid and flexible of relationships—and it naturally arouses engagement, even intensity. (Shenk, 2014a)

Ultimately, the outcomes of these partnerships are often seen as greater than the sum of the two individuals:

Interviewer: One plus one is three then.
Hancock: [*Laughs*]. Right. (Hancock & Shorter, 2014, p. 1:38)

Collaborative creativity has become an area of increasing interest among researchers in recent years – the 6th issue of the journal *Contemporary Music Review* (published in 2016) is devoted entirely to studies of musical collaboration. Practitioners have examined the partnership between composer and performer in both clearly defined (Kanga, 2014a) and directly collaborative roles (Aslan & Lloyd, 2016), and observed the emergent creative entities or ‘voice’ that such collaborations produce (Gorton & Östersjö, 2016). Studies of this nature generally seem to place more emphasis on the discussion of creative process over transcriptions or analyses of musical products, potentially due to the often improvisatory (i.e. ephemeral) nature of the products themselves.

The referents in this portfolio reflect my practice as a ‘free’ improviser. Guitarist Derek Bailey describes free improvisation:

...diversity is its most consistent characteristic. It has no stylistic or idiomatic commitment. It has no prescribed idiomatic sound. The characteristics of freely improvised music are established only by the sonic-musical identity of the person or persons playing it. (Bailey, 1992, p. 83)

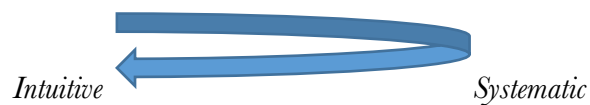
In the case of these pieces and my collaboration with Martin, the “sonic-musical” identity described by Bailey above sits somewhere at a nexus point between the jazz tradition and classical modernism – two fields which have been the focus of both of our artistic interests. This music is also informed by the many artists that have informed my own approach to free improvisation, particularly American free jazz pioneers such as pianist Paul Bley and saxophonist Ornette Coleman, and contemporary improvisers of the likes of Australian trumpeter Scott Tinkler and pianist Mark Hannaford, and American pianist Kris Davis and drummer Tyshawn Sorey. In a similar vein to the material in this chapter, Davis’ recently released *Duopoly* (2016) is based on a set of minimally sketched duo improvisations and features a who’s who of major figures in the jazz and experimental improvisation fields.

4.2 Martin Kay

Martin and I met in 2015 and began meeting regularly to explore both free improvisations and extended interpretations and deconstructions of jazz standards, for which we share a mutual affinity. I was impressed by Martin's unique intervallic language and conceptualization of musical texture – a product of his interests in French spectralism and modernist composers such as Ligeti – and I found myself discovering new ideas and ways of thinking and reacting musically through our improvisations together. I made a habit of recording each session to document these performances and potentially identify material for future use as either composition seeds or improvisation strategies.

At the start of 2016 I listened through our cumulative hours of recordings and transcribed and consolidated a body of fragments – melodic passages, harmonic structures, textural and timbral effects and so on – that I expanded upon to form a set of notated compositions. In turn, I intended each composed piece to act as a stimulus for further improvisation – a set of variations on an improvised theme. Martin and I recorded the completed sketches in June 2016 at the Sydney Conservatorium of Music, together with another half-an-hour free improvisation.

In this chapter I examine both the construction of each 'composition' from its improvised seeds and the resulting improvisations that Martin and I performed, in the process offering yet another perspective on the interplay between systematic and intuitive approaches to music making:



4.2.1 *Extrap*

By taking a systematic approach to the compositional development of each improvisatory seed, I discovered that each fragment had a creative potential far beyond that which could have been fully explored through real-time improvisation. *Extrap* is a good example of this: the four pages that make up *Extrap I, II* and *III* are entirely based on a brief exchange of melodic ideas between Martin and I from the middle of a 35-minute free improvisation on the 27th of April 2016.

Fig. 157: Seed material for *Extrap* (notation approximate)

In *Extrap*, each of the three parts explore a different technique for expanding this original melodic material. In *Part I*, I created a lengthy continuation to the initial melodic exchange largely through a series of intuitive, improvisatory interpretations of the intervallic shapes found within it. In Figure 158 below each box indicates material borrowed and edited from my initial improvisation in Figure 157. During the compositional expansion of the material I also intuitively altered pitches within each phrase to create a more chromatic and tone-row-esque effect - the melody beings with an 11-note row, for example.

Fig. 158: *Extrap* – final score, demonstrating expansion and edition of source material in opening bars

Where I expanded the seed material melodically in *Part I*, I took a harmonic approach to *Part II*. Here, I derived a set of chord voicings by taking the retrograde version of the *Part I* melody, splitting it into 3 to 5 note cells, and deliberately transposing and rearranging the pitches into a lyrical series of chord structures and passing fragments of single-line melody. Once I had set this system for manipulating the material in the first few cells, I was able quickly render the remainder of the source melodic content intuitively via improvisation. Below, Figure 159 below identifies the linear cells from within the un-transposed retrograde of *Part I*, while the subsequent Figure 160 shows the same cells in their final vertical and transposed form. I used open notation throughout the section to convey a flexibility of tempo and style of interpretation.

Fig. 159: Retrograde of *Extrap, Part I*, first few bars.

