FOLIO OF COMPOSITIONS

COMPOSING BREATHING EFFECT:

DECAY OF SOUND

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PhD

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Music

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Abstract

My portfolio of compositions includes eight original scores, plus two revised scores and accompanying recordings. The recordings are presented on one CD and one DVD. Written over three years, the compositions are for a variety of instruments from solo piano through to orchestra. Most of the works have been performed, either by professional musicians or by students.

My research is focused on the role of breath within the dynamic relationship between events, reverberations and rests. My primary goal was to compose decaying musical shapes from the concrete object to silence. In this commentary, I also discuss other aspects of my compositional practice, such as individual *ritardando* techniques. I have analysed the harmonic progression, pitch materials and structure for some of my pieces. In chapter II, I explain how my music is related to the ideas of the musical gestures of appearance and disappearance. In chapter III, I clarify the method of organising broken looping as repetition. Both chapters also include an explanation of my cultural, musical background and influences.

Table of Contents

List of compositions

Title	Instrumentation	Period of composition	Duration
Recollection of the mutual moments	Electric guitar and percussion	August – November 2011/ Revised November 2012	11' – 15'
Sculpting a minuet	Flute and guitar	September – December 2012	6'
Echo	Baritone and piano	January – March 2013	5'
Weeping Tree	Piano solo	March – June 2013	14'
Les accordéons V	String quartet	November 2012 – January 2014	11'–13'
Stepping Stones on the Constellations	Large ensemble of fifteen players Orchestra	July 2013 – March 2014 September 2014 – March 2015	12' 14'
Récollection	Percussion and Piano	October – April 2014	10'
KAIROI	Mezzo soprano, tuba and large ensemble of fifteen players Mezzo soprano, oboe, clarinet, percussion, accordion and violoncello	March – July 2014 August – October 2014	10' 9'

Contents of the accompanying CD and DVD

The audio CD contains recordings of most of the pieces presented in the folio, with the exception of *Sculpting a Minuet* and the third movement of *Weeping Tree*. The video DVD contains live performances of *Stepping Stones on the Constellations* in a version for large ensemble.

For two pieces (*Les accordéons V, Recollection of the mutual moments*) I have included recordings of two separate performances by different ensembles, in order to compare the two different interpretations of the same piece. In both cases, I compare the techniques of individual *ritardando* and unspecified duration of rest using empty bars.

Audio CD

1 *Recollection of the mutual moments* for electric guitar and percussion **12:52**

Performed by Ensemble Besides

Live recording

26th January 2012 at St. Paul's Hall, University of Huddersfield, UK

2 *Recollection of the mutual moments* for electric guitar and percussion **10:05**

Performed by Chimera Ensemble; Azlee Baber (Percussion) and
Max Hampshire (Electric Guitar)

Live recording

30th November 2012 at Sir Jack Lyons Concert Hall, University of York, UK

3 *Echo* for baritone and piano **05:05**

Performed by Robert Rice (Baritone) and William Vann (Piano)

Live recording

6th April 2013 at York Unitarian Chapel, York, UK in Late Music Concert Series 2013

4 *Weeping Tree* for piano solo 1st movement **03:17**

Recorded by Jin Hyung Lim (Piano), William Mackie (Sound Engineer)

November 2013 at Rymer Auditorium, University of York, UK

28th December 2013 at 2:00 pm– 3:00 pm. 29th December2013 broadcast in the USA Viva 21st Century Marathon Plus – International Edition – 25 Hour Live WPRB Radio Broadcast

5 *Weeping Tree* for piano solo 2nd movement **05:58**

Recorded by Jin Hyung Lim (Piano), William Mackie (Sound Engineer)

November 2013 at Rymer Auditorium, University of York, UK

28th December 2013 at 2:00 pm– 3:00 pm. 29th December2013 broadcast in the USA Viva 21st Century Marathon Plus – International Edition – 25 Hour Live WPRB Radio Broadcast

6 *KAIROI* for mezzo soprano, tuba and large ensemble **09:26**

Performed by London Sinfonietta, Lore Lixenberg (Mezzo-Soprano), Oren Marshall (Tuba), Conducted by Garry Walker

Studio Recording, NMC recording
22nd August 2014 at PATS, University of Surrey, UK

7 *Les accordéons V* for string quartet (Introduction only) **03:02**

Performed by Quatuor Diotima

Edited live recording from the workshop

11th February 2014 at the Sir Jack Lyons Concert Hall, University of York, UK

8 *Les accordéons V* for string quartet **07:48**

Performed by Quatuor Diotima

Edited live recording from the workshop

19th February 2013 at the Sir Jack Lyons Concert Hall, University of York, UK

9 *Les accordéons V* for string quartet **09:15**

Performed by Timf Ensemble

Edited live recording

16th November 2013 Composing Factory at Sejong Dream Art Center, Seoul, South Korea

10 *Récollection* for percussion and piano **09:37**

Performed by Siwan Rhys (piano) and George Barton (percussion)

Live recording

10th June 2014 for New Dots Sound of the New, The Forge, London, UK

Video DVD 1

***Stepping Stones on the Constellations* for Large Ensemble** **11:35**

Live recording

Performed by Chimera Ensemble, conducted by Olly Wood

21st November 2014 at the Sir Jack Lyons Concert Hall, University of York, UK

Acknowledgements

I would like to thank my supervisor, Dr. Thomas Simaku for his advice and inspirations, and Prof. Roger Marsh for his helpful comments and trust in my music. I also gained enormous positive energy from Prof. Nicola LeFanu and her sincere support was deeply appreciated. I would like to thank Terry Holmes for the scholarship I received and Gilly Howe for her encouragement. My heartfelt thanks go to Prof. Sue-Yeon Hong for her continuing support and career advice.

I would like to take this opportunity to thank the various organisations and ensembles for the performance of my works: New Dots, Sound of the Engine House, Sound and Music, Chimera Ensemble, London Sinfonietta, Quartuor Diotima, Ligeti Quartet, Huddersfield Contemporary Music Festival, Besides Ensemble, Asamisimasa ensemble, Late Music Concert Series, Southbank Orchestra, and St. Johns University. All of them gave me unforgettable experiences and professional performance opportunities over my three years at York.

Finally, I would like to thank my father who supported me financially and psychologically during my PhD studies, and my family for their patience during my long musical journey in Holland and UK.

Author's Declaration

I declare that I am the author of this commentary and all of the musical compositions submitted in this folio. This commentary has not been presented elsewhere or submitted to any other university or for any other purposes.

Ji Sun Yang

I. Influences and Starting Point

1. Introduction

My primary research question concerns the relationship between musical time and silence. How does the listener perceive time, when both events and silence repeat in varied duration (see Figure 1)? My definition of silence involves both decay and rest. Experimenting with the length of rests or breaks is a fascinating way of researching, because these breathing patterns can alter listeners' perception of time. I initially focused on composing the disappearance of sound at each fragment, and subsequently the decay of sound. I determined the durations of rests between phrases according to certain aspects of the duration of preceding and succeeding passages. The purpose of these rests is to invite the listener to consider the experience of silence.

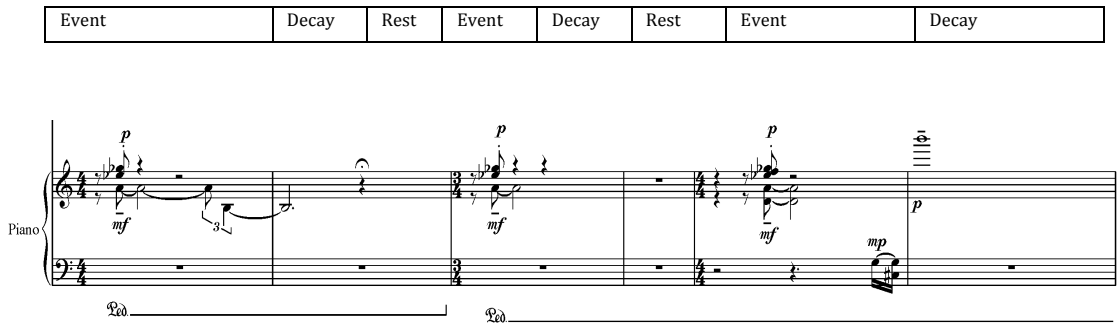

Fig. 1: Repetition of events, decay and rest / *Récollection*, bar 1-6 piano part

The subject of my research is the role of breath within the dynamic relationship between events, reverberations and rests. To illustrate this, I have analysed the technique, structure and pitch organisation of each of the works included in this folio. Some of the questions I explored during the first year of research were: how I compose the duration of breaks according to various musical events such as phrases or chords; how long or how short the rests will be; and even how I organise the moment of appearance or disappearance. My primary idea was to evaluate the composing of decaying sound when the musical blocks change. I focused my research on manipulating the proportion between events and rests so as to vary the effects of each 'silence'.

In the following chapters, I examine my works in relation to three definitions. Firstly, I explain about decay as appearance and disappearance. Secondly, I provide definitions of breathing in music as inhalation and exhalation, and repetition as broken looping.

2. Starting points

Prior to my doctoral studies, I attempted to explore the idea of repetition and tranquil sonority. I was interested in the idea of 'broken looping': breaking up repetitive phrases using silence. I regard sound and silence on an equal footing, the key parameter being duration. To explore this idea further, I needed to consider the question of how to compose the gradual disappearance of sound – the transition to silence. Therefore, I decided to experiment with an individual *ritardando* technique and with the notation of pauses. Experiments led me to consider broken looping as a way of achieving a balance between event and silence: not just the idea of the silent moment, but also the *gesture* of disappearance.

3. Musical/extra–musical influences

For a long time, I have been greatly inspired by Igor Stravinsky, Witold Lutosławski, György Ligeti, Morton Feldman, Tom Johnson, Salvatore Sciarrino, Unsuk Chin, Jo Kondo and Toru Takemitsu. Ironically, my works are not directly connected to any of these composers; I do not employ similar sounds or techniques to theirs. However, the essence of each composer's philosophy is a strong influence on my own music.

I have also drawn ideas from architectures, images and sculptures. My favourite Dutch artist is M.C. Escher, whose work deals with metamorphosis (see Figure 2). I am especially fascinated by those works of Escher, which start from a very little object that is then transformed into a completely different object. The idea of moving from one object to another within the same material is an issue I explore in my music.

