

*PhD in Musical Composition  
College of Arts and Law  
School of Languages, Cultures, Art History and Music  
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...in confidence

## PORTFOLIO OF MUSICAL COMPOSITIONS

by

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A thesis submitted to the University of Birmingham  
for the degree of DOCTOR OF PHILOSOPHY

# UNIVERSITY OF BIRMINGHAM

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## **Abstract**

My work during the last few years, parallel to teaching and concert management, has been focused on instrumental composition, composition with electronic media, sound design and performance. Spontaneous and continuous experiments in all these fields have enabled me to explore and develop many compositional techniques and processes, searching in this way for a unique personal language based on my own experience of listening.

The following portfolio is a detailed examination of my compositions during this period, clarifying the issues in instrumental and electroacoustic music composition which relate to performance, spatialization and live electronic processing; my intention here is to develop, systematize and automate some of the currently vital processes in this area in a flexible, and adaptable way, thereby contributing to new developments in signal processing and enhancing the integration of live instruments and electronics, with the ultimate aim of delivering to the listener the most satisfying experience possible.

In the works submitted, my special interest has been to investigate which current techniques, media, software, and interfaces are most appropriate for each given work. I have balanced these against existing standards which have long been fixed through tradition and technology – thus contributing to a better understanding of works of the past and at the same time seeking to move forward in the field of composition, sound design, live computer music, performance and spatialization.

*To my family and friends, for their love and for their laughter, and especially to my husband Claudio and my little daughter Claudia, who managed to make it possible for a wife-mother-teacher-woman to have time for her music.*

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*This thesis was copy edited for conventions of language, spelling and grammar by Hilary Johnson.*

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(Total duration of portfolio: 83 minutes)

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## Material on the USB-Stick

The audio and video files sources in this portfolio are listed here as part of the documentation, together with the technical information.

### Folder 2: Instrumental Pieces

#### 2.2.1 *Danza de la pena negra* (2012)

Score:

Danza\_gitana\_de\_la\_pena\_negra\_score.pdf

Audio file:

Danza\_gitana\_de\_la\_pena\_negra\_Dal\_Niente\_2012.wav

The audio file contained in this folder is the copy of a single recording made at the *6th International Ferienkurse für Neue Musik Darmstadt*, interpreted by *Ensemble dal Diente*. The recording was made by the organization during the summer course 2012.

#### 2.2.2. *Miniaturen* (2014)

Score:

Miniaturen\_2014\_score.pdf

Video file:

Miniaturen\_for\_soprano\_saxophone\_and\_vibraphone.mov

The video file contained in this folder, is the single recording made of the piece as interpreted by the *Nikel Duo*. This video was made by Franz Bannwart and the organization of *Chaotic Moebius*.

### **2.2.3. Fehlerfrei (2014)**

Score:

Fehlerfrei \_2014\_score.pdf

Video file:

Fehlerfrei\_for\_ensemble\_Lemniscate.mp4

The video file contained in this folder, is a single recording of the piece as interpreted by the *Lemniscate ensemble*. This Video was made by Franz Bannwart and the *Lemniscate ensemble*.

## **Folder 3: Pieces with Electronics**

### **3.2.1. ...tiempo (2012)**

Score:

...tiempo\_score.pdf

Audio file:

...tiempo\_Vertixe\_Sonora.wav

The audio file is an audio production taken personally from a recording made by the *Vertixe sonora* ensemble.

Video file:

...tiempo\_Performance\_La\_casa\_encendida\_Madrid\_2013.mov

The video file contained in this folder, was produced by *La Casa Encendida* Cultural Centre in Madrid.

Application in Max/MSP:

...tiempo\_Max/MSP\_material folder:

    Tiempo\_max\_app folder:

        00\_TIEMPO-Casa\_Encendida\_8Ch\_Concert.mxf

        (please use Max/MSP version 6.0.8.)

Technical instructions:

3.2.1. ...tiempo\_Infos.pdf

Audio channel configuration:

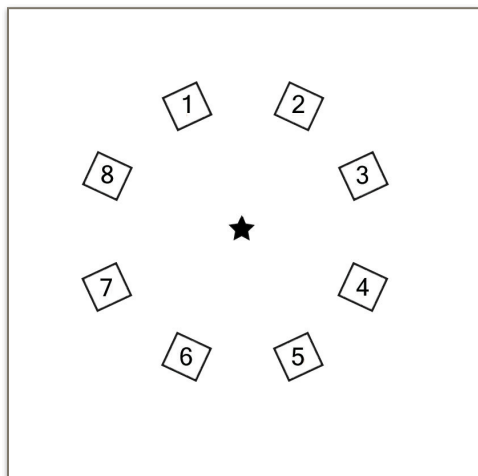


Figure 1: Audio channel configuration for ...*tiempo*.

### 3.2.2\_The-garden-of-earthly-delights (2014)

Audio files: Channel 1 to 8 (Mono)

The-garden-of-earthly-delights-8-001.aif

Audio channel configuration:

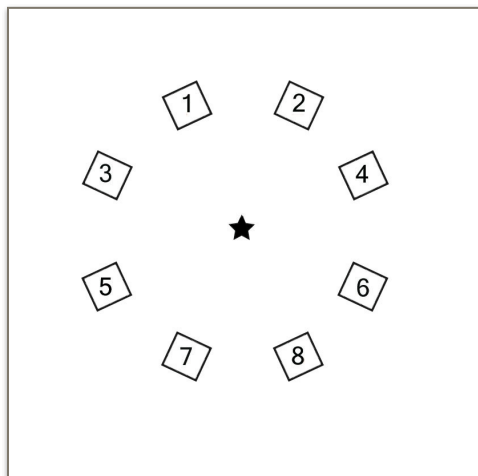


Figure 2: Audio channel configuration for *The Garden of Earthly Delights*.

#### **Folder 4: Pieces in collaboration with *Ballett Basel***

##### **4.2.1. Matching Sounds**

Audio files: Channel 1 to 8 (Mono)

Matching\_Sounds\_8-1.aiff

Audio channel configuration:

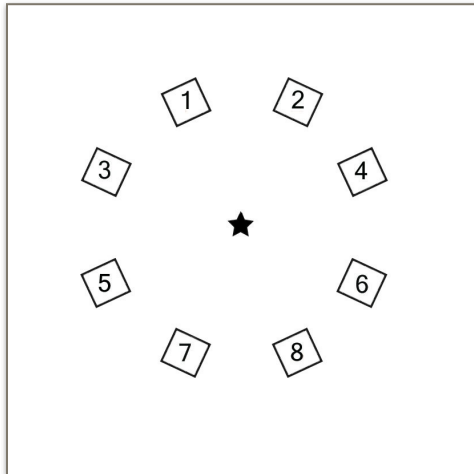


Figure 3: Audio channel configuration for *MATCH[ING] SOUNDS*.

Video file:

4.2.1.Matching\_Sounds.mp4

The video file contained in this folder, was produced by *Ballett Basel*

4.2.1.MS-Max/MSP\_app folder:

4.2.1.Matching\_Sounds\_Infos.pdf

To launch with Max/MSP version 5.1.9:

4.2.1.To\_launch\_Wiimote\_to\_Max\_5-Matching.maxpat

4.2.1.To\_lauch\_Matching\_Sounds\_General\_Patch.maxpat

#### **4.2.2.Bipolar Skin**

Video file:

4.2.2.Bipolar\_Skin.mp4

The video file contained in this folder, was produced by *Jorge García Pérez*

#### 4.2.3.Solareinstieg

Audio files: Channel 1 to 8 (Mono)

Solareinstieg-001.wav

Audio channel configuration:

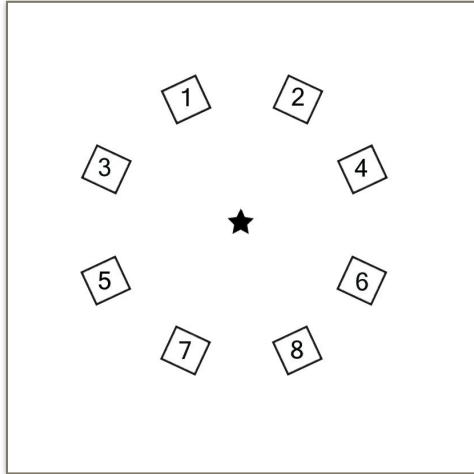


Figure 4: Audio channel configuration for *SOLAREINSTIEG*.