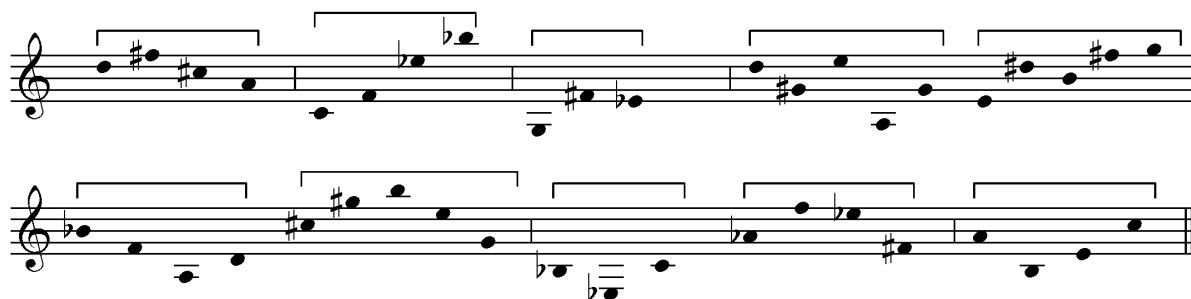


Fig. 160: Opening chord structures to *Extrap Part II*, consolidated and transposed into chord structures and passing melodies.

2 **B** lyrically, with a hint of pulse
ad. lib on subsequent repeats

30

By this point I had been exploring the use of pitch-class sets for some time in other works in the portfolio, and although I did not seek to expressly use pitch-class sets constructions in *Extrap Part II*, several points in the piece demonstrate my intuitive synthesis of the chord structures and chromatic dissonances which I had used intentionally in works. For example, Figure 161 below demonstrates one possible analysis of the implied pitch-class constructions from a section of *Extrap Part II*; the pitch classes [0136] and [0347] can be found in the composition *Grind*, for quartet; the class [0123] can be found in the series of pitch-class sets that

form the basis of *Umbric Symmetry*, for quartet; I used [0147] as one of the four pitch-classes in *Dreamreader*, for solo piano.

Fig. 161: Possible pitch-class analysis of chords structures found in *Extrap Part II*

The musical score for Fig. 161 consists of two staves, treble and bass clef. Above the notes, several pitch-class sets are indicated with brackets: 0136, 0347, 0247, 015, 025, 01237, 01237, 0147, and 0123. The notes are mostly quarter and eighth notes, with some accidentals (sharps and flats).

In recording, Marin and I improvised four cycles of the form of *Part II*, and each took a different approach to the realization of the open notation. Figure 162 below demonstrates the whimsical, bouncing staccato approach I adopted in my solo interpretation of the first pass of the form:

Fig. 162: Piano improvisation with the open notation of *Extrap Part II* (durations approximate)

The musical score for Fig. 162 is a piano improvisation. It features two staves, treble and bass clef. The time signature changes throughout: 8/8, 12/8, 3/4, and 4/8. The notation includes staccato notes, slurs, and dynamic markings like 'p'. There is a speaker icon on the right side of the page.

While the notation and time signatures in Figure 162 above are approximated, the figure does offer an example of the possibilities (i.e. registral shifts, invented articulations) inherent in open notation when treated liberally. Figure 163 below highlights the source content for this improvisation from within the open notation of *Extrap Part II*.

Fig. 163: Source of material in the improvisation on *Extrap Part II* in Figure 164 above, marked with bracket

2 **B** open lengths, improvise around shapes

Later in the performance of *Extrap Part II* during the fourth cycle of the form, I freely improvise a right hand melodic line over the notated dyads in the left hand, while occasionally referencing the notated notes in the treble stave. In this context, my vocabulary as a jazz improviser – based largely on deriving melodic lines from chord voicings or symbols by choosing an appropriate scale – guided my choice of melody notes over the tonally ambiguous dyads. In Figure 164, the improvised interpretation notated is based on the material just after the first dashed bar line in middle of the second stave of *Extrap Part II* (see Figure 163 above).

Fig. 164: Improvised expansion of open notation in *Extrap Part II* (recorded excerpt continues beyond notation to *fine*)

2 *8va*-----



Finally, in *Extrap Part III* I continued the systematic treatment of the initial improvised melodic seed, by composing a virtuosic section of at-tempo chromatic counterpoint based on the inversion and retrograde inversion permutations of the melodic line in *Part I*. By far the most compositionally challenging of the three sections, it took some time to align the two parts to incorporate moments of consonant harmony (i.e. 3^{rds} & 6^{ths}) from amongst the complexity and atonality of the source (i.e. inversion and retrograde) melodic lines.

Fig. 165: Recapitulation of *Part I* as *Part III*, first 12 bars (treble clef: *inversion*, bass line: *retrograde inversion*)

46 C 3

50

54

In one take of *Extrap Part III* I freely embellished, fragmented, referenced and otherwise improvised with the notated piano part, while Martin anchored the treble melody with a strict reading. In the process we created an effect of a fluctuating gravity between my improvisation and Martin's rendering of the composition, which finally pulls me back into alignment at the end of the performance:

Fig. 166: Recording of improvisatory interpretation of the piano part to *Extrap Part III*



In my systematic expansion and edition of the fragments of improvised source material that form the basis of *Extrap*, I demonstrate the vast creative potential of improvisation and in balancing systematic and intuitive creative processes. I continued this approach throughout the pieces in this segment of the portfolio.