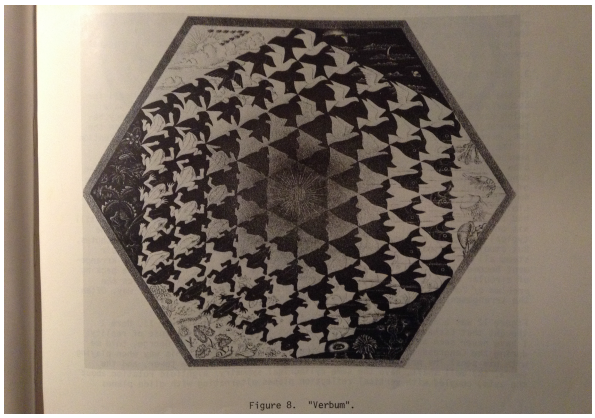

Fig. 2: M.C. Escher. Verbum[1]

4. The scope of this commentary

In using repetition, I am above all concerned with rephrasing one material element. I always attempt to begin with a particularly memorable motivic fragment. The repetition of little motifs can last more than ten minutes or can be a section of three minutes; it depends on the material of each pieces. Some of the pieces engage with only one subject; in contrast, the last pieces (*KAROI*, *Stepping stones on the Constellations*) consist of several sections in order to maintain the momentum in different ways.

My harmonic material is based upon long, static chords that give my music a sense of stability. I may carry out transformations of a chord, but the slow rate at which these underlying chords change results in a harmonic stasis. Towards the end of my portfolio, I managed to be more flexible in order not to limit the pitch sets. In the next three chapters, I explain the chord progressions, pitch materials and my structural approach.

As well as discussing the idea of appearance and disappearance, the technique of individual *ritardando* and its effect on the interaction and interpretation by the performers is explained. I notated the notes in an open space allowing performers to improvise the rhythms, using their independent imagination in order to describe the disappearance gesture.

[1] H.S.M.Coxeter, N. Emmer, R.Penrose and M.L.Teuber. *M.C. Escher: Art and Science*, 75.

II. Breathing effect

1. Decay: appearance and disappearance

> Silence takes on the significance of a place in which all processes, longings and state of anxiety come to an absolute standstill.[2]

The analysis of my compositions in the following chapters shows how the sonic behaviour of decay works in my music, and the connection between appearance and disappearance of sounds. The 'act of disappearance' is the translation of nothingness into sound. The idea of disappearance is related to the Asian aesthetic of 'emptiness', called *soom* in Korea and *ma* in Japan, which 'gives life' to sounds.[3] My research is about the connection between 'something' and 'nothing' in sound.

In traditional Korean and Japanese paintings, an empty space is essential and equally important as the contents depicted on the canvas. The empty space in my music allows the listener to reflect on the nature of the music, allowing for a personal response, individual to each listener. In his article 'Music as Representation', Philip Böhlman clarifies the difference between the definition of silence in Western music and Japanese music. [4]

> Silence in Western music marks the end of a movement or episode, but in Korean or Japanese music, silences or pauses perform the same role as sound; silence and sound are of equal importance. Silence can create wonder, a feeling of expecting unpredictable moments, of listening beyond sound. [5]

I was fascinated by eighteenth century black and white Korean traditional paintings, especially the way in which the subject is spaced (see Figure 3). Figure 3 is typical of this art in this respect: empty space is used to allow the observer to reflect on the object. Furthermore, the balance between the poem on the right, and the subject on the left, is an important feature, uncommon in Western art. The art is exposed only using black colour and each painting suggests one simple subject, the empty space encouraging the observer

[2] Nielinger-Vakil, *Quiet Revolutions: Hölderlin Fragments by Luigi Nono and Wolfgang Rihm*, 254.
[3] Losseff & Doctor, *Silence, Music, Silent Music*, 35.
[4] Böhlman, *Music as Representation*, 213.
[5] Ibid.

to reflect. The idea of creating empty space on paper inspired me to create a similar effect in music.

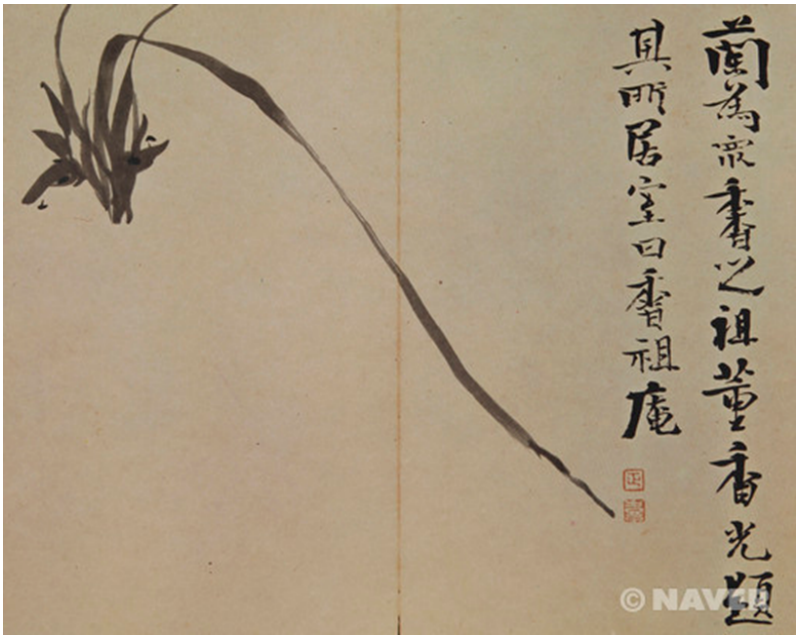

Fig. 3: Chonghui Kim, *MookRanDo (orchid)*[6]

One compositional example of decay is Luigi Nono's *Fragmente-Stille, an Diotima* for string quartet, in which the durations of rests and notes are defined via various types of notated fermatas, with approximate durations given in seconds. Nono composed this piece to explore the connection between gesture (*Fragmente*) and discontinuity (*Stille*). This is achieved essentially through broken figures, including tranquil, silent moments. *Fragmente-Stille, an Diotima* presents familiar material stopping and starting again.

Silence between the fragments renders the structure intermittent; meditative sound is disturbed by the empty space of time. The contexts of quotations in each fragment are transcribed in abstract ways. The music indicates twelve kinds of fermatas allowing performers to use their imagination, as Nono's notes in the front page of the score indicate:

[6] Chonghui, Kim. *MookRanDo* (*Orchid*), 'Private collection' <http://terms.naver.com/entry.nhn?docId=975312&mobile&categoryId=46877>

Each fermata should always sound different from the others, with free fancy

– of dreaming spaces

– of sudden ecstasies

– of unutterable thoughts

– of tranquil breaths

and

– of silences 'intemporally' sung.[7]

Nono gives performers the opportunity to decide on the duration of fermatas; for instance seven seconds to ten seconds of silence at #2 in figure 4. The fermatas result in a sense of pulselessness, and the players must listen to each other in order to resume playing after "stopped" moments. Figure 4–1 and 4–2 show the temporal analysis of events and rests realised by two different ensembles in two performances of *Fragmente-Stille, an Diotima*. It shows how the lengths of both sound and silence can be different for the performers, because the fermatas differ in duration from one another. Nono does not imply any system of numbers for mapping the relationship between them. However, in the first page at the end of phrase (#2) both sound and rests are the longest, to emphasise the end of the passage. A comparison between the two examples shows that representing fermata on both notes and rests makes for huge differences between performances. It emphasises the fact that in the rehearsal, each performer's perception of each fermata should be defined before generating sound.

[7] Nono, *Fragmente-Stille, an Diotima*, performance note

Fragment	**#1**																	**#2**	
A (seconds)	3.5		7		4		11		12		3		4		11		8		16	
B (seconds)		1.5		1		1		2		2		1		2		1		6		8

Fig. 4–1: Recording example A. Luigi Nono. *Fragmente-Stille, an Diotima* for String quartet performed by Arditti String quartet. A – musical event, B – pause[8]

Fragment	**#1**																		**#2**	
A (seconds)	3.5		3		1.5		13.5		3		5		8		4		14		16	
B (seconds)		1.5		0.5		3.5		2		2		4		2		4		13		3

Fig. 4–2: Recording example B. Luigi Nono. *Fragmente-Stille, an Diotima* for String quartet performed by La Salle String quartet. A – musical event, B – pause[9]

Fig. 4: A – Luigi Nono. *Fragmente-Stille, an Diotima* for String quartet
A-musical event, B – pause, Analysis by Ji Sun Yang

In the programme notes included with Nono's string quartet, the composer indicates a scale of varying durations of fermata (see Figure 5). In *Fragmente-Stille*, twelve different types of fermata are defined, each of a different quality and weight, as illustrated in Figure 5 below. However, in my music, fermatas function differently as I tend to use less specific notation, compared to Nono. I deal with fermatas within approximate seconds duration for instance 3 to 15 seconds that the performers can predetermine the duration of pause at each time differently.

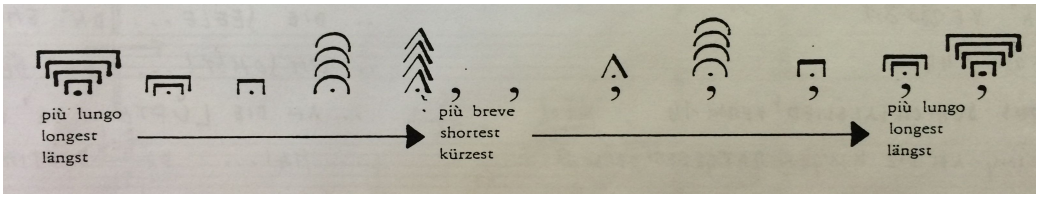

Fig. 5: Nono. *Fragmente-Stille, an Diotima*. The types of fermatas[10]

[8] Nono, *Fragmente-Stille an Diotima*. Arditti String quartet. Paris: Auvidis
[9] Nono, *Fragmente-Stille an Diotima*. La Salle String quartet. Hamburg Deutsche: Grammophon
[10] Nono, *Fragmente-Stille, an Diotima*, performance note.

2. Breathing Effect: Inhalation and exhalation

The concept of 'breath' here can be divided into three stages, as follows: when the phrase begins, we have 'inhalation', while the music is still playing, the breath is 'held', and the last stage, 'exhalation', is the empty bar. Each instrumentalist is connected intimately to this process: there is choreography at work. There is choreography at work. One object changes a tiny thing from one to another or only the duration of the event or rest differs from previous ones, whether it is noticeable or not by listening. By substituting the idea of 'breath' into music, 'inhale' is a musical event, 'holding' is the reverberation and 'exhale' is the rest.

> The sound of music is not…opposed, but rather parallel to silence. It is as though the sounds of music were being driven over the surface of silence. Music is silence, which in dreaming begins to sound.[11]

In my music, the rests are as significant as the sounds themselves. My compositions are often comprised of short or long blocks of variations, and the blocks of rests function as exhalations of sounds. The tranquil moment is the main idea of this work, within the simple material in different durations of empty bars. The silence can be varied depending on what has changed, however little the new material might be; or what is the subtle sound, a colour inside an object. The focus of my recent projects is on patterns of 'inflow' and 'outflow' of breath, and, instead of complete silence, I explore different resonances by creating varied durations of rests.

[11] Picard, *The World of Silence*, 27, Losseff, & Doctor. Silence, Music, Silent Music. 2007, 26.