Video file:

4.0.2.3.Solareinstieg\_in\_Möbius Symphonie.mov

The video file contained in this folder, was produced by *Ballett Basel*

#### 4.2.4.Distorted Seasons

Video file:

4.2.4.Distorted\_Seasons.mov

The video file contained in this folder, was produced by *Jorge García Pérez*

## **Folder 5: Music Theater Works**

### **5.1.1.Lummelundagrottan**

Score:

5.1.1.Lummelundagrottan\_score.pdf

Video file:

5.1.1.Lummelundagrottan.mp4

The video file contained in this folder, is a single recording made of the piece as interpreted by the *UME Duo*. It was made by Franz Bannwart and the organization of *Chaotic Moebius*.

### **5.1.2.Two peas in a pot**

Score:

5.1.5.Two\_peas\_in\_a\_pot\_score.pdf

Video file:

5.1.5.Two\_peas\_in\_a\_pot.mp4

The video file contained in the folder is a single recording made of the piece as interpreted by the *Two New Duo*. It was made by Franz Bannwart and the organization of *Chaotic Moebius*.

# 1. Introduction

My compositional work within the context of this PhD consists of instrumental works with or without electronics as well as electroacoustic works, some of these having been written in collaboration with the choreographer Jorge García Pérez and the *Ballett Basel*. For a better explanation of the pieces, and for a greater clarity of the key elements involved in the compositional process, I have classified the works into the following subgroups: instrumental works, works with electronics, and work for music-theater works.

Decisions concerning the overall concepts, instrumentation or media used in these compositions have been influenced by the requirements of the respective commissions from the performing artists and musicians or professional instrumental groups during my research period at the University of Birmingham. My work with these performers has involved a significant amount of collaboration, which has thus become an important part of my creative life.

My instrumental and electronic compositional work has been influenced by the statements laid down by Jacques Chailley in his book *40,000 ans de musique* which, as the author notes, were already outlined before the first World War (1914-1918) – release of tonality, rhythmic symmetry and periodicity –. These aspects were influential in leading me to a search for new sounds: instrumental, electronic and concrete. <sup>1</sup>

Despite the fact that these statements have formed the basis of my compositional thinking, casting aside the attachment to a preset order of harmonic and melodic sequences through the use of microtonality and exploring complex rhythmic in order to create more natural or organic rhythms, some exceptions can be found and explained in this portfolio. These exceptions are

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<sup>1</sup> In Locatelli de Pégamo, A. M. (1973) *La notación de la música contemporánea*. Buenos Aires: Ricordi. p.16.

the works written for the *Ballett Basel*, which occasionally entail periodicity – in order to communicate easily with the dancers – as well as the composition ...*tiempo*, whose general concept required a simple rhythmic treatment.

At the start of my work for the *Ballett Basel*, I spent much time reflecting on the function and functionality of art in general, and of music in particular. Up to this point, I alone had made all the decisions regarding musical and performing aspects of a work: instrumentation, duration, use of scordatura, degree of difficulty, use of extended techniques, development of time and form, progression of rhythm, as well as the evolution of pitch and spectra. Collaborating with another artist challenges one to make compromises that may differ from one's own personal decisions, and in doing so creates aesthetic dilemmas.

In this particular context – *Ballett Basel* – the music is strongly related to the act of dancing, where musical decisions must be integrated into the general interdisciplinary concept, which is uniquely influenced by the decisions established by the entire 'artistic team' (composer, choreographer, dancers, lighting designer, etc.).

Inevitably, the composer must make compromises that affect the duration, form, timing and accents, as well as the atmosphere of the piece. Likewise the treatment of certain musical events and accentuations may require exaggeration, in order to denote musical cues for the dancers, to commence a new part of the choreography, or to simplify the rhythm in order to allow the dancers to count steps.

Many other aspects of interdisciplinary collective creation may shape the composer's creative process. Examples include lighting (in the search for musical solutions to cover a blackout), the

stage design or stage proportions (which may limit the use of live music and performers, or the use of small loudspeakers on the stage), or the use of video (although the video created for the piece *Moebius Symphony* was in this particular case produced using the music of the piece *Solareinstieg* as a basis).

Technical considerations may affect the composition too, such as the decision to use an 8.1 surround format for the piece *Match[ing] sounds*,<sup>2</sup> a direct result of the specific technical possibilities of the theater in Basel. In a similar vein, the composition *...tiempo* follows a minimalistic aesthetic, having been influenced by the general concept proposed by the ensemble *Vertixe sonora* together with the artist Esther Ferrer. This particular concept will be examined in more detail later in the commentary.

Issues concerning my instrumental, electronic, music theater and *Ballett* pieces, as well as the commentaries on individual works, will examine the compositional processes, techniques used and aesthetics followed, also illustrating the influences of other authors and pieces.

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<sup>2</sup> Included in the portfolio in a 8-channel version.

## 2. Instrumental pieces

### 2.1 General observations

#### Research areas

My compositional research for this group of works includes:

- *New methods of notation appropriate to specific timbral palettes*
- *The exploration of extended instrumental techniques and blending techniques*
- *Development of timbral richness, variety and depth through instrumental resources*
- *Microtonality as a harmonic and expressive structuring device*
- *The malleability of complex textures and resonances*

All of these aspects have been intensively explored during the experimental and compositional process. Clearly, however, not all aspects are equally present in each of the pieces included in this portfolio. As such, the commentaries for each work act to illuminate the key compositional concerns from the above list that were explored during the work's creation.

One of my first reflections was about how notation may help to clarify these compositional concerns, following Brian Ferneyhough's description in *Aspects of notational compositional practice*:

As the most immediate and natural iconic vehicle, notation seems to be the key to one possible area of musical auto-introspection.<sup>3</sup>

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<sup>3</sup> Ferneyhough, B. 'Aspects of notational compositional practice'. In Ferneyhough, B. (1995) *Collected Writings, London & New York: Contemporary Music Studies. Routledge*. pp. 4-5.

Ferneyhough establishes three essential presuppositions in relation to notation. The first one refers to the 'ability' of an adequate notation 'to offer a sound-picture of the events for which it stands'. Likewise, an adequate notation must offer all 'instructions for a valid reproduction and imply an ideology of its own process of creation'.

Ferneyhough's observations about notation help me to take decisions about how to decide upon the best form of notation before I start to write a score. Bearing in mind the space related to performers and interpretation, my intention is to notate the musical ideas as clearly and as precisely as possible, with attention to details and singularities and developing an individual form of expression, deciding as well which kind of notation would be best for each individual piece. I notate graphically pieces with strong theatrical content, involving body gestures and movement, whereas for large instrumental groups – in order to solve problems of rhythmic synchronization – I use a more standard Western notation. In a sense, in the above quote, Ferneyhough could also be referring to the musician's interaction with notation. Different ways of notating essentially the same music could produce very varied musical results. This is particularly true in my graphic notations that suggest certain musical gestures, and allow musicians to explore expressive ideas, especially in the context of extended techniques and noise-based music. Through carefully drawn graphics, I hope to interact with the musicians through notation, and elicit a musical gesture that would be impossible to describe using traditional notation. One example of this is the piece for cello and trombone *Two peas in a pot*, where notation involves actions, body gestures and movements on the stage in relation to the music.

As well as the score, I include other media formats as part of the notation materials, such as audio and/or video recordings which help the players to understand my intentions more clearly. The use of multimedia as an extremely effective means of communication, as well as the incorporation of digital and social media to the performance materials, constitute a greatly

important aid in reproducing accurate techniques and timbres, supplying musicians with another means of understanding, and enabling the best possible performance.

As mentioned above, my compositional practice involves the substantial use of extended techniques. My interest in such techniques arises from the search for musical analogies between the sonic surfaces of electronic processes and the vivid instrumental timbres produced by the performers. Some of these techniques have been developed in collaboration with players, exploring with their instruments through workshops and creative dialogue. In other cases, I have experimented with the instruments myself, deliberately subverting traditional performance techniques and searching for new ways to obtain certain exciting sound effects.

In this respect, I have also experimented with the many different techniques and advice given in the following literature: *Handbuch der Instrumentationspraxis* by Ertugrul Sevsay, *The Techniques of Saxophone Playing* by Marcus Weiss and Giorgio Netti, *The Techniques of Flute Playing: vol. 1 & vol. 2* by Carin Levine and Christina Mitropoulos-Bott, and *New Directions for Clarinet* by Phillip Rehfeldt.