4.2.2 *Haunted Dreamscape*

Haunted Dreamscape grew out of an improvisation Martin and I performed in November 2015, particularly a long series of wide interval chords derived through stacked combinations of minor and major 7^{ths} and 9^{ths} that I introduced during a section of sparse micro-tonality:

Fig. 167: *Haunted Dreamscape*, transcribed piano improvisation/solo section

repeats open (ad lib.)
sax harmonics and quarter-tones
(use previous material or generate your own)

11 **B**
mp
ped cont.

8^{va} 8^{va}
8^{va} 15^{va}

After transcribing this passage from the original recording, I composed a contrasting melodic section with an interval range of no more than a perfect 5th to act as an introduction. In Figure 168 below, the performance direction and the rhythmic complexity of the notation are intended to be only a representative guide for the performer:

Fig. 168: *Haunted Dreamscape*, opening melody.

semi-metrical rubato

5 3 3 5 9
4 3 3 5 3 3 5
7 3 5 3 5

Following the open-ended B improvisation section, I recapitulated this melodic theme with its retrograde inversion and retrograde forms, book-ending the entire piece to finish in the way it started. The resulting effect is a feeling of gradual expansion and contraction; the piece progresses from an interval range of a few semitones in the first bar to close to the entire range of the piano, before returning to its starting range in the final bars. As with *Extrap*, my systematic compositional treatment of the original seed idea translates the material into a thorough, multi-faceted musical narrative, one with the potential for recreation and further improvisatory expansion – a further example of the reciprocity of systematic and intuitive methods.

4.2.3 *Minimal Animal*

Minimal Animal is derived from a snippet of minimalist improvised interaction between Martin and I from April 2016.

Fig. 169: *Minimal Animal* – source material from duo improvisation



I edited and expanded this source material into another sketch for further improvisation. I utilized an online random number generator to complete each of the two parts; I took the common approach of labeling C=0, C#=1 and so on up to 12, and to maintain a tone-row impression considered any consecutive repeated numbers to represent just one instance of that number. Registrational choices we made intuitively, and in the case of the piano part, with a pointillist style in mind.

Where the original improvisation had had a metronomic tempo and languid mood, *Minimal Animal* seeks to further the minimalist and pointillist themes by encouraging the performers to experiment with using various speeds, combinations, registers, articulations and dynamics in their interpretation. As such, no two performances of *Minimal Animal* will have the same musical outcomes, as each performer approaches their material with a different eye and the two melodic lines intersect at different points, each time carrying different harmonic implications. Figure 170 below depicts the openings 20 or so seconds of Martin's and my interpretation of *Minimal Animal*. It demonstrates both the liberal flexibility with which we realized the score, and the unspoken communication between us that quickly establishes a thematic trend for the improvisation.

Fig. 170: Interpretation of *Minimal Animal*, indicating thematic continuity established by communication during performance (notation approximate)

The musical score for 'Minimal Animal' consists of two systems. The first system is in 5/4 time and features an alto and piano. The alto part starts with a half note G4 (marked *mp*), followed by a quarter rest, then a quarter note A4 (marked *sp*), and a half note B4 (marked *f*). A 'flutter' marking is above the B4 note. The piano part starts with a half note G3 (marked *pp*), followed by a quarter rest, then a quarter note A3 (marked *f*), and a half note B3 (marked *mf*). The second system is in 6/4 time and continues the alto and piano parts. The alto part starts with a half note G4 (marked *mf*), followed by a quarter rest, then a quarter note A4 (marked *pp*), and a half note B4 (marked *mf*). The piano part starts with a half note G3 (marked *mf*), followed by a quarter rest, then a quarter note A3 (marked *pp*), and a half note B3 (marked *f*). The score includes various musical notations such as rests, notes, dynamics, and articulation marks.

This style of collaborative and communicative interpretation continues through the rest of the recording, and typifies the organic and empathetic ethos I've found in improvising with Martin.

4.2.4 Metrics

Metrics was derived from a pitch-class like structure I came across during a free improvisation with Martin in November 2015:

Fig. 171: Source piano figure for *Metrics* taken from free improvisation

The musical score for 'Metrics' is in 4/4 time and features a piano part. The piano part starts with a quarter rest, followed by a quarter note G3, a quarter note A3, a quarter note B3, and a quarter note C4. The score includes a pitch-class structure [012567] and a piano figure. The score is in 4/4 time and features a piano part.

Rather than use this figure precisely as it appeared in the improvisation, I expanded and transformed the seed pitch-set into an initial melodic pattern while keep the same root and leading melody note, and intuitively derived a subsequent sequence of complementing extended time-signature phrases. Figure 172 below shows the initial seed set (now the mirror 9-9* [01235678A]) alongside the see-sawing melodic contour I used as thematic glue throughout *Metrics*, as seen the first two patterns:

Fig. 172: Pattern A and B from *Metrics*

The image displays two musical patterns, A and B, from the piece *Metrics*. Pattern A is written in 9/4 time and consists of two staves (treble and bass) showing a see-sawing melodic contour. Pattern B is written in 10/8 time and also consists of two staves, featuring triplets and a note labeled 'LH all 8vb/etc'.

In performance, each measure of *Metrics* is meant to be played indefinitely, with a freely liberal expansion and contraction of the melodic shapes within it. The audio example Figure 173 below begins with Martin stating the theme of the first measure before branching out into improvisation, while I maintain a bustling, fragmented undercurrent also derived from the notated material. Near the end of the excerpt we transition to the second measure via a visual cue.