3. Techniques

3.1. *Recollection of the mutual moments for electric guitar and percussion*

Composing for small chamber ensembles, rather than larger forces, enables one to exploit fermata notation more fully: the intimacy between musicians allows for greater possibilities. In *recollection of the mutual moment*s, the length of pauses and even the total duration of the piece are completely decided by the musicians. To enable the players to listen to the moments of silence and the decay of echoing, it was crucial to give them the freedom to make decisions at the end of phrases; they then cue each other at the start of every new phrase. Each pause can last between three seconds and fifteen seconds: it is expected that musicians determine the duration of each rest in advance.

The initial aim of this piece was to employ the limited pitches and the restricted rhythmic material effectively, to create a satisfying listening experience. There are three elements of repetition: the fragment itself is repeated; the same note at the end of the fragment is repeated; and the expectation of pause moment is repeated. The vertical *tutti* chord appears again after a *rallentando* disappearance. The structural plan (Figure 6) was clear to me at the initial stage of imagining the piece in my mind. In *Recollection of the mutual moments*, I imagined a non-dramatic context with an atmospheric and warm colour. Additionally, I intended a structure with no development and no contrast. Instead, there is one long, continuous line.

Rehearsal Mark	A, B	C, D, E	F	G
Feature	Vertical chords	Melodic lines using small groups of pitches	Repeated chords and groups of melodic lines	Similar to A, B
Register	Wide, full	Middle and high	High	Middle

Fig. 6: *Recollection of the mutual moments*, Structure

In general, the dynamics are very quiet, with very little contrast. For the most part, only four dynamics were specifically indicated: *ppp*, *pp*, *p* and *mp*, with small *crescendi* and *diminuendi*. The entire piece can last as long as ten minutes or more. I realised how much further I could go within intentionally limited parameters such as dynamics,

instrumentation, rhythm and pitches. The delicate sonority transitioning into the silence is designed to deliver the sense of breathing out into the space.

The use of the bow and e-bow creates rich reverberation, and blends the sonorities together (bar 83). The effect of disappearance and reverberation is exaggerated by using e-bow on both instruments. The instrumentation allowed me to experiment with longer reverberation without attack. The techniques of combination between harmonics on electric guitar and a single rolled tremolo note on vibraphone is inspired by the sparkling stars in a quiet night (see Figure 7).

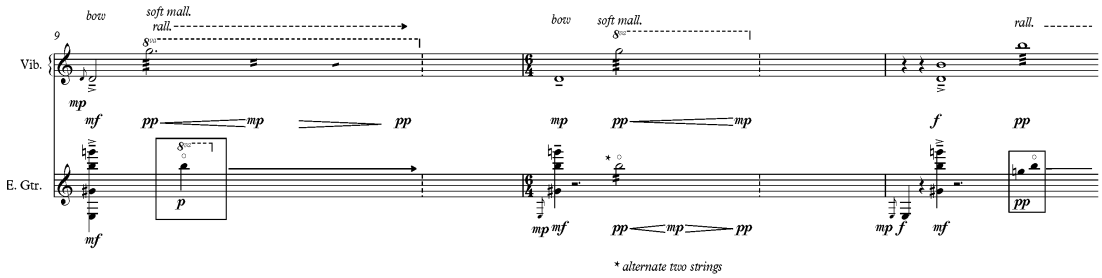

Fig. 7: *Recollection of the mutual moments*, bar 9–16

The pitch organisation is based on one chord comprising six pitch-classes: G, G#, A, B, D, E. The chord is varied and repeated in different registers by the two well-blending instruments, guitar and vibraphone, whilst the triadic figure is represented through the simplification of the tonal sentence. Each chord uses only pitch-classes from the set listed above, with variations in the spacing and the order (see Figure 8). I tried out all the possibilities of each chord, by moving certain notes to different octaves. Most of the time I use the middle and low registers to create a full body of sound, however, the high register is used twice, to convey the sense of 'flying away'. The progression of chords seems to not be moving forward at the beginning, but gradually the voice leading is juxtaposed in various registers. Finally, the piece ends with the pitch E in octaves, E having been the bass note of the first chord. The pitches are divided between the two instruments, which play together as one voice in the opening chords. Later on, however, the two instruments gradually start to function more independently, in more improvisatory sections.

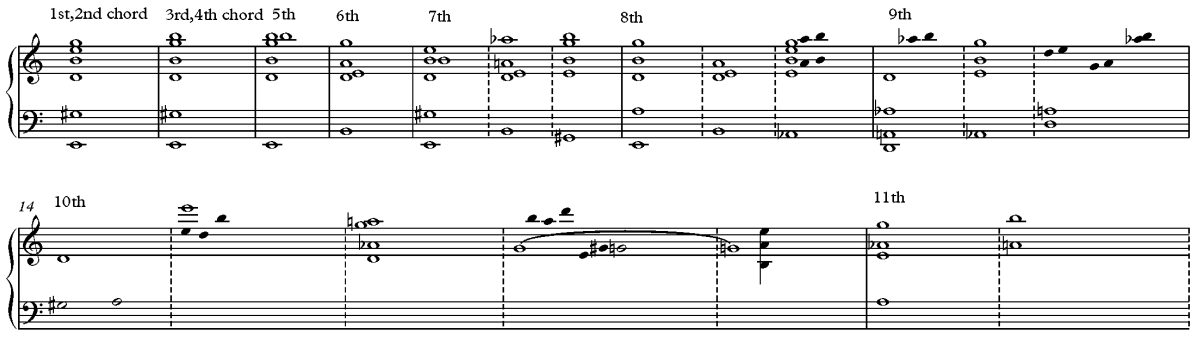

Fig. 8: *Recollection of the mutual moments*, harmonic progression

This piece stems from a different approach to Feldman's treatment of the arc of events and rests. I treat both of them equally, and draw an event and a rest as a pair of wings. I intentionally did not notate the rests; instead, I simply wrote empty bars after event. The intention here was to achieve a more diverse duration of rests than the performers produced. In figure 9, the chart demonstrates how performers have interpreted the unspecified duration parts of empty bars differently. The notes to performers specify that 'the duration of each empty bar should be between three seconds and fifteen seconds. Performers should be creative in varying the duration of the rests each time. As the analysis of duration of rests shows in the example below, when there are empty bars, in both instances the performers seem to have preferred to keep similar durations each time, rather than contrasting the lengths. The rests frequently have similar durations, generally 3, 6, 8 or 10 seconds. The longest possible duration – fifteen seconds – appeared only once in the premiere. I assume that the performers reflected on how long the silence should last depending on the developments of musical events, for instance, between bars 13–23 the duration of rests are shorter than elsewhere. This shortening occurs because of changes and new material at this point in this music. Thus, the performers' interpretations of the duration of rests apparently depended on their listening to the context of musical events.

Bar	1	2	3	4	5	6	7	8	9	10	11	12	13 – 14	15	16	17	18	19 – 22	23	24 - 26
A (second)	4		9		15		11		17		14		17	17		26		34		21
B (second)		10		8		6		8		9		6			5		3		3	

Bar	27	28–29	30–33	34	35–37	38	39	40	41	42–43	44	45–46	47	47	48
A (second)		13	34		38	29		15		24		50		27	
B (second)	8			15			6		6		10		6		8

Fig. 9–1: Performed by Ensemble Besides, *Recollection of the mutual moments*

Total duration: 10:05

Bar	1	2	3	4	5	6	7	8	9	10	11	12	13 – 14	15	16	17	18	19 – 22	23	24 – 26
A (second)	8		15		15		14		21		18		28	14		35		57		89
B (second)		8		6		10		8		6		6			6		9		11	

Bar	27	28–29	30–33	34	35–37	38	39	40	41	42–43	44	45–46	47–48
A (second)		33	67		25	31		33		59		46	41
B (second)	7			11			11		9		9		

Fig. 9–2: Performed by Chimera Ensemble, *Recollection of the mutual moments*

Total Duration: 12:52

Fig. 9: *Recollection of the mutual moments*, Analysis by Ji Sun Yang. A: event / B: rest.

3.2. *Les accordéons V for string quartet*

Les accordéons V for string quartet is inspired by a particular bellows technique used by the Bayan (Russian accordion – see Figure 10), *Russian accordion*. The Bayan player shakes the instrument's bellows to create different kinds of tremolo effects that interest me because of the connection to the breath from their body. Thus, the Bayan becomes a physical extension of the player's lungs, mimicking patterns of breathing. The physical action of the Bayan's technique of "opening" and "closing" the bellows is imitated by the string instruments. In this piece, I sought to bring about a similar kind of patterning of inhalation and exhalation, for instance, when strings begin to play one chord together *tutti* but execute the subsequent *ritardandi* independently of one another, at different speeds, indicated in the score as '*individual rit.*'. At the start of each *tutt*i phrase, the musicians inhale together and look at each other to find exact timing.

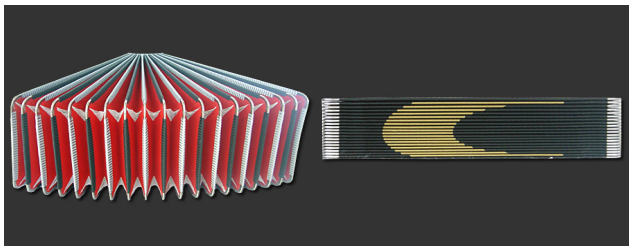

Fig. 10: Accordion bellow's open and closed.[12]

The main technical concern here was the question of how to compose the gradual disappearance of the sound. The patterns of 'inflow' and 'outflow' of musical breath form an arc shape; for instance, in *Recollection of the mutual moments* and *Les Accordéons V*, I predetermined the length of each phrase and its decay depending on the musical event. However, at each point of repetition the shapes are slightly changed and the length of reverberation time is partly determined by the performers. The structure is conceived as a succession of pairs of wings: event, pause; event, pause again. If the process had been restricted only to looping, or if the exhalation process had not included the 'decay' phase – i.e. the transition from sound to silence – the structure would have become too predictable.

Les Accordéons V consists of two parts; bars 1–45 (the introduction) and bar 46 - the end (the main part), which were performed by Quatuor Diotima during workshops. The

[12] *Accordion bellow's open and closed*. <http://www.marconi-bellows.com/bellows.htm>

initial idea for this piece was inspired by the Russian Bayan accordion; its shaking bellows movement is transformed into strings. The two parts are connected to each other and derived from the same idea of the accordion's bellow movements. However, the two parts have contrasting atmospheres; whilst the introduction is texturally dense and draws long, thick lines, the main part describes a gesture of moving from *tutti* towards spreading out of individual notes. The introduction is slow and distorted, with long, sustained chords. The only change is created through certain string techniques - for instance, the degree of bow pressure, the strength of the vibrato and the position of the bow. The biggest difference between the two parts is the way of presenting the chords; with smaller intervals in only one register in the first part. The main part is mostly about a *tutti* rhythmic pattern that is transparent as regards individual phrasing and breathing. The main section of the piece is more rhythmically animated, and progresses with successive transitions from *tutti* to individual *ritardandi*. Nonetheless, the sections share certain common features, such as similar colours and short repeated notes. The quartertone upwards glissandi gestures in the main part are exaggerated in the introduction, with longer durations and slower motion (bar 6).