For my understanding of, and experimentation with stringed instruments, I wish to mention at this point my intensive work with the cellist Dr. Ellen Fallowfield – author of the research resource *Cellomap*<sup>4</sup> – as well as the rewarding collaboration with Professor Brian Archinal during our experimental work with percussion instruments. Most of our meetings and rehearsals were documented in video or audio format. Listening to these recordings retrospectively allowed me time to reflect and analyze anew many musical and performative aspects – especially possibilities for developing timbre over time and the links between experimental techniques and performative practice. These sonic and visual materials constitute for me a starting point for the composition. I usually draft the first sketches for a new work after I analyze its content in depth.

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<sup>4</sup> Fallowfield, E. (2009) *Cellomap*, [Online], Available: <http://www.cellomap.com> [30 Oct 2014].

***Timbre as harmony***<sup>5</sup>

Electroacoustic music, in enabling noise exploration, seeks to embrace the full spectral potential of the wide-open sound world.<sup>6</sup>

For me, the development of timbral richness represents one of the most interesting challenges in my compositional process. *Klangfarbe*<sup>7</sup> – *sound color* – is the basis of my compositional thinking, not only for my acousmatic works but also for the instrumental and electroacoustic pieces. I am continually working on and developing the many aspects related to timbre, discovering and emphasizing the significance of transitions between different timbres, and from this principle, extending forward to the accentuation of inner movement, transformation and continuous change of the spectra over time.

Denis Smalley discusses in his work 'Spectromorphology: Explaining Sound-Shapes', the spectral qualities of sound, departing from the opposition of 'note' and 'noise' and exploring the contrasts and ambiguities involved in harmonicity and inharmonicity.

I adopt the more general terms *spectra* or *spectral space* to represent the wide variety of sound-qualities, timbres and pitches perceived over the spectrum of audible frequencies.<sup>8</sup>

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<sup>5</sup> The term *Timbre as harmony* refers to the writing 'Timbre as harmony – Harmony as timbre' by Professor Robert Hasegawa. Keynote address, Fostering New Music and Its Audiences: The Grawemeyer Award for Music Composition 30th Anniversary Conference, March 6, 2015, (University of Louisville).

<sup>6</sup> Smalley, D. (1997) 'Spectromorphology: Explaining Sound-Shapes' in *Organised Sound*, 2(2), Cambridge University Press, pp. 120-121.

<sup>7</sup> German word for *timbre*. For a detailed explanation of the etymology of the term *Klangfarbe*, see *Definitions of Klangfarbe*, in Schell, G. 'Klangfarbe aus Physikalische und Psychologischer Sicht', *Zur Entwicklung der Klangfarbenwahrnehmung von Vorschulkindern* p.5.

<sup>8</sup> Smalley, D. (1997) p.118.

Like Smalley, I think of my music as a continual exploration of contrasts and ambiguities of timbre, delving into transitions between noise and note, and the dilemmas contained in the antithesis of consonance–dissonance, and tension–release.

The composer Kaija Saariaho in her work: 'Timbre and Harmony: interpolations of timbral structures' also mentions the *sound/noise axis* when discussing timbre in her compositions. For her, 'noise' replaces the concept of dissonance and 'sound' that of consonance.

Amongst these I would mention the purity of sound (including the idea of pure/noisy) and its texture (grainy/smooth).<sup>9</sup>

Like Saariaho, I consider in my composition the opposition of pure and noisy sounds and qualities of sonic textures. A clear example, is the use of harmonics or *flautato* sounds in opposition to noises produced by bow overpressure on the strings, or the use of harmonics as well as pure tones on wind instruments in opposition to air sounds, even when coloured by vowel sounds produced through the instrument. As Saariaho does, I relate the control of timbre to the control of harmony using the sound/noise axis to develop musical phrases and larger forms, with the intention of creating strong inner tensions in the music and extending this principle at different structural levels of the composition (from micro to macro-formal domain).

The sound/noise axis exists as an abstraction which can be applied on different scales: it might be conveyed with a single violin bow, or by using all the instruments of an orchestra.<sup>10</sup>

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<sup>9</sup> Saariaho, K. (1987) 'Timbre and harmony: interpolations of timbral structures' *Contemporary Music Review*, Vol. pp. 93-133, Harwood Academic Publishers GmbH, p. 93.

<sup>10</sup> Saariaho, K. (1987) 'Timbre and harmony: interpolations of timbral structures' p. 94.

In my continuing research into timbre and qualities of sound, I like to explore with musicians how to implement these varieties of timbre in instrumental practice. In this sense, the ability to define and describe the sound qualities in themselves, as well as their potential for change over time, improves my own compositional practice, and allows me to develop criteria for the selection of materials, as well as strategies and techniques for the composition, analysis and communication, which are expressed positively in the sonic results.

Professor Robert Hasegawa introduces his work 'Timbre as Harmony – Harmony as timbre'<sup>11</sup> by doing an exhaustive analysis of the association between these two concepts which are prevalent in the music of the twentieth and twenty-first centuries:

However in contemporary music, particularly music that is sound-based rather than note-based, the definition of timbre as a property of a single note is no longer sufficient. We encounter many composite events —sound-mass textures, complex chords, synthesized acoustic spectra, *etc.*—in which the constituent sounds fuse together to create a unified effect with its own unique global timbre. Instead of assuming that timbre is a property of single notes, we can redefine timbre more broadly as an emergent property of composite events [...] the emergent timbre of a composite event will be affected by the individual timbres of its constituent sounds, but also by their amplitude, register, temporal unfolding, and even specific pitches—in other words, harmony.<sup>12</sup>

The use of harmony in my own compositional process follows the ideas defined here by Prof. Hasegawa. The fusion of multiple single sounds recorded, synthesized or emitted by instruments allows me to create complex and vivid timbres, which appear in the composition as sound-objects, musical gestures or sonic textures. I also take control of changes of motion,

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<sup>11</sup> Hasegawa, R., (2015).

<sup>12</sup> Ibid. p.1.

processes of growth and decay, and changes of spectral density over time, creating artificial sonic spaces and developing the changes of the distance of the musical events. This aligns with Smalley's definition of the 'qualities of spectral space and density':

Spectral space covers a distance between the lowest and highest audible sounds. In discussing motion and growth processes it was assumed that spectromorphologies move through spectral space as they change over the time [...] spectral density... can be imagined as a fog, curtain or wall of broader or narrower spread which allows sounds to penetrate or not... Spectral density is related to distance perspective and needs to be considered along with space in general. <sup>13</sup>

The concept of 'Timbre spaces' <sup>14</sup> or 'spectral space' as a multidimensional phenomenon, form an increasing component of my present research into the use of audio descriptors for timbre as a medium. The use of audio descriptors, such as those found in Table 1, is a helpful compositional tool which allows me to define in detail the qualities of sound spectra, and pre-establish and define the possible sonic results or sonic transitions in advance. This table has been a beneficial aid for expanding my timbral sound palette and helping me to creating elaborate musical gestures and textures.

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<sup>13</sup> Smalley, D. (1997) p.11

<sup>14</sup> Peeters, G., Giordano, B.L., Susini, P., Misdariis, N. and McAdams, S. (2011) 'The Timbre Toolbox: Extracting audio descriptors from musical signals' *Journal of the Acoustical Society of America*, 130(5), pp. 2902-2916.

	Audio descriptor	Units	Abbreviation	Input representation
Global descriptors	Attack	s	Att	Temporal Energy Envelope
	Decay	s	Dec	
	Release	s	Rel	
	Log-Attack Time	log(s)	LAT	
	Attack Slope	a/s	AttSlope	
	Decrease Slope	log(a)/s	DecSlope	
	Temporal Centroid	s	TempCent	
	Effective Duration	s	EffDur	
	Frequency of Energy Modulation	Hz	FreqMod	
Amplitude of Energy Modulation	a	AmpMod		
Time-varying descriptors	Autocorrelation (12 coefficients)	-	AutoCorr	Audio Signal
	Zero Crossing Rate	s <sup>-1</sup>	ZcrRate	
	RMS-Energy Envelope	a	RMSEnv	Temporal Energy Envelope
	Spectral Centroid	F	SpecCent	STFTmagnitude (STFTmag) STFTpower (STFTpow) ERBfft (ERBfft) ERBgammatone (ERBgam) Harmonic
	Spectral Spread	F	SpecSpread	
	Spectral Skewness	-	SpecSkew	
	Spectral Kurtosis	-	SpecKurt	
	Spectral Slope	F <sup>-1</sup>	SpecSlope	
	Spectral Decrease	-	SpecDecr	
	Spectral Rolloff	F	SpecRollOff	
	Spectro-temporal variation	-	SpecVar	
	Frame Energy	I	FrameErg	
	Spectral Flatness	-	SpecFlat	STFTmag, STFTpow, ERBfft, ERBgam
	Spectral Crest	-	SpecCrest	
	Harmonic Energy	a <sup>2</sup>	HarmErg	Harmonic
	Noise Energy	a <sup>2</sup>	NoiseErg	
	Noisiness	-	Noisiness	
Fundamental Frequency	Hz	F0		
Inharmonicity	-	InHarm		
Tristimulus (3 coefficients)	-	TriStim		
Harmonic Spectral Deviation	a	HarmDev		
Odd to even harmonic ratio	-	OddEveRatio		

Table 1: *The timbre toolbox*. Multidimensional descriptors of timbre. <sup>15</sup>

## Microtonality

The use of microtonality in my instrumental pieces follows a similar principle, of working intensively with pitch and minimal changes of pitch in order to acquire profuse and varied coloration. For instance, I am continually discovering new possibilities offered by the use of scordatura on the strings, as a way of increasing the palette of tones available.