Fig. 173: Improvisatory treatment of melodic content in first and second measure of *Metrics*



Later in our interpretation, we lock onto place once more around measure three, before quickly transitioning back into a fragmentary use of the notated material. In Figure 174 below, both Martin and I experiment with using various lengths and snippets of measure, occasionally referencing the theme at the same time.

Fig. 174: Fragmentary use of notated material in the improvisation on *Metrics*

As with *Minimal Animal*, in *Metrics* I establish a broad range of possible realization outcomes that would be difficult, due to the intricacy and spontaneity of collective improvisation, to achieve through pre-set or compositional directives.

To explore this avenue, alongside this collection of improvisatory pieces I wrote another complementing group of sketches based on pre-set or composed parameters rather than pre-recorded improvisations, reversing the creative process to begin with a systematic compositional approach.

4.2.5 *Tricolour*

Tricolour is based solely on three pitch-class sets: the two all-interval sets [0146] and [0137] and a mediating [0135]. As with many of the quartet pieces in the portfolio, I began by first constructing a scaffold of chord voicings based on cyclical permutations of the two all-interval sets with the occasional interjection of [0135], alternating systematically between prime and inverted forms:

[0146], [0137i], [0146i], [0137]

This chord chorale forms the basis of the improvisation section at the end of the piece; Figure 175 outlines the first system of the chorale:

Fig. 175: First passage of the chorale to *Tricolour*, b.44

44 **solo form (chorale-like)**

Once this chorale had been constructed, I derived a series of melodic statements to act as an introduction, by targeting various tiers of the SATB chord structures; the A, B and C sections of the piece were formed by intuitively filling in melody notes between the tenor, alto and soprano parts respectively. In each case, the underlying chord changes, or harmonic

rhythm behind the melody is in approximately units of $\frac{1}{2}$ notes; i.e. each chord of the melody is implied to last for twice that of $\frac{1}{4}$ notes suggested in the chorale. For example, Figures 176 & 177 below demonstrates opening phrases of the A and C sections, with the target notes from the chorale marked by asterisks:

Fig. 176: Melody derived by targeting tenor parts of the chorale in *Tricolour* (target notes marked with asterisks)



Fig. 177: Melody derived by targeting soprano parts of the chorale in *Tricolour*

In the case of Figure 177 above, I changed the E-natural at the end of the first melodic line of the chorale to a D# in the melodic statement, having decided this was a better choice in the context of the harmonic implications of the melodic line.

The improvisation on *Tricolour* occurs over cycles of the chorale. In our recording, I provide the harmonic accompaniment while Martin improvises with and expands on the notated harmonic cells.

Fig. 178: Excerpt of improvisation on *Tricolour*



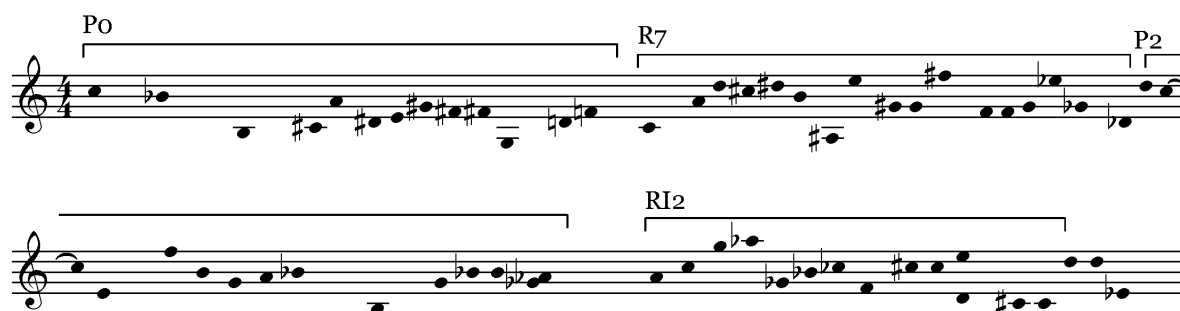
4.2.6 *Ophiology*

Ophiology is a *contrafact* (a composition based on an existing harmonic framework) of the classic jazz standard *I Got Rhythm* by George Gershwin. Derived entirely from transpositions and transmutations of a tone-row, the title references the snaking, chromatic nature of the melody.

Fig. 179: Prime form of tone row of *Ophiology*



Fig. 180: Opening phrases of *Ophiology*, with row forms marked



Throughout *Ophiology* I structured the rows to outline Gershwin's original chord progression, hinting occasionally at moments tonality amongst the twelve-tone melodic environment. Figure 181 below, for example, identifies a series of points where the melody targets the third or seventh of the underlying chord, momentarily referencing the inherent functionality of the progression. The excerpt also represents the hidden barlines of the score with dashes, demonstrating the 8-bar length of the passage.