Furthermore, in this opening section, the rapid single-note gestures mirror the movements of the bellows changing direction, as the valve stretches in and out. Three parameters are exploited to create a particular type of sonority: the position of the bow on the string, the amount of bow pressure, and the degree of vibrato. These are always notated above the notes. The increased bow pressure and *molto vibrato* makes the sound distorted. The narrow chords in one register generate an effective sonority, and an intense and sharpened atmosphere. The contrast between the introduction and the main part is achieved through changes of register, colour and intensity within the imaginary accordion (see Figure 11). In bar 61, the use of separate bows imitates the motion of the fast bellow shake, whilst bars 8 – 9 imitate the fully extended bellows.

Bar 8– 9 Bar 61

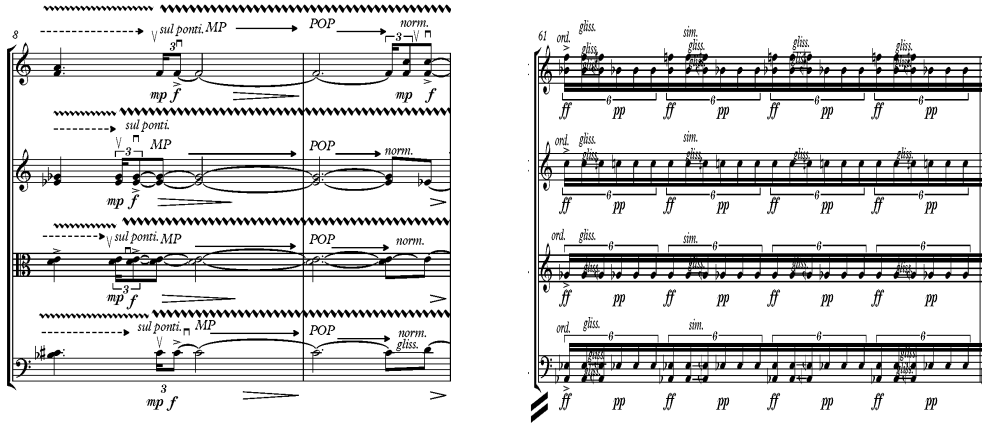

Fig. 11: *Les accordéons V*, bar 8–9/ bar 61

In comparison to the introduction, the first chord of the main part has a diatonic character (see Figure 12). All the works presented in this portfolio have similar elements in terms of pitch: all are based originally on third, ninth, and eleventh chords. These relatively consonant chords form pitch sets, which can be rendered dissonant later on, by moving all the pitches into the same register. I am interested in transforming one simple chord into another, so I experiment with various forms of one chord as much as possible, by altering the density of the sound.

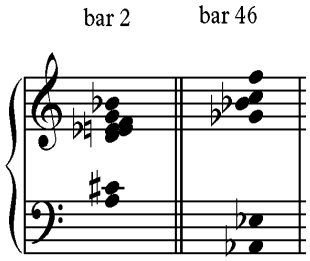

Fig. 12: *Les accordéons V*, chords bar 2 / bar 46

I stated earlier that my main aim in this piece was to develop and explore the decay and the disappearance of sound at the end of each fragment. In order to achieve this, the pauses at the end of each phrase serve to enable the listener to contemplate the resonances hanging over from previous events. I observe this as the image of silence spreading out from the instruments, in a certain venue. The tapping technique on the string in bar 67, for example, creates an echo in the space. The whole shape of disappearance exists in one phrase, and later on, that motion is repeated within different durations. To ensure that the music keeps a sense of tension and release I used different lengths of rest when the echo of sound vibrates after each musical block, for instance, the choice of the duration included both the duration of rests and the actual event; these are either in a certain proportion or an inverse proportion.

The idea of *ritardando* motion is also explored as a form of decay or a behaviour of 'disappearance'. The illustration in Figure 13 depicts the attack and decay of a single sound I take this diagram as a model for medium-to large-scale structures. In the same way, the fragment of *tutti* in *Les accordéons V* consists of three parts. The *tutti* running from bars 61–68 can serve as an illustration. The first part of this *tutti* (attack) is an *ff*→*pp* unison in bars 61–62. The second part (sustain) is an individual *ritardando*, *decrescendo* and '*sul tasto*→*sul ponticello*' in bar 63–66. The third part (decay) is a *ritardando* which involves 'tapping the note, left hand' in bar 67–68. In order to depict the movement of the Bayan's bellows' unpitched air sound, I composed a transition from a strong, vigorous motivic *tutti,* changing from *sul tasto* to a subtle *sul ponticello*.

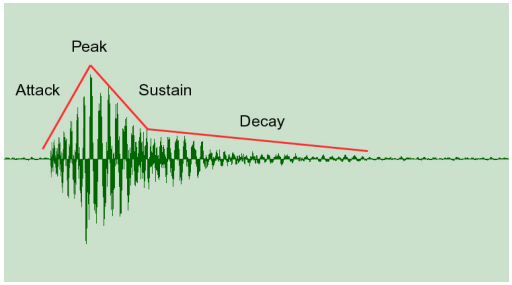

Fig. 13: Decay of single sound[13]

[13] *Attack and decay* website. <http://facweb.cs.depaul.edu/sgrais/attack.htm>

The contrast of the dynamic level from *ff* to *pp* in a short and fast repeated motif is intended to represent the sound of an object disappearing into thin air. Independent, *individual ritardandi* ensure that the four players diverge from unison chords to single plucking notes. This gesture is a musical representation of the opening of a Japanese hand fan, where the *tutti* chords represent a closed fan, and the individual *ritardandos* represent the fan getting wider and wider (see Figure 14).

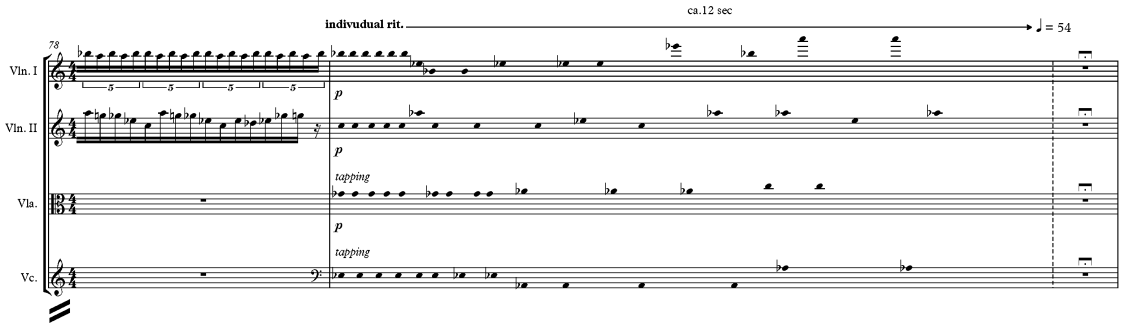

Fig. 14: *Les accordéons V*, bar 78–80

When musicians play individual *ritardandi* at the end of the phrase, they exhale to release the gesture. This type of gesture appears again after the fermata pause. I composed patterns of 'inflow' and 'outflow' of breath as though the group were single Bayan player (bar 46). I consider this kind of '*ritardando*' action as a form of '*breathing out*'. The breathing effect will yield different results with different players and ensembles, as proven by the two recordings of *Les Accordéons V*. Unconsciously, each string quartet created their own distinct timing. I wanted to experiment with how the performers perceive and react to the partly open score notation. Each chord breaks off, before starting again - as composed of small, distinct blocks or breaths. It is a fascinating phenomenon to me because these breathing patterns create the time frames which organise the longer temporal flows. It is possible to 'start' the next event together without counting a predetermined duration, provided that the musicians look at each other and sense the right moment to start playing again. Had this not been the case, the piece could not have presented the main idea - the shape of unfolding a hand fan. Following the premiere, I felt that the dynamic level was too loud at the beginning of each event. The high dynamic level disturbs the moment of 'stopping', when the music starts over again with the accented *tutti* chords.

Upwards quartertone glissandi first appear in bar 46 (Figure 15). Firstly, the second violin part has an upward glissando, which imitates the sound of the seagull, in bar 64, and this element is then expanded to all four instruments (bar 83–85). Secondly, this gesture of *tutti glissandi* (Figure 15) is exaggerated as an expansion in bar 142–143. The quaver rhythm of *tutti* on viola and violoncello play *glissandi* upwards, and then downwards (bar 142–143) which is a slower motion than the previous sextuplet downwards *glissandi* (bar 46).

Bar 46 Bar 142– 143

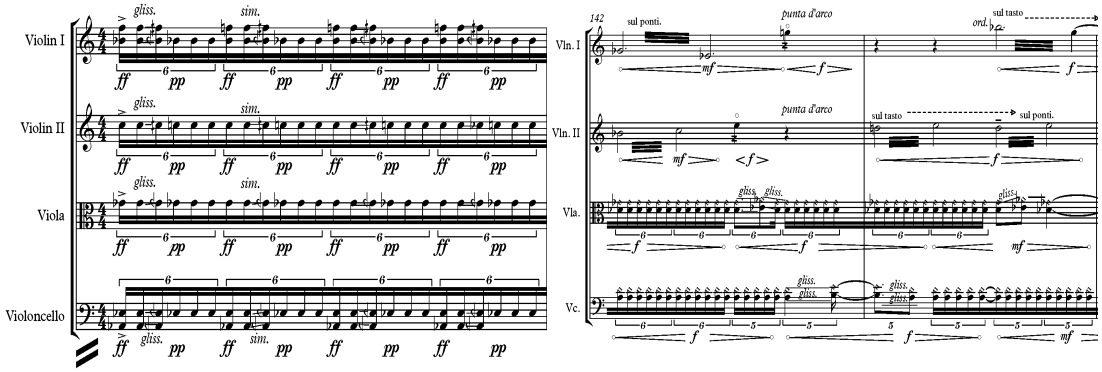

Fig. 15: *Les accordéons V*, bar 46 / bar 142–143

The duration of each pause is entirely up to each ensemble, within the 2- to 15-second time limit: at each moment of silence, the players wait for each other to start the next phrase. Quatuor Diotima, Ensemble Timf and the Ligeti Quartet have each performed this piece. Their individual perceptions of the durations of empty bars resulted in very different performances. The Ligeti Quartet had longer silences between musical events, whereas Ensemble Timf performed the shortest rests. Quatuor Diotima performed a wide range of durations of silence. I assume that these results were affected by the performers' past experiences of open notation. It was interesting to hear, in recordings of the three performances, how the performers participate in each other's disappearance of sound.