<sup>15</sup> Ibid. p. 2905.

The composer Brian Ferneyhough utilizes microtonal structures in his compositions (quarter-tones and eighth-tones). In his pieces *Carceri d'Invenzione IIa*, *Etudes Transcendentales* and *Mnemosyne* these intervals are understood as *inflectional approximations*.<sup>16</sup>

Going a step further from this principle, and based on transcriptions of multiphonics such as the examples given by Giorgio Netti<sup>17</sup> or Phillip Rehfeldt,<sup>18</sup> as natural microtones produced by the instruments, I especially enjoy exploring the effects of eighth-tones, as Ferneyhough does, with the aim of refining the varieties of timbre and using following notation:

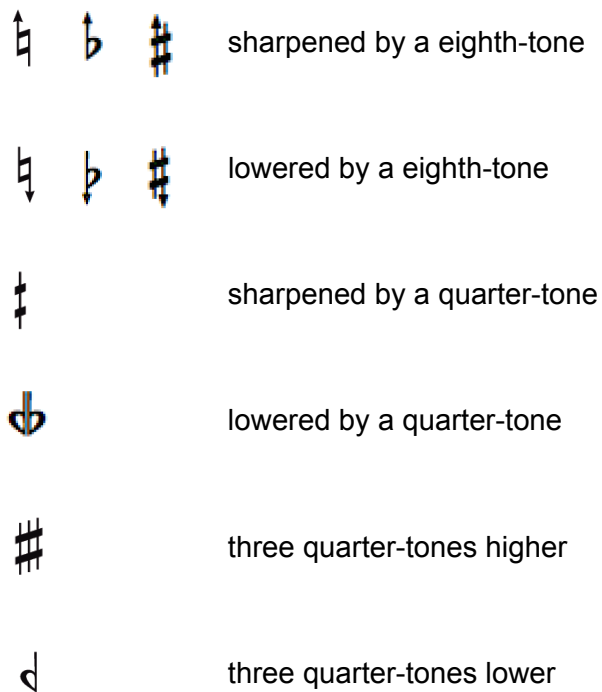


Figure 5: Microtonal notation

<sup>16</sup> Microtones are listed as part of differentiated continuum and arrowheads indicate the direction of the deviation from the predetermined accidentals. In Paetzold, C. (2010) *Carceri d'Invenzione von Brian Ferneyhough, Analyse der Kompositionstechnik*, Hofheim: Wolke Verlag. p.30.

<sup>17</sup> Weiss, M. and G. Netti, G. (2010) *The Techniques of Saxophone Playing*, Hofheim: Bärenreiter-Verlag.

<sup>18</sup> Rehfeldt, P. (1994) *New Directions for Clarinet (The New Instrumentation Series)*, revised edition, Berkeley: Scarecrow Press.



In a second interpretation, as in Ferneyhough's compositions and according to the performance practice experience of musicians, we may understand the use of these microtones as inflectional approximations, in order to ease the grade of difficulty of the piece. In this case, the use of imprecise microtones will provide a certain random effect at harmonic level, as well as a vivid spectral effect.

Another use of microtonality in my compositions is the use of natural harmonics (Figure 6). The contrast between harmonics played on strings which have been altered in pitch through scordatura, combined with the same harmonics played on strings tuned traditionally, creates pulsations or *beatings* of different velocities which can be used to increase the intensity of the piece. The beat as a centre point of compositional interest is what the composer Georg Friedrich Haas defines as 'Klangspaltung'<sup>20</sup> (*sound cleavage*). Such transitions and changes in time and motion of *Klangspaltungen* have become a fundamental aspect of my compositional interest.

Extending these sound treatments to a group of instruments or voices enables me to create complex textures and continuously varying or contrasting resonances. The development and transformation of these textures through gradual transitions or through sudden contrasts, enables me to articulate the form of a composition.

In Brian Ferneyhough's music, the treatment of time is structured at three different levels: tempo, meter, and rhythm.<sup>21</sup> Using the same principle, I determinate the temporal macrostructure of the composition at the beginning of the compositional process, through the establishment of the duration of the piece and the definition of a general tempo or a defined

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<sup>20</sup> Georg Friedrich Haas (1999) in 'Mikrotonalitäten' " in Metzger, H-K. and Riehn, R. (2003) *Musik der anderen Tradition: Mikrotonale Tonwelten* Munchen: Richard Booberg Verlag. p.59.

<sup>21</sup> In Paetzold, C. (2010) p.20.

metronome marking. This marking may change abruptly by a new metronome indication or move to a new tempo through *ritardandi* or *accelerandi*.

The microstructure, or smallest element of the composition evolves from the combination of notes and pauses contained within each measure, as well as micro fluctuations as beatings produced by *Klangspaltungen* or eighth-tones played simultaneously. The measure constitutes the middle level of the structure of time. As Ferneyhough states:

A measure is not primarily a unit of emphasis of agogic priorities, but a space, serving to delimit the field of operations or presence of specific sound qualities, of musical processes.<sup>22</sup>

In the same way, I assume that any ratio in time 'is expressible in terms of both absolute duration and quantity of discrete impulses in a given time-space'<sup>23</sup> maintaining the correspondences and changes of these three levels as a strategy to develop rhythm and break with periodicity. During the performance of my instrumental works, I do not use any particular technique to establish each measure. I determinate the 'metric space'<sup>24</sup> in relation to musical gesture. A clear example of these principles can be found in the piece *Two peas in a pot*, where music and body gestures constitute the contents of one bar, denoting the accentuation of the first beat and the coordination of voices.

The issues described here regarding time, timbre, notation and instrumental practice, summarize the basis of the methods and theories applied in the composition of my instrumental

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<sup>22</sup> Brian Ferneyhough (1989) 'Duration and rhythm as compositional resources' in Ferneyhough, B. (1995) *Collected Writings*, London & New York: Contemporary Music Studies Routledge. p.52.

<sup>23</sup> Ibid p.52.

<sup>24</sup> Ibid p.52.

pieces. Concrete examples of the aforementioned compositional processes will be discussed in detail during analyses of the individual pieces.

## **2.2 Commentary on the works**

### ***Danza de la pena negra (2012)***

For ensemble

(bass flute, soprano saxophone, piano, acoustic guitar, cello, contrabass)

*Danza de la pena negra* (Dance of the Black Sorrow) was written for the *International Composition Workshop Competition* in Darmstadt, Germany, directed by Professor Hans Thomalla (Associated Professor in Composition at the Northwestern University in Chicago, USA), together with Professor Lucas Fels (cellist of the Arditti Quartet and Professor of Chamber Music at the Hochschule für Musik und Darstellende Kunst in Frankfurt, Germany) and the Ensemble Dal Niente (from the Northwestern University, Chicago). This Competition was part of the 46th International Ferienkurse für Neue Musik in Darmstadt (2012). I was selected, together with five other composers, to write a piece for the Ensemble dal Niente and participate in a composition workshop which took place in two phases: the first took place at Northwestern University in November 2011 where the first drafts (which included sketches and graphic elements) were reviewed and discussed; the second phase of the workshop took place at the 46th Internationale Ferienkurse für Neue Musik in Darmstadt, where the work was finally premiered.

### **Compositional Process**

The first ideas for this piece emerged from the poem *Romance de la Pena Negra* by Federico García Lorca – a poem about sorrow, solitude and waiting. The piece incorporates gestures,

rhythm and timbres that emerge from the Spanish *cante flamenco* and from the passion and intensity of Spanish gipsy performance. For me, one of the essential qualities of flamenco is the ‘parasitic noise’ or the sounds produced by the act of playing energetically – for example, the incidental noises produced by strumming strings, or the percussive effect of playing harmonics on the guitar or plucking harmonics on stringed instruments.