Fig. 181: 3rds & 7ths of chords from the *I Got Rhythm* progression targeted by the melody of *Ophiology*

The image shows the *I Got Rhythm* chord progression with the melody of *Ophiology* overlaid. The chords and their targeted notes are as follows:

- Bb^{maj7}: tonic (G4)
- G⁷: 3rd (Bb4)
- Cm⁷: 3rd (Eb4)
- F⁷: 7th (Eb4)
- Dm⁷: 7th (Cb4)
- G⁷: 3rd (Bb4)
- Cm⁷: 7th (Eb4)
- F⁷: 7th (Eb4)
- Fm⁷: 5th (Cb4)
- Bb⁷: 3rd (Eb4)
- Eb^{maj7}: 3rd (Eb4)
- Ebm⁷: 3rd (Eb4)
- Dm⁷: 3rd (Eb4)
- G⁷: 3rd (Bb4)
- C⁷: 3rd (Eb4)
- F⁷: 7th (Eb4)

The melody is shown on a single staff, with the notes connected by a continuous line. Dashed vertical lines indicate the hidden barlines of the score, demonstrating the 8-bar length of the passage.

In performance, Martin and I freely switch between referencing the melody of *Ophiology*, the *I Got Rhythm* progression and free improvisation.

Fig. 182: Snippet of use of *Ophiology* melody used in free improvisation.



4.3 Summary

This group of sketches and recordings demonstrate the possibilities of improvisation as a creative strategy. In utilizing improvised seeds for the generation of more extensive composed works, these works offer further insight into the equilibrium between intuitive and systematic modes that has formed the basis of my exegesis.

As mentioned in the introduction to this chapter, throughout the collaboration with Martin, I noticed that the intimacy and immediacy of the musical conversation in the duo setting generated what I regard as some of my more successful creative outcomes in this portfolio. In music, as a duo improvisation unfolds, each person contributes ideas to the performance which are often picked up and further elaborated by the other party. The musical outcomes thus emerge organically through collaboration, as each person juggles both their own and the other person's ideas – selecting, recombining, editing and expanding in real time. This phenomenon has been chronicled in recent studies of famous artistic partnerships: for example, Pablo Picasso and Georges Braque invented Cubism together, while they were nearly inseparable during many months living in the Montmartre district of Paris (Gardner, 2011, p. 149).

The findings of this chapter set a precedent for further research in this area, which will focus in greater analytical detail on the roles of creative authorship in collaborative free improvisation.

Chapter Five: Applications of this Research & Conclusion

This exegesis has demonstrated the myriad potential of pitch-class sets, serialism and intervallicism, both as tools for systematic improvised performance and in the intuitive generation of composed structures. To summarize the findings of the analyses in Chapters Two, Three and Four, I offer here a final series of consolidated examples which I hope catalyze ideas for the reader as to the broad applications of the insights and analyses discussed throughout this exegesis. As such, this chapter looks to the future by addressing the ways in which one may both systematically integrate pitch-class sets, serialism and intervallicism into one's creative vocabulary, and use these structures intuitively in one's existing practice as a composer or improviser.

5.1 Re-imagination of Tonal & Functional Harmony

As discussed previously, jazz pianists are principally concerned with harmonic realization and accompaniment, and thus well-versed in the possibilities of voice-leading through chord progressions. With my background in traditional jazz performance, over the course of this study I experimented with various ways to integrate the pitch-class structures I discovered into conventional chord progressions, with the aim of further developing the repertory of techniques that I could retrieve intuitively while improvising.

Figure 183 below demonstrates one example of this approach within a simple ii-V-I progression. The first two bars depict common voicings for this progression, while the second two bars offer a series of possible pitch-class structures that can be derived through subtle chromatic shifts of certain notes within these original voicings. In the case of the first chord of bar 3, for example, I moved the three inner voices up a semi-tone to create a harmonic tension preceding the ii⁷ chord. On beat three of the same bar, two further chromatic readjustments create a dense voicing that could be interpreted as Bbmaj13^(susb9) in the place of the original Bb13^(b9). Finally, the tonic chord in bar 4 is edited to form the slightly more volatile Ebmaj9^(b9).

Fig. 183: Typical ii-V-I progression, and the same progression re-harmonized with pitch-class chord structures.

The image shows a musical score for a ii-V-I progression in 4/4 time, presented in two parts: a traditional harmonic version and a re-harmonized version using pitch-class structures. The traditional version consists of three measures: Fm⁹, Bb^{7(b9)}, and Ebmaj¹³. The re-harmonized version consists of four measures, each with a pitch-class structure label above it: 5-16B [03467], 5-13 [01248], 5-Z18 [01457], and 5-2 [01235]. The notation includes a grand staff with treble and bass clefs, showing the chord voicings in both hands.

Utilising pitch-class structures in this way builds on the pioneering work of modern-era jazz pianists such as Clare Fischer and later Herbie Hancock, who during the 1960s revolutionised the harmonisation possibilities available to improvising pianists by adopting the dissonances and tensions heard in modernist classical music.⁴ To take this technique one step further, it is possible to use strings of pitch-class structures to radically re-imagine conventional harmony. Ballads or tunes with slow-moving melodies are especially fitting for this kind of densely chromatic treatment, as they allow one slightly more time to consciously consider the voice-leading movements between chords.

Take for example, the first 8 bars of the classic jazz standard *Body & Soul*. Figure 184 below demonstrates one possible reimagining of the original chord progression using 4-note pitch-classes, which I created largely through improvisation by freely altering the key and quality of each chord while maintaining an intentional yet vague tether to the original harmony – the excerpt resolves to the original Dbmaj⁷ chord in the 2nd bar and Ebm⁹ in the 5th bar, for example. The audio excerpt below contains first a performance of *Body & Soul* in 4 parts true to the original chord changes, and second the harmonization *Body & Sets* notated in Figure 184.⁵

⁴ Additionally, pianist Bill Dobbins's indispensable *A Creative Approach to Jazz Piano Harmony* (1994) has greatly influenced my conceptualization of harmony and harmonic progression over the years.