3.3. *Récollection for piano and percussion*

Récollection was commissioned by Sounds of the New, organised by New Dots in 2014. It was premiered at The Forge, London on 10th June 2014. The original idea for this piece was taken from *Récollection of the mutual moments*. However, *Récollection* turned out to be a rather different piece in the end, following a workshop with the performers in which some initial sketches were tested out. One similarity remains, in that both pieces emphasise the importance of interaction and intimacy between two players, but the percussion set-up is larger in *Récollection*, which requires gongs, temple blocks, cowbells, crotales, glockenspiel and vibraphone. The choice of instruments was influenced by Phillipe Hurel's *Tombeau in Memorium Gerald Grisey*, which explored reverberation and echoed sonorities and which has made a strong impression on me. The pianist plays two gongs in order to reduce the amount of gongs the percussionist has. The e-bow is used on the piano in the same way as it is used on the e-bow on electric guitar in *Recollection of the mutual moments,* producing a similar effect.

Although the piece consists of two contrasting movements, it is played through without a break. The first movement serves as an introduction, and the sound-world is a rich reverberation of long sustained notes. The second movement is more active, engaging with the motion of appearance and disappearance, and I was focusing more on gestures of growth into sound, which suddenly stop.

In figure 16, the chord progression demonstrates how the pitches are moving around the highest register of crotales and glockenspiel. The highest pitches are continuously performed by crotales and glockenspiel, and those phrases form an abstract melodic line. Harmonically, the opening section is relatively static. Initially, the piano part sounds completely independent from the percussion sonorities. In contrast, in the second movement they are more in conversation. The chords in the first movement were treated quite restrictively and statically, but the second movement was written more freely, with the same interval repetitions reappearing.

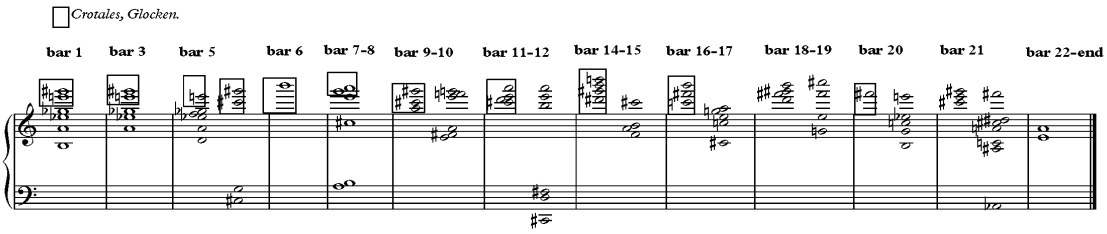

Fig.16: *Récollection* first movement, Analytical overview of voice leading

Compared to the first movement, the second movement is more fully spread across the whole register between the low bass notes and the highest octaves (See Figure 17). Even if the sonorities of the two movements are similar in terms of timbres and textures, the main character of their chords and overall gestures are obviously contrasted. The clusters are frequently reconfigured in the high register and the augmented fourth interval, which is hardly found in the first movement, features prominently here. The octave ornament leaping gesture in the second movement (bar 25) reappears constantly during the remainder of the piece. The rhythmic figures between the two movements are clearly contrasted as the second movement is made up of a flux of fragmentary gestures, compared to the static atmosphere of the first movement.

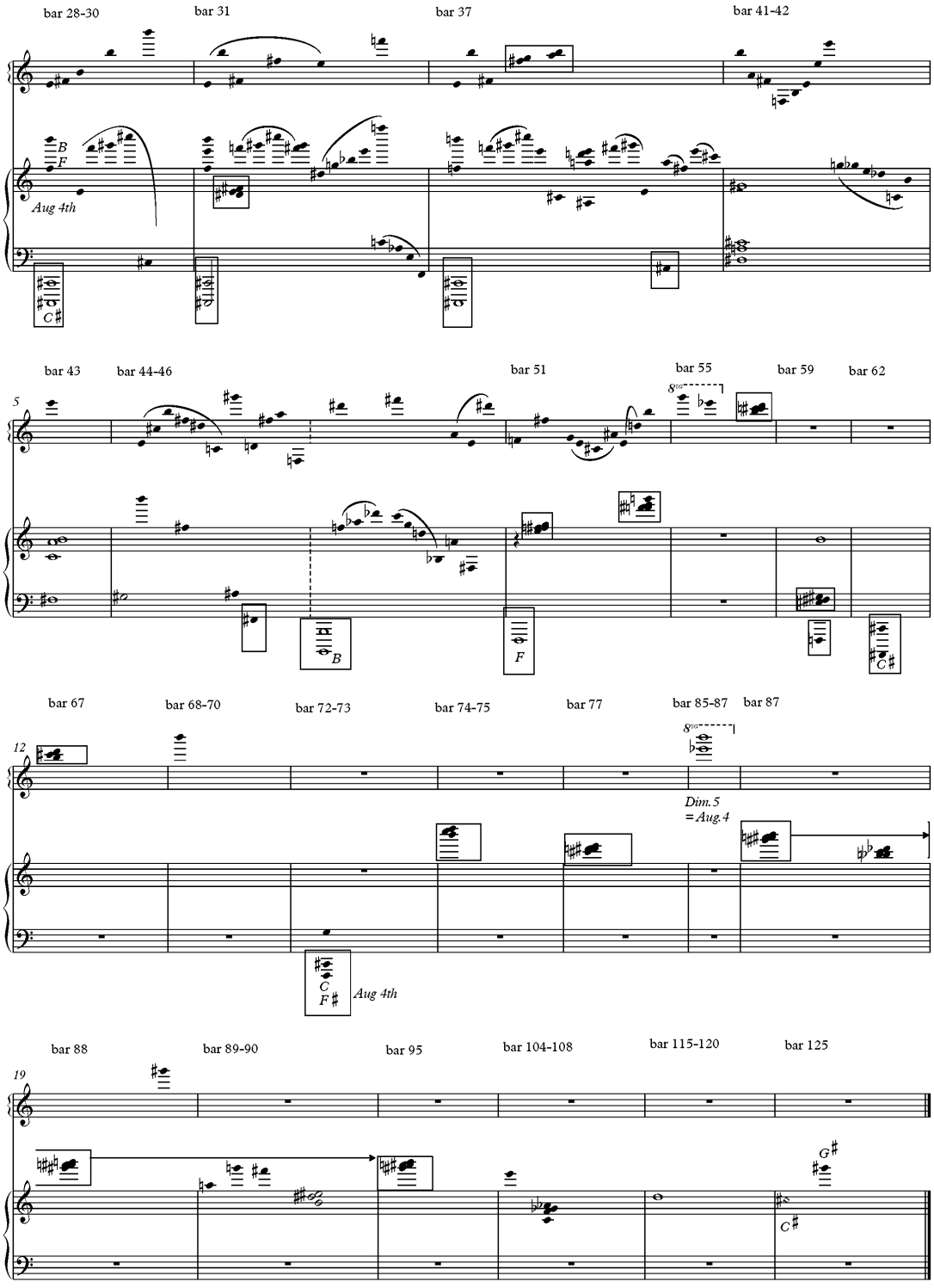

Fig. 17: *Récollection* second movement, analytical overview of voice leading

In figure 18, one can see how the notes F♯, D ♯ and E which were presented at the end of the previous bar, are repeated as a delayed effect or echoing. The unspecified rhythm here is intentionally up to performers' decision, however, the number of the notes and the order of notes should be exactly as written.

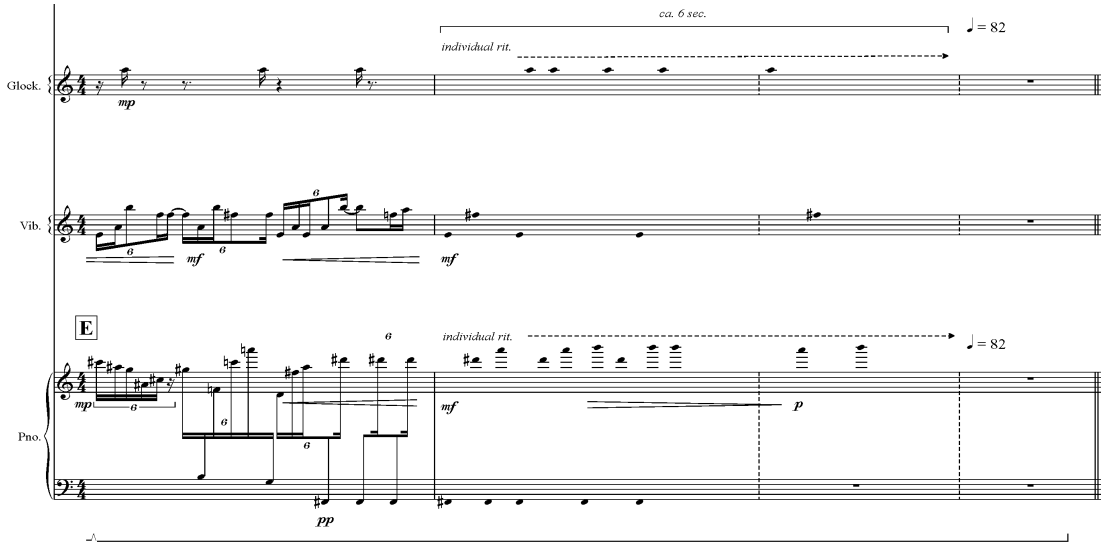

Fig. 18: *Récollection*, bar 47-50

3.4. *Stepping Stones on the Constellations for Large ensemble*

> One rule which it is possible to formulate about my experiments with twelve-note chords is that the fewer different intervals between neighbor notes the chords contains, the more characteristic the result is.
>
> – Witold Lutosławski[14]

Stepping Stones on the Constellations was composed just before *KAIROI*. The two pieces use similar methods of organising groups of pitches, with the interval of a third featuring prominently in both. I imagined jumping between stars as stepping stones in the starry sky, hence the title. The piece is for a large ensemble of fifteen players, and was premiered by The Chimera Ensemble. This piece was originally conceived in a horizontal way like *KAIROI*. I sought to create clearer colours and, to that end, I was inspired by how Lutosławski builds up a harmonic progression using the same intervals. I wanted to experiment with extending my harmonic language with a less static way of writing (see Figure 19). The minor 7th chord on string instruments is floated through the first movement as some pitches are gently removed or added. This chord appeared again at the end of the third movement. The pulsation of an octave E on the Marimba reappears at the end of the third movement as the pulsation of octave F in bar 136 – end (see Figure 19).