Influenced by *palos del flamenco* of *Bulería*, *Alegría* and the dance of *Zapateado*, *Danza de la pena negra* reflects features of Spanish traditional music. Although the sound materials and instrumental techniques for the *Danza de la pena negra* are based on flamenco music, my wish was not to write a new flamenco piece. My intention was rather to analyze those musical aspects of flamenco which I find interesting, and reimagine them in my compositional work. I then use these musical aspects to explore form, accentuation, agogic, rhythm, dynamics and timbre.

After an initial period spent analyzing flamenco forms with the help of the *Enciclopedia de los Estilos Flamencos de la A a la Z*, focusing on the work of artists such as *Paco de Lucia*, *Estrella Morente*, *Miguel Poveda*, *Diego El Cigala*, *Tomatito*, *Carmen Linares* and others, I began to form and establish my own musical preferences based on my interpretation of the ideas and emotional expression in Lorca’s poem. Finally, I sketched out the initial shape of the piece and established the general form of the composition (see figures 7 and 8).

#### ROMANCE DE LA PENA NEGRA

*Las piquetas de los gallos  
cavan buscando la aurora,  
cuando por el monte oscuro  
baja Soledad Montoya.  
Cobre amarillo, su carne,  
huele a caballo y a sombra.  
Yunques ahumados sus pechos,  
gimen canciones redondas.*

*Soledad, ¿por quién preguntas  
sin compañía y a estas horas?  
Pregunte por quien pregunte,  
dime: ¿a ti qué se te importa?  
Vengo a buscar lo que busco,  
mi alegría y mi persona.  
Soledad de mis pesares,  
caballo que se desboca,  
al fin encuentra la mar  
y se lo tragan las olas.  
No me recuerdes el mar,  
que la pena negra, brota  
en las tierras de aceituna  
bajo el rumor de las hojas.  
¡Soledad, qué pena tienes!  
¡Qué pena tan lastimosa!  
Lloras zumo de limón  
agrio de espera y de boca.  
¡Qué pena tan grande! Corro  
mi casa como una loca,  
mis dos trenzas por el suelo,  
de la cocina a la alcoba.  
¡Qué pena! Me estoy poniendo  
de azabache carne y ropa.  
¡Ay, mis camisas de hilo!  
¡Ay, mis muslos de amapola!  
Soledad: lava tu cuerpo  
con agua de las alondras,  
y deja tu corazón  
en paz, Soledad Montoya.*

\*

*Por abajo canta el río:  
volante de cielo y hojas.  
Con flores de calabaza,  
la nueva luz se corona.  
¡Oh pena de los gitanos!  
Pena limpia y siempre sola.  
¡Oh pena de cauce oculto  
y madrugada remota!*

(F. G. Lorca 1926)

*Rooster-beaks sharp as mattocks  
excavate the dawn  
as Soledad Montoya  
climbs down the dark mountain.  
Yellow copper, her flesh.*

*Scent of horses and shadows.  
Her breasts, two smoking anvils,  
resound with round moans.  
Soledad, whom do you ask for,  
alone and at this hour?  
'What does it matter?  
I ask for the one I ask for.  
I seek what I am searching for:  
my joy and my own self.'*  
*Soledad of my sorrow,  
hard-mouthed and untameable,  
in the end you'll reach the sea,  
and waves will swallow you.  
'Don't remind me of the sea,  
for if you do the black pain  
will unfurl in the land of olives  
beneath the rumour of leaf-rain.'*  
*Soledad, what hurt you suffer!  
What great pathetic grief!  
Lemon tears bitter with  
waiting roll into your mouth.*

*'What enormous pain!  
I run back and forth like a madwoman,  
from hearth to bed-post,  
my braids dragging on the ground.  
What pain! I am turning into jet:  
black flesh, black clothes.  
Ay, my fine linen shifts!  
Ay, my thighs frail as poppies!'*  
*Soledad, wash your body  
with the dew of skylarks.  
Soledad Montoya,  
rest your heart in remotest peace.*

\*

*Far below sings the river,  
streaming with sky and leaves.  
New light crowns itself*

with yellow squash-flowers.  
Oh the pain of the gypsies!  
Pain so clean and alone.  
Pain of hidden river-beds  
and unapproachable dawns.

(Translation by Julith Jedamus <sup>25</sup>)

First formal sketches

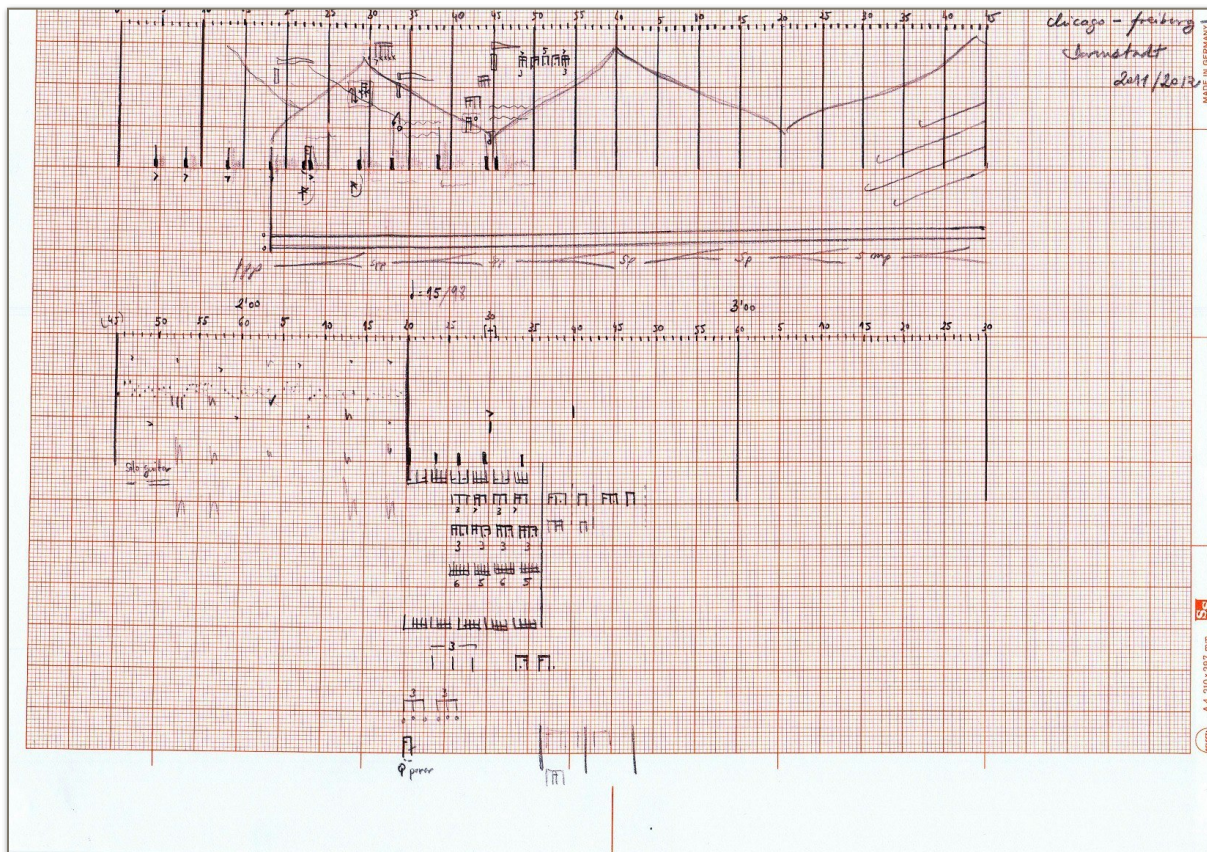


Figure 7: Schematic representation of the form of *Danza de la pena negra* [1].

<sup>25</sup> García Lorca, F. (1928) *Romance de la pena negra* – translation – [Online], Available: <http://www.mptmagazine.com/poem/romance-de-la-pena-negra-593/> [30 Oct 2014].