⁵ This technique extends a re-harmonization approach identified by pianist Mark Levine in his seminal *Jazz Theory Book*, whereby each note of a melody can be harmonized at random as a new chord from any of the 12 keys, if one pays careful attention to voice-leading and root movements between consecutive chord structures.

Fig. 184: *Body & Sets*: a possible re-harmonization of the first 8 bars of *Body & Soul*, based on 4-note pitch-class sets derived through improvisation



Having spent some time working with pitch-classes by this point, the sound and tactile feel of pitch-class set structures at the piano had begun to intuitively seep into my vocabulary, which made composition of this example more improvisatory than if the sets had been systematically chosen in advance. The fact that a few of the voicings constructed through improvisation to form Figure 184 also appear within various composed works in the portfolio suggests that by the time I wrote *Body & Sets*, the systematic theory of and my approach to exploring pitch-class structures had led to a greater degree of fluency in the intuitive use of these materials as an improviser.

For example, the first chord of *Body & Sets* is also the first chord of *...forked paths* in a different inversion; the first chord in bar 6 of *Body & Sets* is also the first chord of *Umbric Symmetry* with the 2nd voice from the top dropped down an octave; and the first chord of bar 7 of *Body & Sets* appears in the same inversion (with the addition of the pitch class [2] at the end of the first phrase of the B section of *Mammoth* – all compositions which were at the time occupying much of my creative and professional performance time.

As these voicings become naturalized to the ear and assimilate further into one's schemas for improvisation over time, it is foreseeably possible (as with any spoken language or system of musical improvisation) to reach a fluidity in which this kind of advanced re-harmonization can be processed and performed spontaneously. Particularly within a solo piano context, the use of pitch-class sets in free improvisation offers an expansive, systematic method for generating a sense of consistent structure in an often otherwise structure-less environment

– thereby synthesizing the systematic and intuitive modes that have been discussed throughout this exegesis.

Often interchangeable to pitch-class structures, intervallicism offers a different lens through which to view the construction of chord voicings. Figure 185 below depicts a series of voicings based on various interval structures of diminishing size – from major 7th and minor 9^{ths} in the first bar through 6^{ths}, 4^{ths}, and 3^{rds}. The possibilities of such an approach to chord generation is once again extensive; for example, the last bar contains a chord derived by stacking a major 2nd, major 7th, minor 2nd, perfect 5th and another major 7th to form the dense 7-note set of nested semitones 7-1[0123456]. In this way I take a similar approach to saxophonist Dave Liebman in his *Voicing Compendium* at the end his book *A Chromatic Approach to Jazz Harmony and Melody* (1991), although Liebman does not offer any explicit suggestions as to how this material may be used in tonal or post-tonal contexts. I offer one further such example in bar three, following on from my analysis of chord stability and volatility and pitch-class harmony in Chapter Three.

Fig. 185: Intervallicism as a technique of generating chord structures

The figure shows five bars of music in G major. Above the staff are labels for each bar: [0123], 6ths, [012567] C¹³(#11) 3rds, and [0123456]. The first bar has a treble clef and a bass clef, with a key signature of one sharp. The second bar has a treble clef and a bass clef. The third bar has a treble clef and a bass clef, with a key signature of one sharp. The fourth bar has a treble clef and a bass clef, with a key signature of one sharp. The fifth bar has a treble clef and a bass clef, with a key signature of one sharp. The notation includes various chord symbols and interval labels.

Several points in this portfolio demonstrate my use of these types of chords. Figure 186 below depicts one chord built in major and minor 6^{ths} from *Microcosm*. Next to it, I offer a potential extension to this voicing to continue this construction, in this case generating a chord that spans the entire range of the piano and all 12 tones; the chord would precisely span the range from A0 to C8 if transposed up a semi-tone.

Fig. 186: Voicing in 6^{ths} from *Microcosm*, and potential extension to 12-tone chord

The image shows a piano voicing in 6ths from the piece 'Microcosm'. The notation is in treble and bass clefs. The original voicing is labeled 'Microcosm b.5' and consists of two chords: the first chord has notes G4, B4, D5 in the right hand and F3, A3, C4 in the left hand; the second chord has notes A4, C5, E5 in the right hand and G3, B3, D4 in the left hand. A bracket above the second chord indicates a 'Possible extension' to a 12-tone chord with notes G4, B4, D5, F5, A5, C6 in the right hand and G3, B3, D4, F4, A4, C5 in the left hand. A second bracket below the second chord indicates a further extension '(if low Ab available)' with notes G4, B4, D5, F5, A5, C6 in the right hand and G3, B3, D4, F4, A4, C5, Ab4 in the left hand.

5.2 Improvisation of Melodic Line

As discussed throughout Chapters Two, Three and Four, my study of the three devices outlined in this exegesis also led to a radical shift in my conception of and approach to melodic line. For example, I began systematically inventing and practicing the application of pitch-class melodic structures to standard jazz repertoire. I found that pitch-class set structures become particularly effective during long passages of a single chord, where the opportunity exists to juxtapose chromatic options with other, more conventional techniques. Guitarist and Princeton lecturer Bruce Arnold offers a significant investigation of the applications of pitch-class sets to jazz harmony in his *Sonic Resource Guide* (2006). Here I extend Arnold's approach by venturing further into advanced harmony and 'outside' playing, taking a lead from notable jazz pedagogues such as Dave Liebman (1991) and Jerry Bergonzi (particularly his *Pentatonics* (1994) and *Hexatonics* (2006) books).