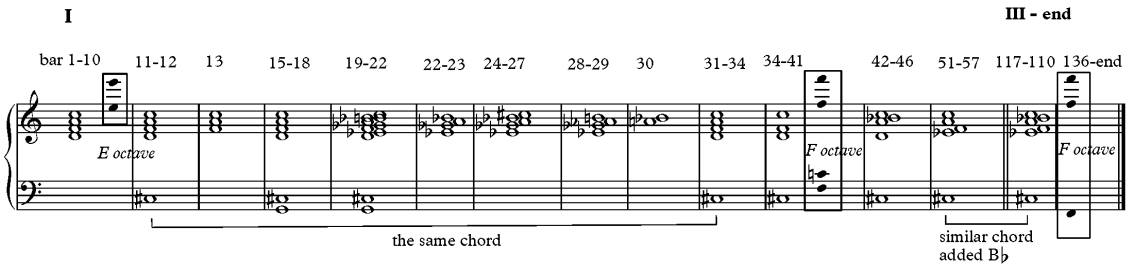

Fig. 19: *Stepping Stones on the Constellations* ensemble version, Harmonic progression

[14] Bodman, *The Music of Lutosławsk*i, 50.

This piece consists of three movements each with a different character (see Figure 20). The first movement starts with minor seventh chords, on top of which leaping melodies based on major and minor thirds are composed and layered in various ways. Unlike the first movement, in the second movement the music turns out to be restricted to vertical, distinct blocks. The last movement provides a climax, as the fastest and most complex section. It also revisits the experiment with individual *ritardando* notation that I used in *Recollection of the mutual moments*, and *Les accordéons* V. I focused on creating interchanges and transitions between straightforward pulsation and chaotic free individual passages. In the slowing down motion, the players breathe out all the energy and prepare for the next passage, which is similar, but slightly different to the previous one.

	I	II	III
Tempo	♩ = 68 flicky, niftily	♩ = 80 winsomely	♩ = 76 confident, brassy
Feature	Combination of long, sustained chord and jumping melody	Slow, with leaping chords	Leaping fast
Main Material	Heavy waving background	*Tutti*	*Individual ritardando*

Fig. 20: *Stepping Stones on the Constellations ensemble version,* Structure.

In writing this piece, I realised that a minimalistic, static approach can yield very diverse ideas on a larger scale. Thus, I aimed at creating successive transformations of colours and floating gestures, rather than restrict the sound-world unduly. The three movements are connected and unified by the idea of leaping. The movements should not follow one another *attacca*; however, the conductor and all the musicians should hold the tension during the silence between the movements.

After the premiere, I revised the score and composed it for orchestra. The entire idea and structure are the same as the original. However, I extended the duration of each movement. The most notable change was to the third movement, which was given a new opening, featuring contrapuntal, rhythmic pizzicato string patterns (bar 115–122). These rhythmic patterns derive from the beginning of the individual *ritardandi* in bar 127.

The silent, sustained string parts in the first movement unexpectedly surface again in a completely different context in the third movement. The *molto* vibrato including *quarter-tone* range helps to depict waves of colours in a starry sky. Occasionally, brass take over the role of the strings to sustain *molto vibrato* chords (bar 20–22). In bar 180, the twist from a leaping gesture to a single sustained sonority looks back to the very first chord of the piece.

III. Broken looping: repetition

> Repetition changes nothing in the object repeated, but does change something in the mind which contemplates it.[15]

Gilles Deleuze states, in defining repetition, that "the repeated object is something that makes the listener conceive the changes". [16] The limits imposed on the iterative object can enhance the cognition of sound because the listener can concentrate more on the internal aspects of the object itself.

In my compositions, repetition is an essential concept, in the form of 'broken looping'. The minimalist music of Steve Reich embodies a different concept of repetition because he finds meditative thinking within the continuous looping of sound in the long term. On the other hand, the music of the Wandelweiser group [17] explores extended silence by composing long periods of sustained notes that have extremely soft dynamics. I would like to suggest two concepts on an equal level: (A) the iterative event and (B) the pause. In a synthetic structure, the definition of repetition in my compositions consists of the repetition of A and B as well as repetition of the event (A) itself.

The idea of repetition is only considered in relation to an object; that object is composed in space, and its reconstruction is recognised by the listener inside the time-space of performance. In this portfolio, the common thread is how to limit the pitch materials; the plan of pitch progression in the first sketch involves the implication of repetition. I compose the first chord on the piano and then develop transformations of that chord.

Feldman's work *String quartet II* provides an example of repetition as 'broken looping'. In Feldman's works, empty bars exist either between the same pitches with a different rhythm or after a long repetition of a phrase rather than just one single bar. In figure 21, the time signatures (1/2, 3/4) in empty bars appear again in the next system. The significance of iteration is hardly recognised as real change, so it challenges the experience of the listener. Thus, the irregular appearances of rests break the looping.

[15] Deleuze.G. trans. Paul Paton. *Difference and Repetition*, 90.
[16] *Ibid.*
[17] http://www.wandelweiser.de

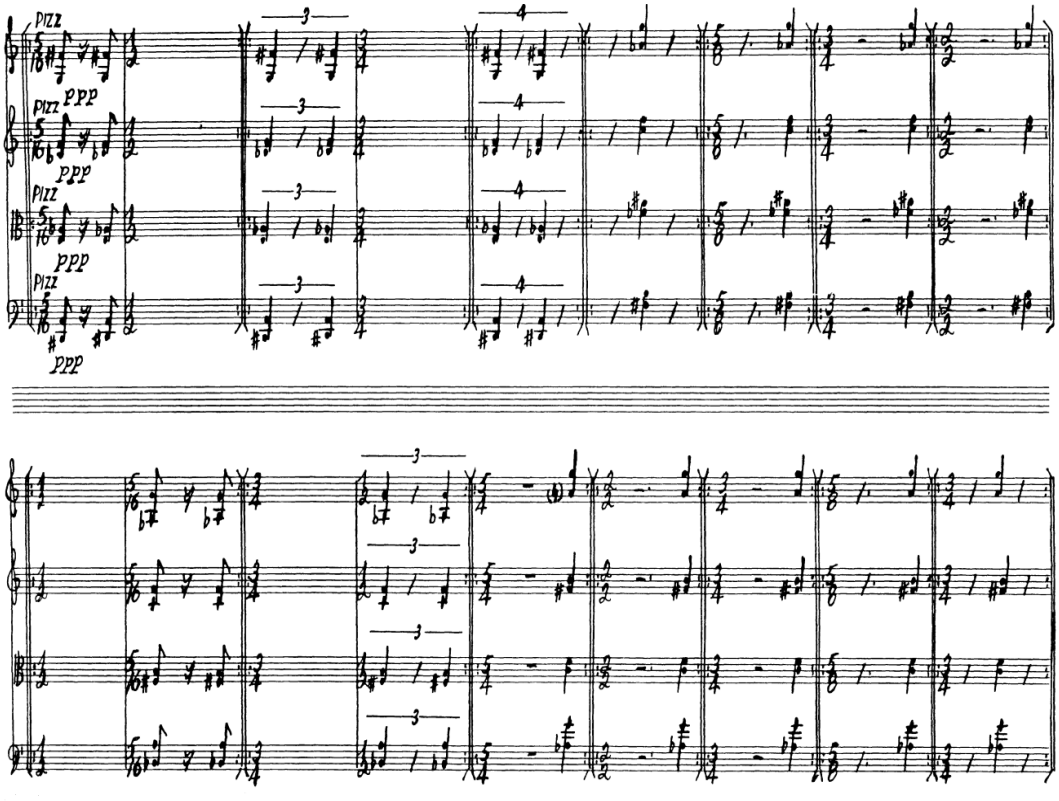

Fig. 21: Feldman. *String quartet II*, 17[18]

I took similar inspiration from Bernhard Lang's installation piece, '*Machine shop #1*', which is music improvised by dancers' footsteps.[19] Between each movement, a dancer goes back to the starting point and loops a simple gesture in slightly different ways. Therefore, the sound changes slightly each time. For me, this particular type of repetition becomes clearer when I see the piece of music interacting with the dancer, because I can visualise and memorise the different sounds.

[18] Feldman, *String quartet II*, 17.
[19] Lang, *Maschinehalle #1(Machine Shop #1*) <http://maschinenhalle.at/nr1.html>

2. Techniques

2.1. *Sculpting a minuet for tenor recorder and theorbo*

This piece makes the most extensive use of repetition in this portfolio. The very dry sound of the two instruments makes no echo, in stark contrast to *Recollection of the mutual moments* and *Récollection*.

The gesture of a minuet was sculpted as distinct blocks from one phrase to the next. Neither instrument ever plays alone: rather, both are treated as one instrument throughout. When both musicians stop playing, only after complete silence can the next phrase commence. At figure 22, the steady quarter note of the theorbo has the role of accompanying the recorder. This figure of recorder trills and tremolos turns into longer phrases.

Bar 1–3 Bar 53–55

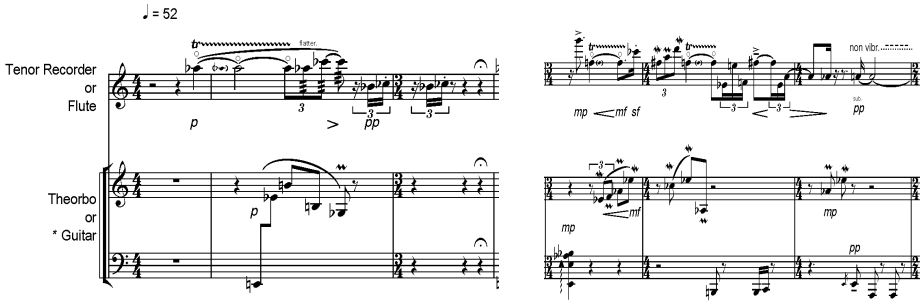

Fig. 22: *Sculpting a minuet*, bar 1–3 / bar 53-55

2.2. *Echo for baritone and piano*

Echo was composed for the Late Music Concert Series at York Unitarian Chapel in 2013. I imagined two contrasting characters between the Baritone and pianist; piano part consists of the arpeggio harmonic progress and on top of that the baritone takes part of melody line. I chose the poem 'Echo' by Ursula Vaughan Williams because it shares the ideas of echoing and silence that I have used in other works. I began by analysing the poem itself and following its structure. Later, I explored the idea of repeating words, treating them as looping fragmentary shapes. However, there is a sudden cut-off point, for instance, for the words 'Speak' and 'Turn it' in bar 14 and 26. Here, I decided to use speech instead of singing. The words 'echo, listening, silence, rest' are central to the poem, and

my musical treatment emphasises these words further still. The rhyming couplets are mirrored in the music at the end of each phrase in various ways.

Echo

Echo by a ferny spring
Or by houses loitering
Listening since the world began
Takes the careless words of man
And gives them back with other sense
Clothed in mocking innocence.

Speak or whisper she will hear
And change your certain hope to hear;
Take a foolish idle jest
And turn it, barbed, against your breast;
For every word she gives a wound
And only silence keeps her bound.

Be silent then, let echo rest.