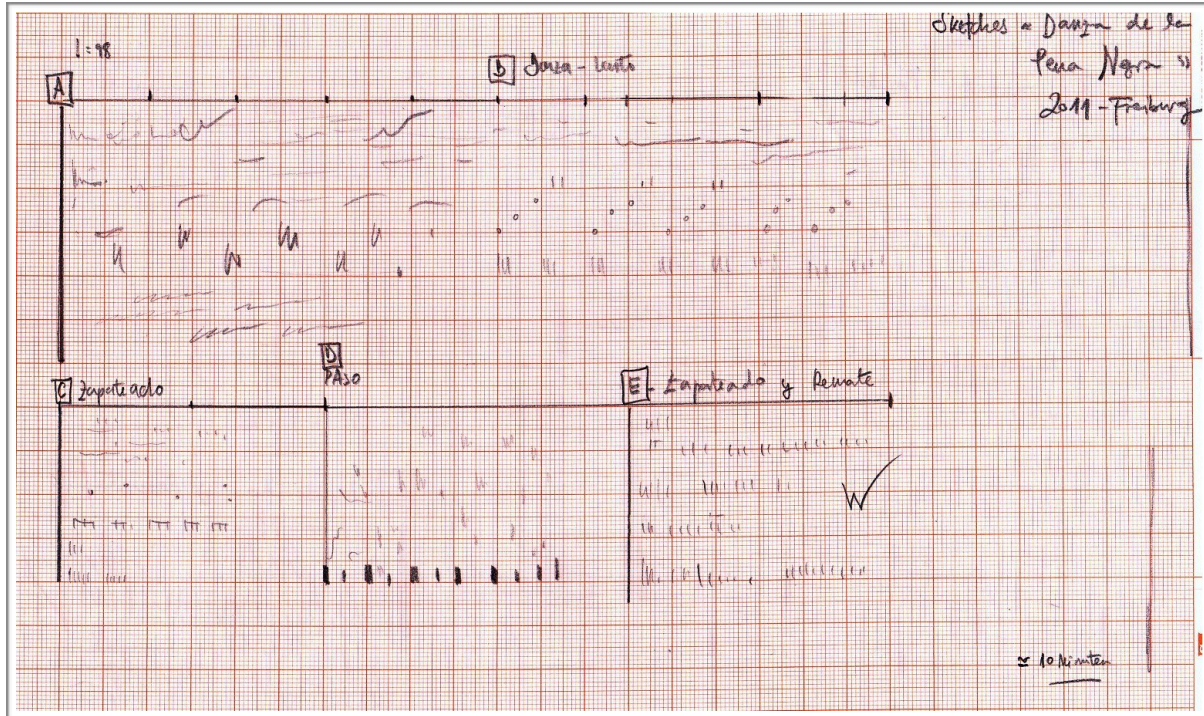


Figure 8: Schematic representation of the form of *Danza de la pena negra* [2].

### Establishing the form

As a development from these first formal sketches, the form of *Danza de la pena negra* was finally established in order to create contrasting sections as follows:

- A – Introducción
- B – Danza (Lento)
- C – Zapateado
- D – Paso
- E – Zapateado y Remate

During the workshop in Chicago, my ideas for the first three first parts – *Introducción*, *Danza*, and *Zapateado* – were exposed to discussion and then intensively worked on by the players from *dal Niente ensemble*, Professor Hans Thomalla, Professor Lucas Fels and myself. My interest here was to explore a range of percussive techniques, as well as the multiphonic

possibilities of the instruments, looking for new timbres and variations of timbre. After experimenting on the instruments with the players of dal Niente Ensemble and discussing aesthetic and technical issues (such as new instrumental techniques, the use of harmonics, multiphonics and microtones, and more general questions about rhythm, accentuation, tuning, blending and dynamics), I established and notated the first layout for the composition.

### **The harmonic basis**

The harmonic basis of the piece is derived from a selection of multiphonics from the soprano saxophone and the bass flute. These instruments were selected because of their alluring timbral and dynamic possibilities, which give rise to the whole harmonic context and the scordatura. I developed a set of multiphonics after an intensive study of *The Techniques of Saxophone Playing* by Marcus Weiss and Giorgio Netti as well as *Present Day Flutes* by Pierre-Ives Artaud and Gerard Geay. There was also much experimentation during the workshop with *ensemble Dal Niente* and the excellent saxophone player, Ryan Muncy, in which we discussed the techniques proposed in relation to performance practice. Many later decisions for the composition, involving aspects such as tempo, rhythmic and dynamics, were based on this discussion.

**First sources***Soprano saxophone multiphonics (Weiss-Netti)*

Figure 09: Schematic representation of the soprano saxophone multiphonics in *Danza de la pena negra*.

Comments by Ryan Muncy (Saxophone player in Ensemble dal Niente – Chicago)

#31 - works as indicated (with relevant dynamics) in the book.

#41 - also works as indicated. There is a lot of air sound in this multiphonic. Also, the second one is very unstable (note the graphic symbol which notates unstable multiphonics)

#62 - works fine, as indicated with dynamics and instability

#63 - works very nicely, is somewhat unstable at the initial attack, but then it's relatively easy to make it stable.

#73 - this one works at the very quiet dynamic indicated, but on my saxophone, the lowest note of the multiphonic sounds more like a B-natural than a B-natural quarter tone sharp.

#80 - works nicely. on the second multiphonic, I'm having difficulty hearing the F quarter tone sharp

#106 - works pretty well. lots of air sound. Make sure you see that the third multiphonic in this set is very unstable. I couldn't get all three pitches with stability

#122 - works nicely.

Following on from Muncy's notes, and given the instability of some multiphonics, I chose those around C5 and A5-flat that were less hazardous to play, paying attention to the attack, dynamics and filtering possibilities. I was looking for a situation in which one tone of the multiphonic could be played, then developing and growing slowly into the whole multiphonic, in parallel with dynamic change (as appears in the saxophone's bar 8). The same process with multiphonics on

the alto flute was explored with the flutist Shanna Gutierrez. This kind of growth and decay process is very effective in obtaining attractive changes of spectrum.

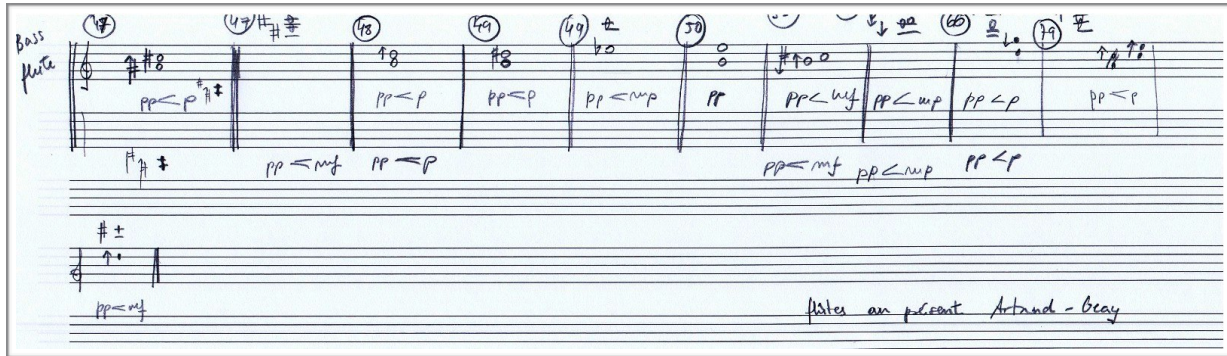


Figure 10: Schematic representation of the bass flute multiphonics in *Danza de la pena negra*.

### Establishing harmony – establishing timbre

After I selected the multiphonics from the bass flute and the soprano saxophone, I established the harmony for the piece. I organized the pitches contained in the notation of the multiphonics as follows, in order to obtain microtonal scales:

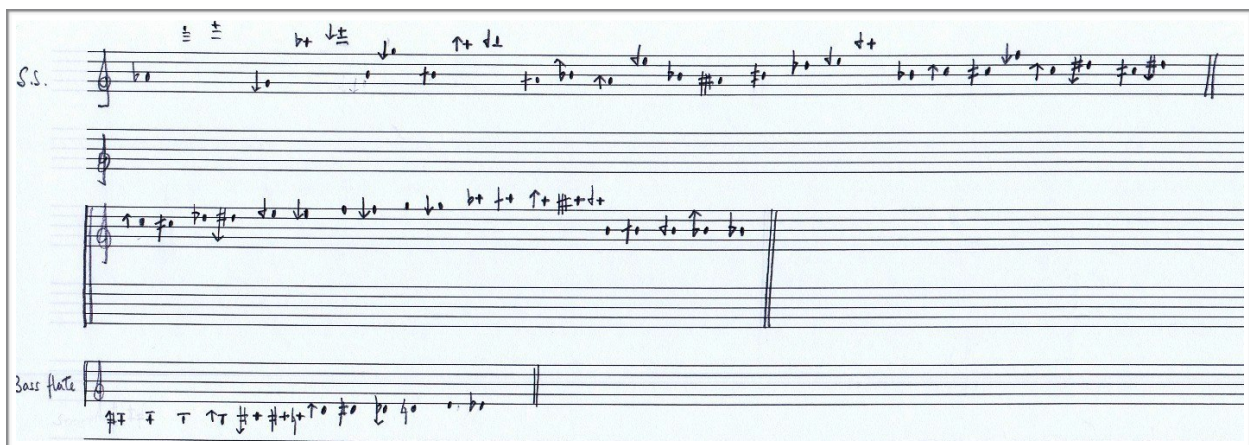


Figure 11: Schematic representation of microtonal scales in *Danza de la pena negra*.