For example, with a long series of four 4-bar chord durations, saxophonist Joe Henderson's classic standard *Inner Urge* is a good vehicle for practicing pitch-class melodies. Take the first chord of the piece, an F# half-diminished 7. While an improviser could interpret this chord in any number of ways, standard chord-scale theory posits the use of either the G major or A melodic minor scales – the difference being the performers preference for either a major or flattened ninth (see, e.g. Levine, 1995).

Using pitch-class theory, one can choose a pitch cell that utilizes a selection of these notes. The A melodic minor scale, for example, (as one of the available options) contains any number of different pitch class structures:

Fig. 187: Pitch-class structures within the A melodic minor scale, as improvisation options over the $F\sharp^{\text{half-dim}7}$ in

Inner Urge

A melodic minor

$F\sharp^{\text{dim}7}$

[0236] [0348] [0157] [01346]

Taking this approach stays diatonically true to the typical chord-scales associated with the chord symbol. For those seeking to explore beyond the bounds of conventions, it is possible to superimpose a range of generated pitch-class structures over the chord, some of which may contain passing chromatic tones from outside the aforementioned scales.

One could use the pitch-class [0145], for example, which in the permutation below (see Figure 187) outlines the 1th, minor third and both the minor and natural 9^{ths} of the $F\sharp^{\text{half-dim}7}$. To create more chromatic tension, one could use the pitch-class [0256], which in this key includes both the guide tones of the 3rd and 7th, as well as two chromatic passing tones in the Bb and Eb . A pitch class with three added chromatic tones (relative to the scale of A melodic minor) and one chord tone would sound even more dissonant – for example, the below mirror set [0127] contains only the 7th of the chord.

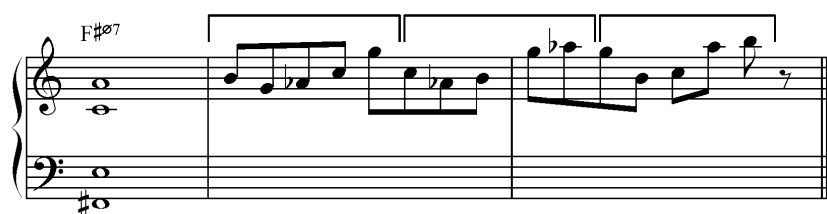
Fig. 188: Theoretical superimposed atonal pitch-class sets of increasing chromatic dissonance, as improvisation options on the $F\sharp^{\text{half-dim}7}$ in *Inner Urge*

$F\sharp^{\text{dim}7}$

[0145] [0256] [0127]

In my own practice, I sought to use these structures in both melodically and rhythmically interesting ways. I might practice a 4-note set as a 5-note pattern, for example, so that the rhythmic contour of the line shifts against the 4/4 time signature with every permutation:

Fig. 189: Pitch-class structure [0145] from Figure 160, used in 5-note pattern



Clearly, taking such an approach to the melodic realization of chord symbols offers a vast terrain of possibilities (even just within 4-note pitch-class sets, let alone larger cells), limited only by the performer's knowledge of pitch-class structures, their ability to think outside conventions and their ear for acceptable dissonance. Starting from a base of 4-note structures, it is also easy to include additional tones or chromatic passing notes to generate larger melodic chains – an approach I adopted in my own practice of the many 4-note and larger patterns found in Slonimsky's *Thesaurus of Scales and Melodic Patterns* (1947).

The more one becomes familiar with pitch-class sets, the easier it becomes to make intentional, or ultimately intuitive use of chromatic dissonances or passing notes over extended improvised passages. One could play the pitch-class [01567] in one key over the entire first 16 bars of *Inner Urge*, for example; in the key of Figure 190 below, the set balances varying degrees of melodic consonance and dissonance with each subsequent chord change, and would give an impression of flirting with playing 'outside' the changes. In this example, I've marked the more unconventional tones with exclamation marks (in performance, each chord lasts for four bars).

Fig. 190: Possible use of pitch-class [01567] over first 16 bars of *Inner Urge*

Over the course of this project I also became more adept in integrating pitch-class sets into settings of free improvisation, both as preset catalysts for creative extrapolation and structural options available to improvisers in contexts with no prescribed performance parameters. Adopting this approach revolutionized my view of the creative possibilities in any situation – particularly in the open-ended collaborations with Martin Kay and *koto* player

Michiyo Yagi. Pitch-class sets present a valuable tool for the generation of atonal florid lines, for example, such as in this tonally ambiguous bar from the opening bars of my composition *Roundabouts*:

Fig. 191: 6-note pitch class line in *Roundabouts*, b.4

To take this example one step further, many passages of pitch-class or intervallic structures found in the works of my portfolio also unintentionally seem to be based on serial or 12-tone row schematics. Take for example the excerpt in Figure 192 below from the [D] section of *Mammoth*: except for a small number of passing notes, the first three phrases spell out 11- and 12-tone rows despite being derived from the series of 5-note pitch-class sets used in the [A] section of the piece.