– Ursula Vaughan Williams[20]

The poem suggests loneliness in a cool windy and foggy forest atmosphere. I translated that mood into the music. The piano part has a cloudy, muddy and atmospheric sonority, and the arpeggiated harmonic progressions are varied in the high register. The harmonic changes are not sudden; rather, similar pitches recur so that only one or two pitches are replaced with each change. By contrast, the baritone part is steadier – a long stretched line on top of the piano, like a car driving down through a foggy road. To some extent, my treatment of the voice and piano is traditional, with the piano serving as accompaniment to the vocal line. I tried to focus on the poem's atmosphere of loneliness and the meaning of the poem. The arpeggiated piano phrases seem to want to play continuously, but most of the phrases stop in order to give breathing space. The last moment (bar 48–54), 'Be silent', is the culminating point of all four minutes of waiting.

[20] Connock, *The Complete Poems of Ursula Vaughan Williams and a short story*, 226.

For the pitch organisation, there are two separate sets (set A and set B) comprising six pitches each. Each of the six-note sets is divided into two three-notes sets and these are then combined with one another as A1+B1, A2+B1, A1+B2, A2+B2 (see Figure 23). That combination creates several chords of varying colour and density. In the piano part, set A is played by the right hand, with set B in the left hand, in the form of repetitive arpeggio figures. After long passages of arpeggiated melodies, the sudden, momentary stops evoke the exhalation of breath, not only for the baritone singer but also for the pianist as well.

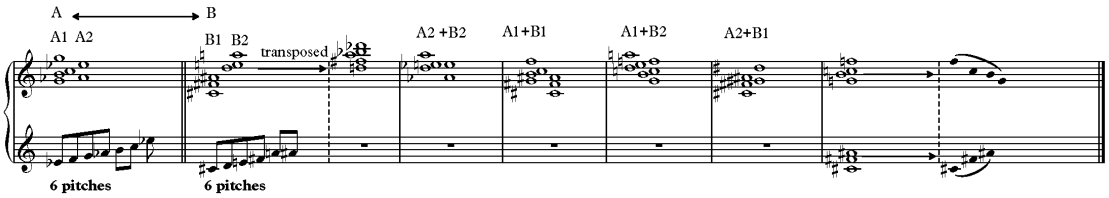

Fig. 23: *Echo*, Chords relationship

2.3. *Weeping Tree for piano solo*

This solo piano piece is inspired by a weeping tree that stands in front of my house. I was very interested in how perspective changes the different colour and shapes of a weeping tree depending on the changing weather. I am not usually inspired by nature when I start a piece. However, this time I relied entirely on intuition for the whole picture of the piece from the beginning to the end.

With the same techniques as in the *Recollection of the mutual moments*, each phrase of the second movement culminates in a pause, with a non-strict notation of duration for the pause. The piece consists of three movements that contrast sharply with each other. The first movement is about melodic variation using a limited pitch set (see Figure 24). The pitches are organised by cycling round the set linearly and using octave displacement. I used the three staves on purpose even though it is not practically useful for a performer to read the score because the three voice lines are clearly divided into three all the time. The opening instruction 'steady, legato and calm' describes the character of the music. Each arc of pitch material, displaced by octaves, covers two or three bars. The new pitches are carefully presented only in the second, third and fifth repetition. It seems like looping the same patterns of pitches; however, the duration of each note changes, one at a time. The

listener might not necessarily always recognise what is changing and what is staying the same; new pitches are added gradually into the original pitch set.

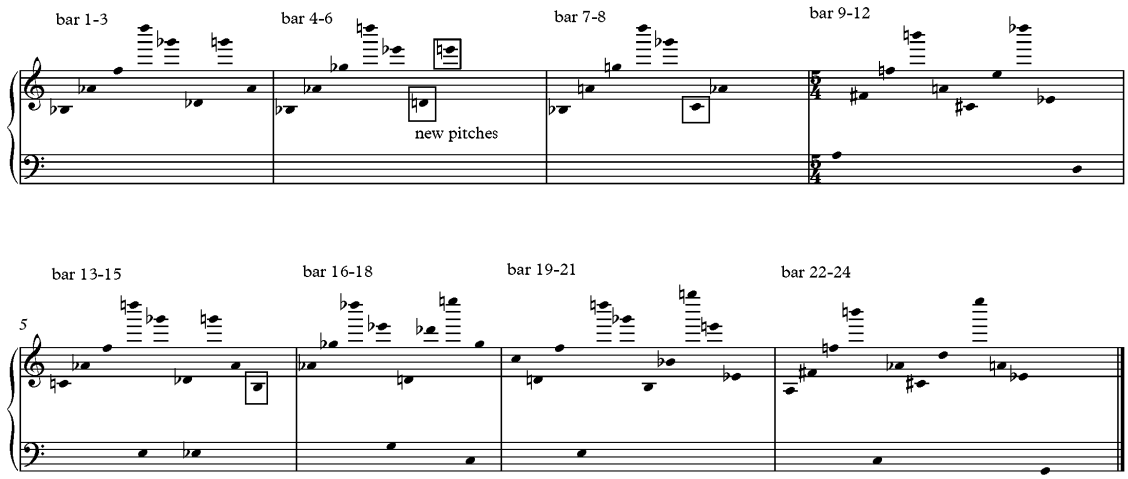

Fig. 24: *Weeping Tree* first movement, Pitch sets

The second movement completely changes the whole mood of the piece. Instead of the soft floating melody, the strong vertical chords are repeated with contrasting dynamics. Whilst the first movement describes a weeping tree's swinging shape in gentle wind, the second movement depicts the body of the tree and leaves hanging in stormy weather. The binary elements between musical event and pause are repeated in various durations of each phrase. The strong accents of chords in *sfz* imitate the big tree's body, and the *pp* small clustered notes represent the hanging leaves. The bass note C rings continuously throughout, but it descends into B and B♭ before ascending suddenly to D♭ at the last moment (see Figure 25).

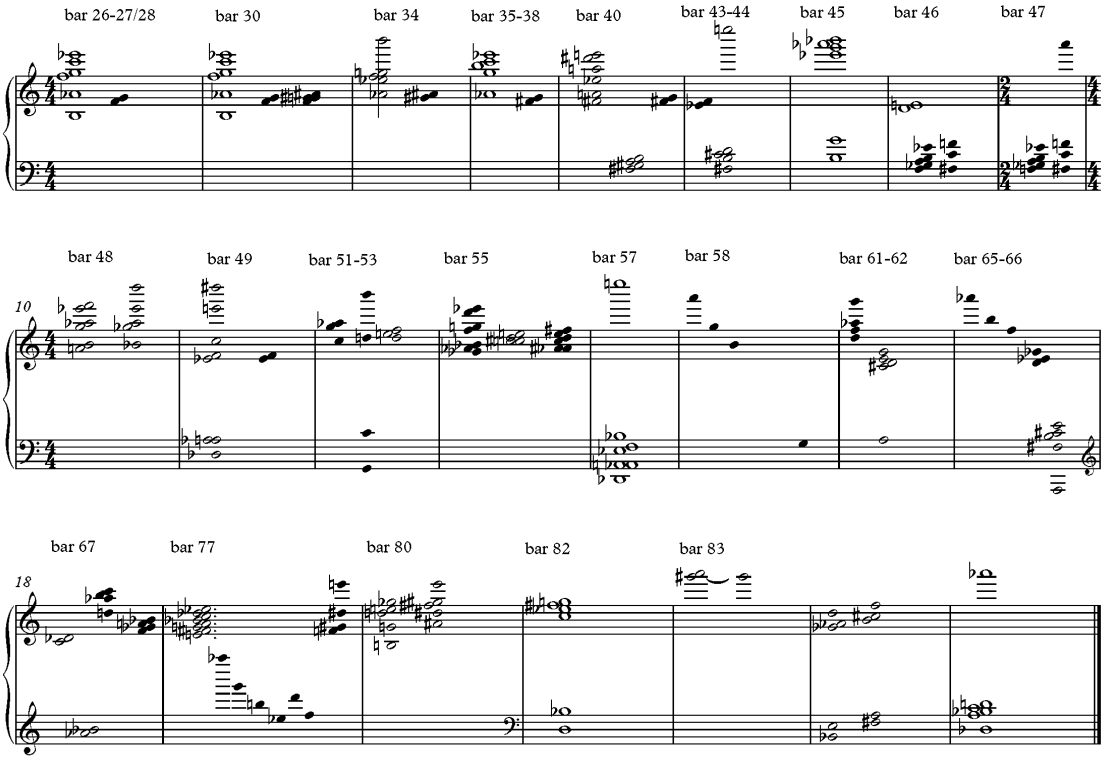

Fig. 25: *Weeping Tree* second movement, Chord progression

The initial concept behind the piece was to examine the different aspects of stasis between the two movements. The first movement flows horizontally in monophony whilst the second one is about strong attacks and vertical cluster chords. After the loud chord, the small cluster is echoed in *pp* (see Figure 26). The pitch changes are very similar in each movement, with neither featuring sudden changes. I call this a 'broken looping' technique because in theory, the main idea of this kind of minimal aspect of music could carry on without breaks between the phrases. In practice, however, I feel it is considerably more satisfying to listen to when the accumulated sounds are left to reverberate in space. The performers can freely improvise the unspecified rhythm of notes for the open space; this is exactly the same idea that I examined in *recollection of the mutual moments*.

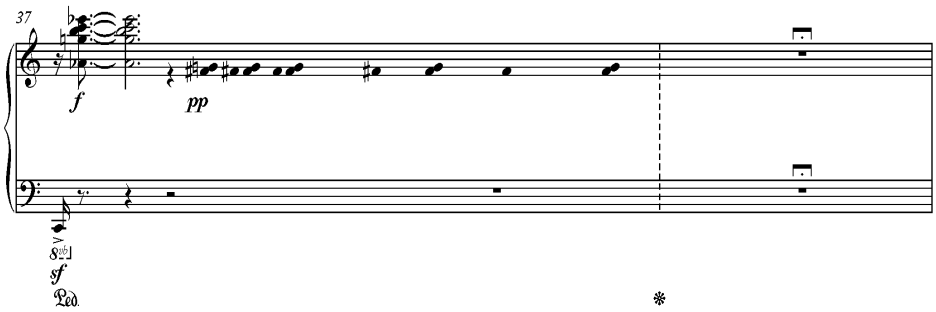

Fig. 26: *Weeping Tree* second movement, bar 37–39

2.4. *KAIROI for mezzo soprano, tuba and large ensemble*

Kairoi is the final composition in this portfolio. The title, plural of *Kairos* in Greek, means 'the times'. The initial idea was '*Kairos in Chronos*', that the pulsation of *tutti* becomes irregular and individual time (disappearance). The ticking clock gives a pulse, and stopped moments are sustained as repeated rhythmic patterns. My piece aims to capture the concept of time passing by mirroring the mechanism of the human breath. Unlike the other pieces, I did not plan the whole structure, but rather I wrote short sketches before deciding the order of the sections.