The idea for this kind of organization of tones comes from my analysis of several pieces by Klaus Huber. I spent over a year (2008-2009) at the *Paul Sacher Foundation* analyzing works by

Klaus Huber, in particular his piece *Metanoia* for organ, trombone and children voices.<sup>26</sup> The difference between Klaus Huber's process and my own is the fact that Huber obtains the pitches from the analysis of the microtonality of *maqamat*.<sup>27</sup> He then organizes the pitch material, using permutations of pitches which follow a previously predetermined form.<sup>28</sup> Generally, in my compositions, the harmonic material evolves from the possibilities of the instruments themselves to produce complex sound spectra. Pitches of selected multiphonics from alto flute and soprano saxophone, their specific characteristics, notation and their implementation within the entire instrumentation constitute the basic harmonic material for the composition.

### Establishing scordatura

The scordatura of the stringed instruments was established taking into account the implementation of the previously determined harmony and microtonal scales, the possibility of including a large number of tones to generate beating between different harmonics, as well as the mixture of timbres and performance possibilities.

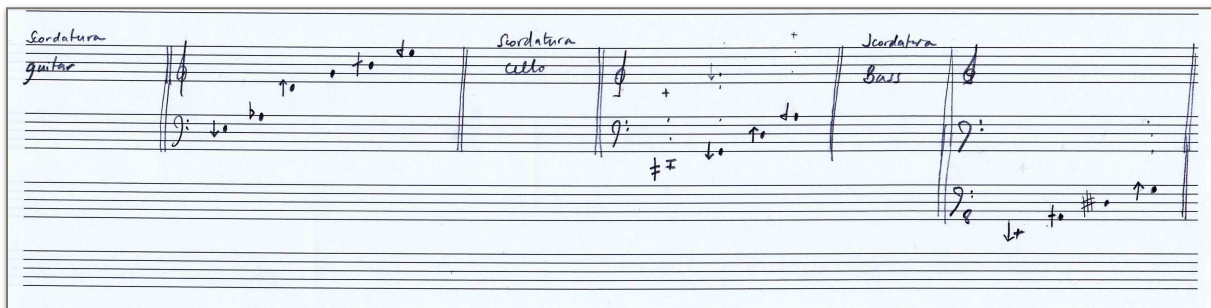


Figure 12: Schematic representation of scordatura with stringed instruments in *Danza de la pena negra*.

<sup>26</sup> Huber, K. (1995) *Metanoia* NEOS 11220. [Online], Available: <https://www.youtube.com/watch?v=PA-5iQWZnmg> [30 Oct 2014].

<sup>27</sup> *In Arabic music, a maqam (plural maqamat) is a set of notes with traditions that define relationships between them, habitual patterns, and their melodic development. Maqamat are best defined and understood in the context of the rich Arabic music repertoire* [Online], Available: <http://maqamworld.com/maqamat.html> [30 Oct 2014].

<sup>28</sup> Carrasco, T. (2010) 'Klaus Hubers Composition Metanoia' New Score and Documentation. Research and Analysis Klaus Hubers Music and Compositional Techniques in new Music. In the context of Diploma Thesis subject Composition. Collaboration Music Academy Basel – Paul Sacher Foundation Basel, Switzerland.

## Rhythm

For the rhythmic aspect of this work, I analyzed flamenco rhythm. This process included not only the experience of listening and making transcriptions, but also the practical aspects of taking flamenco dance classes over several months in order to internalize the rhythms and gestures, and to deepen my understanding of all aspects surrounding this art form. Some of the rhythmical patterns of this composition are based on typical *palmeo*<sup>29</sup> and *zapateado*<sup>30</sup> of the dances of *Alegrías* and *Bulerías*. At the end of the work, these two flamenco forms reappear explicitly, as a reminiscence of an element from the past, in the form of a *coda*.

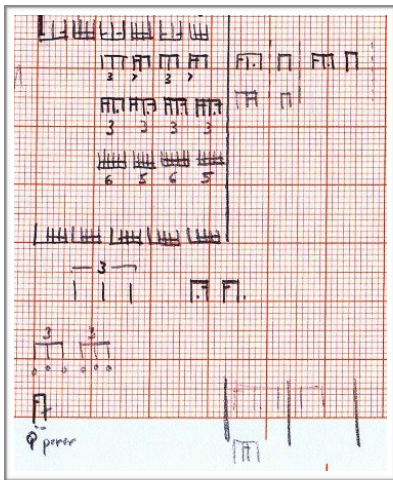


Figure 13: Schematic representation of the rhythm in *Danza de la pena negra*.

At this point I wish to mention the importance of the intensive collaboration with interpreters and composers during the workshop and the premiere performance of *Danza de la pena negra* in Darmstadt 2012. Together we explored many new techniques and implemented these in a way which gave a fresh input to the composition – for example, the energetic percussive elements produced by hitting the body of the instruments, the intensive work with harmonics and muted notes on the piano; or the slaps and key clicks produced by the woodwinds. The interpretation

<sup>29</sup> *Palmeo* refers to rhythmic sounds of *palmas* (handclapping).

<sup>30</sup> *Zapateado* refers to a spanish dance which emphasizes the percussive effect of agile movements of the feet.

of this work demands from the musicians a focus on the physicality of the gestures. Indications for expressions appear at the beginning of sections: *enérgico* (forceful), *íntimo* (intimate), *danzando* (dancing), *expresivo* (expressive), *con fuerza y color* (with force and color). In several of my later compositions I have continued to expand and develop these techniques further.

### ***Miniaturen* (2014)**

For soprano saxophone and vibraphone

#### **Commissioned by *Nikel Duo* in Switzerland**

*Miniaturen* (Miniatures) for soprano saxophone and vibraphone is a work commissioned by the *Nikel Duo* – Patrick Stadler (saxophone) and Brian Archinal (percussion). Fundamentally, *Miniaturen* experiments with the different timbre of both instruments, using extended techniques in a continuous search for analogies and contrasts. The whole work is based on the multiphonic possibilities of the soprano saxophone in combination with the contrasting timbre of the vibraphone.

In this work, I followed a similar principle to that used in my other instrumental compositions, establishing first the form, then the harmony and the rhythm. The major difference in the composition of *Miniaturen* is the treatment of time. The short movements experiment with complex measures and are presented as *frozen moments* in which timbre is used as the principal element. My main interest in using this technique is the possibility of developing the regular measures into more complex units and thereby breaking the periodicity. The resulting complex measures produce a vivid, intense and organic sense of rhythm.

The first *Miniature* is primarily concerned with speed and perfect coordination between the two performers. This work must be played as fast as possible, thus constituting a challenge for the musicians, introducing a certain competitiveness in the performance.

The percussionist strikes the resonators of the vibraphone with different sticks, or combined sticks in order to obtain distinctive percussive timbres. The function of the saxophone here is to intensify the accents from the vibraphone and contrast them with soft resonances – created by playing multiphonics and using the technique of *frullato* – which generates a textural granular sound quality and a sense of movement. Some short *piano* or *pianissimo* motives, which include microtones as deviations of 1/4 and 1/8 tones, act as a contrast. Given the difficulties in performing these intervals accurately, they can also be understood as inflectional approximations.

The second *Miniature* is written as a contrast, and should be played as slowly as possible. Here, the very slow tempo was influenced by the concept of a macrostructure in time, as represented by a work written by John Cage in 1987, *Organ2/ASLSP*.<sup>31</sup>

As its name indicates, Cage's piece should be played as slowly as possible, stretching time and turning structure into an almost indefinable, unrecognizable construction. In the second miniature I try to capture this feeling in a reduced form by asking the performers to play as slowly as possible.

The central feature of this movement is the quality of the resonance between the instruments, in a continual search for musical analogies between the two. The treatment of the vibraphone with the bow is highlighted as an extension of the tones produced by saxophone and *vice versa*, in order to create a homogeneous sonic surface which blends the sound of both sources.