Fig. 192: Possible tone-row analysis of [D] section of *Mammoth*

As an improviser, it is conceivable to achieve a similar result by monitoring and regulating one's position in the chromatic scale – either intuitively or by systematically exploring certain melodic cells. For example, the pitch-class [014] can be repeated four times to complete the chromatic scales, as in Figure 193 below:

Conclusion

By way of three distinct bodies of original compositions - for solo piano, trio & quartet and duo - this portfolio of works and exegesis represent a culmination of my investigation of pitch-class sets, serialism and intervallicism as creative tools. At the same time, by adopting the lenses of the *systematic* and *intuitive* modes to observe and analyze my working methods and thought processes, I considerably expanded both my musical vocabulary and my cognizance of the available possibilities in any setting of composition or improvisation. In so doing, I discovered a underlying permeability in my use of what are generally termed as ‘compositional’ or ‘improvisational’ creative strategies, and extracted a number of key research findings which pose answers to the research questions outlined in the introduction of this exegesis.

In Chapter Two, I utilized various systematic approaches to facilitating improvisation for solo piano, and intuitively manipulated systematically-grounded structural devices in both the *comprovisation* of the composed works and the subsequent improvisations derived from them. This chapter demonstrated both the essential role of this comprovisation in my creative process, and, through transcriptions of recorded improvisations, the broad creative possibilities that emerge when treating an entire composed work as a source of creative content during improvisation – much in the same way as performers of Classical music approach improvised cadenzas. In the case of *Codify* and *Microcosm* this led to improvisations that spontaneously recycled and reimagined the sketch-like composed material with a broad range of techniques, leading to the emergence of numerous permutations of the identity of the ‘composition’ during the course of a single performance.

In Chapter Three, I focused in depth on the myriad methods of using (predominantly) pitch-class sets as core structural units. Through a wide variety of transformative processes such as inversion, transposition and the expansion and contraction of intervallic components, I discovered a spectrum between harmonic and melodic *stability* and *volatility*, both between and within individual permutations of pitch-class structures. This consideration of consonance and dissonance was informed by my background as a jazz pianist and familiarity with conventional harmony, chordal accompaniment and voice-leading techniques. Additionally, transcriptions of collective improvisations with various members of the quartet depicted the effective balancing of systematic elements (i.e. pre-set harmonic and melodic frameworks) with intuitive improvisation in both the performances of the other musicians, and the interactions between us. The collaborative nature of these performances and the very satisfying musical outcomes

(to myself at least) further demonstrated the practical applications of my approach to using pitch-class sets, serialism and intervallicism as creative tools.

In Chapter Four I examined this role of collaboration in greater detail through the musical processes behind and products of a duo project with saxophonist Martin Kay. I discussed the iterative nature of this collaboration: where free improvisations were recorded and became compositions, these compositions in turn facilitated fresh improvisation, and these improvisations in turn could potentially turn into revisions of the composition, or new works in their own right.

In Chapter Five, I offered an additional demonstration of the ways in which the outcomes of this research may be integrated with existing tonal theory, particularly within the realm of jazz performance. The example of *Body & Sets* depicted the synergies possible between intuitive voice-leading principals and the systematic theory of pitch-class sets, and the broad palate of tone colours that can be derived by using this method to reharmonize harmonic progressions. Further examples presented possible ways to use pitch-class structures in melodic improvisation by relating them to conventional jazz chord-scale theory. This analysis was by no means intended to be exhaustive, and remains an area for further inquiry in both my practice and teaching.

My practice-based, autoethnographic methodology outlined in this exegesis also offers a contribution to the ongoing dialogue around the shape of creative research within academia, particularly in the merging of practice-led research (i.e. investigation and outcomes derived from one's existing creative work and methods) and research-led practice (i.e. investigation and outcomes resulting from the applications of theory). In fact, it is possible to view these two approaches as also being reflective of the intuitive and systematic modes, respectively. I further demonstrated that, particularly in case of creative practice, methodology is a living, breathing entity subject to change, revision and new approaches over time – particularly over a five-year period, where one's aesthetic is likely to morph (as mine certainly did) as a result of both research and heuristic processes.

Through this project I sought to synergize the worlds of jazz improvisation and 20th century composition that have captivated my musical curiosity since my teenage years. In hindsight, I recognized that I had intuitively begun to investigate many of the techniques covered in this exegesis before the start of my candidature: particularly in the use of chromatic

5-7 note sets in melodic improvisation and of dissonant chordal structures as a means to both imply and substitute for tonal harmony. These embryonic ideas have invaluablely benefitted from being expanded upon throughout the past five years with the kind of holistic and systematic method offered particularly by pitch-class theory.

Having based this project on exploring the applications of pitch-class sets, serialism and intervallicism to small group and solo performance, I'm eager to apply the insights gleaned through this process to upcoming large ensemble projects and further develop the approaches to collective improvisation schematics, extended forms, and chromatic counterpoint established in this portfolio of music.

Above all, this study has revolutionized my creative practice and the direction of my journey as a musician. Thanks to the volume of available materials and open ended nature of the process, I envisage that I will continue to expand and refine the applications of the tools and techniques discussed in this exegesis for many years to come. Finally, I hope the compositions and analysis presented here offer a resource to both composers interested in facilitating open-ended music making, and improvisers seeking fresh approaches to their art.

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