This piece was originally written for two particular soloists (Lore Lixenburg, mezzo-soprano and Oren Marshall, tuba) and large ensemble (the London Sinfonietta). The initial idea was to map the interactive relationship between the two soloists' interactions, especially between their contrasting registers. I was particularly fascinated to explore multiphonic sounds for the tuba soloist - notating pitches to sing and play simultaneously (see Figure 27). The soprano part here imitates the phenomenon of decay shape as disappearance (see Figure 13). I was equally fascinated to find ways of orchestrating these combinations with the ensemble instruments.

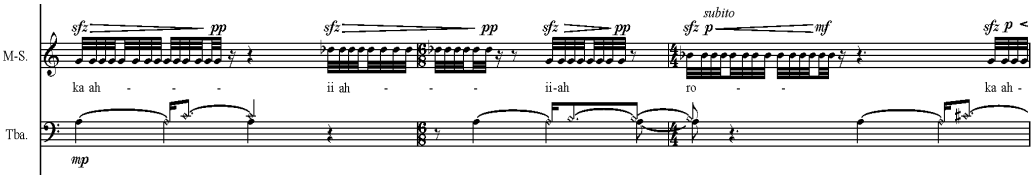

Fig. 27: *KAROI* Large Ensemble version bar 27–29, Mezzo soprano and tuba part

At first, the music sounded 'messy', because too many different languages and layers were operating at the same time. Of the four minutes written for an initial workshop, only one minute was kept for the final score. During the workshop, I felt that I was experimenting more with the ensemble, rather than with the soloists individually. The soloists showed me a number of techniques that could be used, and I took all these into account when composing the piece. For example, the mezzo-soprano improvises on rhythmic patterns with tongue click in front and back of the mouth and the tuba player suggested the speaking, tongue clicks and multiphonic techniques in bar 129-145.

Leaping broken chord gestures comprising major and minor thirds are contextualised through the whole piece. Although the four sections are based on different concepts, several distinct sections share some common features, such as the intervals of major and minor thirds, and the interplay between gestures and silences. The leaping broken chords of thirds are developed further in the third section, through rhythmic and percussive material. In the last section, the mezzo-soprano's long melodic lines extend this idea of leaping chords further still.

Standing out from the overall texture, the mezzo-soprano and tuba soloists are also accompanied by the accordion. I was especially interested in using the different registers of the accordion and other instruments. The text is shared by mezzo-soprano and tuba – at times cooperating, at times in conflict – from intelligible verbal utterances to language like sounds, to pure musical tone, free of linguistic content. At the beginning of the piece, the soloists are involved or hidden purposefully in the ensemble. However, gradually by the end of the piece they gain stronger individual identities.

From the beginning of this piece, the five temple blocks help to colour the leaping five-note gesture of the other instruments in unison, and this idea is taken up again in Part III, this time with six wood blocks replacing the temple blocks. The first three bars present the character of the whole piece, with the expectation that the repeated theme will be changed slightly each time. The first five descending notes (D♭, B ♭, G ♭, F, B) are repeated again in different lengths and different orchestrations until bar 33. The three consecutive repetitions of the theme are collectively manipulated again and again in order to develop the small cell of material. I varied the lengths of pauses between repetitions, because each stopped moment causes curiosity, and different lengths of silence invite further curiosity. Furthermore, the bass line consisting of three notes – a descending melody of major second and minor second intervals in the accordion and tuba – returns in Part III as the tuba's tongue click.

Kairoi is divided into four parts, and, as shown in the table in figure 28, each section establishes a new tempo, a new rhythmic character, and a new subject. The descending, short melody in the beginning is explored as an exaggerated gesture throughout the piece. Each part has the common subject of a third interval, but the sections contrast greatly with one another in terms of the changing context.

Section	Part I	Part II	Stationary part	Part III	Part IV
Bar	1–49	50–61	62–77	78–190	191–238
Character	Heavy	Quirky, Whispering	Brassy	Light, pleasant	Howling, spatial
Feature	Descending melody, short phrases	Static, echoing effect	Horn and Tuba Solo	Key clicks, soft	Static, dots, improvisational
Register	Middle and low	High	Middle	Middle	Full
Tempo	♪ =126	♩ = 63	♩ = 63	♪.= 138	♩ = 68 –> ♩ =58

Fig. 28: *KAIROI Large ensemble version,* Structure

In the second part, the howling effect of a big *diminuendo* provides a new focus. The atmosphere is unexpectedly twisted and sharpened. Nonetheless, the material remains mobile. In the high register, the vibraphone and mezzo-soprano play in unison echoing the effect of big *diminuendo*. Meanwhile, tonal *tutti* chords are sharply accented, accompanying the shifting figures of the vibraphone and mezzo-soprano.

Part III is the quietest, and yet the most intense section of the piece. The stationary section functions as a bridge from Part II to Part III. The mezzo-soprano sings a similar pattern as in Part III, but is now more hidden behind the brass and tuba soloist's long lines. In the third part, the key clicks by the flute, oboe, clarinet, wood-blocks and mezzo-soprano continuously transform the rhythmic pattern in the fast tempo. The accordion and two violins colour the key clicks very softly, providing a contrasting background. Besides the on-going rhythmic developments, the durations become longer and longer, and the short interruptions from the brass gain a more defined identity. Again, the common material of each part is the gesture of leaping thirds. The pitch material has a horizontal, linear relationship with intervals of a minor third and major third (see Figure 29). The idea of the rhythmic pattern originated from the very first bar of the piece.

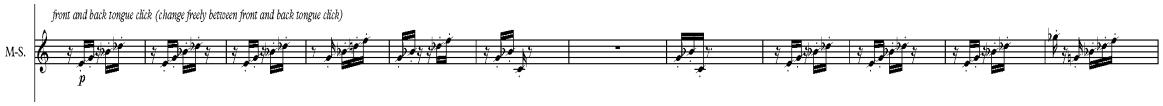

Fig. 29: *KAIROI* Large Ensemble version, Rhythmic patterns, bar 78–88

The final section was written for the initial workshop and then reworked. The original sketches did not sound as clearly as I imagined, so I took out most of the material, and focused on working with the individual *ritardando*. The strict rhythmic *tutti* pattern undergoes a process of rhythmic shifting, and progressively disappears. At bar 204, the gradual decay appears to be moving towards the end of the piece, but the section starts again unexpectedly with a longer phrase. Part IV explores the whole register from high to low like Part I, except that the chords and pitches are now sparser. The last four notes of the mezzo-soprano solo melody (A♭, F, D♭, D ♮ all marked *sfz)* reinforce the connection between the intervals and the main idea of the entire piece (see Figure 30).

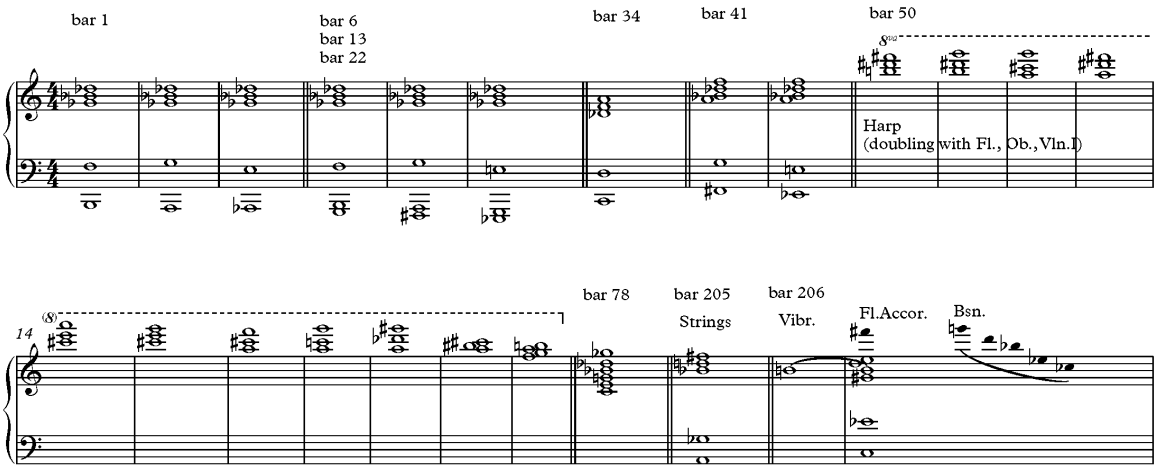

Fig. 30: *KAIROI* Large ensemble version, Harmonic progression

In retrospect, the main technical subject of individual *ritardando* was not successfully shown in the entire piece; however, in the last section this technique is effective. The static quality of the last few minutes (bar 162 – end) is the most interesting part for me, as I could listen for a long time to the whole sonority and the sound of the individual instruments. Each instrument plays the original rhythmic cell and pitches, and these individual repetitions decay gradually into silence. Finally, I wanted to explore the idea of *Kairoi* (the times), signifying both physical clock time and individual time. In order to create a space that appears to halt the physical measure of time, certain elements in this closing section change, whilst others come to a standstill.

I subsequently revised the score for mezzo-soprano, oboe, clarinet, percussion, accordion and violoncello. It was premiered at HCMF 2014, performed by Sounds of the Engine House. Paradoxically, I have come to prefer this smaller version even if the plan was originally for the big ensemble. The material and the structure of the piece are exactly the same as the original large ensemble piece, but each layer is much clearer in the version for smaller ensemble.

Conclusions

At the outset of my research, I made certain deliberate aesthetic choices. Those choices initially led to restrictions and limitations on musical material, in works such as *Recollection of the mutual moments*. Later on, I explored the idea of a 'breathing effect', whereby both events and silences are repeated with varying durations. This effect stemmed from a central research question: how best to sculpt and exploit the transition from sound to silence, for example via *individual ritardandi*. I also sought to expand my harmonic language, by using many changes of colour and density to offset the static quality of long chords.

Throughout my doctoral research, in working with different ensembles, I experimented with multiple versions of the same pieces. I was fascinated by how differently the performers perceived and interpreted gestures of disappearance, and the durations of silences. Later pieces, such as *KAIROI* and *Stepping Stones on the Constellations,* employed forms of structural metamorphosis, rather than dwelling on a single element or sound-world throughout the piece. In the course of my research, I also developed further skills in orchestration and in retaining momentum from phrase to phrase.

I conceive of 'breathing gestures' not only in purely musical terms, but also in terms of the performers' physical actions. In future I will investigate further the idea of drawing abstract shapes through the players' physical gestures. Future pieces will explore additional means of translating visual or physical gestures into musical language. For example, I plan to experiment with *individual ritardandi* over longer durations, prolonging the sense of exhalation and disappearance. I will be addressing the question of how to sustain the listener's interest over these longer *ritardando* sections. I will resolve the problems raised by open space notation, and explore more specific ideas which will create more space for the performers to improvise.

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