In this movement I investigated the effects of a new technique by adding the flexatone to the vibraphone bow as a second voice. This allowed me to explore microtonality and obtain a

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<sup>31</sup> Cage, J. (1987) *Organ2/ASLSP* [Online], Available: <http://www.aslsp.org/de/das-projekt.html> [30 Oct 2014].

colorful range of spectral variations in time. Brian Archinal and I explored the sound produced by the combination of vibraphone and flexatone as a physical phenomenon. When playing both instruments simultaneously with the bow, the result is two sounds whose waveforms closely approach a pure tone. Since the player can change the pitch of the flexatone by varying the pressure, one can create glissandi which, in combination with the tone produced by vibraphone, generate brilliant and varied spectra, as well as extremely diverse microtonal possibilities.

In the third *Miniature* the saxophone leads, using techniques of playing and singing simultaneously, and thus creating variety in the sonic palette of colors. This time, the vibraphone forms the resonances. Again, the coordination between the two players is of great significance in order to create a single voice.

In the fourth *Miniature* the most challenging component is the rest or pause. Pauses are used as a *freeze effect* in order to create periods of extreme tension. The two players have to keep the tension by not moving at all during these pauses, as if they have been turned to stone.

### ***Fehlerfrei. Scherzo für Perfektionisten (2014)***

#### **For Ensemble**

(alto flute, bass clarinet, percussion, piano, violin, viola and cello)

If ... we state the function of man to be a certain kind of life, and this to be an activity or actions of the soul implying a rational principle, and the function of a good man to be the good and noble performance of these, and if any action is well performed when it is performed in accordance with the appropriate excellence ... human good turns out to be activity of the soul in accordance with virtue, and if there are more

than one virtue, in accordance with the best and most complete. (Aristotle.  
*Nicomachean Ethics*)<sup>32</sup>

*Fehlerfrei* (2014) was commissioned by Ensemble Lemniscate in Basel 2014 under the Programme 'Resonances'.<sup>33</sup> In this project, the Ensemble – newly founded in Basel 2013 by the Argentine flutist Micaela Durán – explores the influence which Helvetic culture, politics and social complexity (including music) has had on six young foreign composers who have been living, studying and working in Switzerland in recent years.

The composers were asked to compose a piece based on characteristic Swiss traits – for instance, a flavour, a colour, an image, emotions, feelings, sensations, *etc.* Such reminiscences and subjective perceptions form the basis of this artistic work, raising questions about how the artists and their works have been influenced through their new cultural context.

[T]he good for man is an activity of the soul in accordance with virtue, or if there are more kinds of virtue than one, in accordance with the best and most perfect kind.<sup>34</sup>

The wish to reach perfection, through a search for *excellence* and trying to avoid errors, is the principal idea behind the composition. The musicians endeavor to blend their own sound with the other instruments, in search of new musical textures whose spectra develop over time in the piece. I have used extended techniques for the instrumentation, working again with scordatura and microtonality.

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<sup>32</sup> Aristotle. *Nicomachean Ethics*. Book I, Chapter 7 p. 3731 [10] in Barnes, J. (1984) *Complete Works of Aristotle, Volume 1: The Revised Oxford Translation*, New Jersey: Princeton University Press.

<sup>33</sup> Lemniscate ensemble (2014) *Resonances* [Online], Available: <http://www.ensemblelemniscate.com/#!rsonances/cxku> [30 Oct 2014].

<sup>34</sup> Aristotle. *Nicomachean Ethics*. Book I, Chapter 7 p. 3731 [15] in Barnes, J. (1984).

The piece follows a very formal structure: *attack; defragmentation; sustain* and *release*. During the first part – *attack* – piano and percussion work together to create strong impulses, combining the traditional *forte* piano attack with cymbals, crotales, and tom-toms, and adding a complex resonance produced by the combination of winds and strings, along with the third pedal of the piano. The use of the third pedal of the piano merits further discussion. It can be used to alter the resonance of played chords or clusters according to the addition of the overtones from the notes played and those prepared with the third pedal. In this way, some overtones become louder and others produce beating frequencies.

My use of this technique was influenced by Helmut Lachenmann's *Serynade* (1997-1998),<sup>35</sup> which I had the honour of hearing performed in 2009 by the pianist Yukiko Sugawara and commented on afterwards in a discussion by the composer himself during his *Gastprofessur* residence at the *Musik Akademie* in Basel. Since then I have integrated a similar process into my own works for piano and electronics.<sup>36</sup>

The deconstruction of the act of piano playing has an effect on the overall creation of timbres and resonances.<sup>37</sup>

The pianist Katalin Lukács classified the most important techniques of piano sound manipulation in Lachenmann's *Serynade* as follows:

1. Certain notes or groups of notes are being silently held down with the help of the sostenuto pedal before producing another sound. This results in the overringing sounds of the already depressed notes.

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<sup>35</sup> Lachenmann, H. (1998) *Serynade*, [Online], Available: <https://www.youtube.com/watch?v=sQE1TXooMbg&list=RDsQE1TXooMbg> [30 Oct 2014].

<sup>36</sup> As I did in the piece ...*tiempo*, discussed below.

<sup>37</sup> in Lukács, K. (2013) 'In Pursuit of a Mental Model for the Architectural Interpretation of Music in Performance' PhD dissertation, University of California. p.59.

2. The exact opposite can be heard when, after a loud cluster, a group of notes is to be held over on the Keyboard, which filters out the sound of the cluster. Occasionally, this also happens as a gradual, step-by-step filtering by removing of component notes to reduce their resonance...<sup>38</sup>

In this section of *Fehlerfrei*, both techniques are used as a part of the exploration of timbre.

The second part of the composition – *defragmentation* – evolves from percussive impulses which become shorter and shorter in a discontinuous form of pizzicato harmonics from the strings and piano, slaps from the woodwind and clusters from the vibraphone.

The third part – *sustain* – is created with tones of different pitches, which gradually elongate thus becoming increasingly important. These lengthened sounds are written in the score as sustained tones using the bow on the vibraphone and harmonics played with the bow on the strings, as well as long glissandi from the bass clarinet and prolonged tones from both wind instruments.

The *release* comes in the final section: Here the music takes on a calm, serene tempo and the frequency range changes to a low register. The texture imitates the resonance from electronic sounds, processed with reverberation with a high diffusion setting. For that, I created textures produced by individual voices or instruments with close but slightly different rhythms. An example of this can be seen in bar 119, where I contrast noisy textures in a regular pulse with textures in 3:2, 5:4, 6:4, 7:4, and 9:8 eighth-notes.

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<sup>38</sup> Ibid.

### 3. Pieces with electronics

#### 3.1 General observations

##### Perspectives of electronically expanded instrumental sound

Following on from the language and compositional techniques described above, I am concerned with the following issues in pieces using electronics and instrumental sound:

- *Using electronics as an extension of the sound qualities of the instrument, looking for unity in the sound.*
- *Looking for new forms of expression using new instrumental techniques as a basis for the transformation, and searching for analogies between instrumental and electronic sound.*
- *Experimenting with timbre, developing complex spectra in time, and masking the sound through filtering or resonators.*
- *Transforming and morphing sounds in such a way that they appear organic and natural to the ear.*
- *Using impulses from instruments as attacks for electronic events and vice versa.*
- *Working with distance and the shaping of space through the spatialization of the music.*
- *Exploring movement through gestures, trajectories in space and multichannel possibilities.*
- *Extending and freezing instrumental material – for example, creating a pedal note to establish a new musical space.*
- *Recording sounds from live performance for live sound transformation and diffusion.*
- *“Do the ends justify the means?” Giving equal importance to the use of both sources: instrumental and electronics (or to all sources, if more media are involved in the composition, such as video or interaction).*

These issues are relevant to my personal style of composing instrumental music because I search for unconventional sound worlds that can sound strange and are hard to identify in the context of conventional instrumental technique. The listener may not be able to distinguish between the instrumental sound and the electronics, and I aim to blur the line between these two sound worlds. One example of this in my music is the percussive sounds produced on the piano and saxophone in ....*tiempo*, which imitate the mechanical sound of the clock and could easily be produced electronically, and are even intended to sound machine-like, but are actually generated by percussive playing techniques in the saxophone and piano, and rely on the coordination and chamber music skills of the two players. Similarly, my use of sounds generated from or inspired by nature or musical instruments in electronic music make the border between instrumental and electronic sound less easy to distinguish: the recorded sound of the clocks in ....*tiempo* evokes the sound of insects and also, in turn, echoes the percussive sounds of the instruments.

For the composition of acousmatic pieces, I follow the principles written by Michel Chion in his *Guide des objets sonores* (1983).

Acousmatic listening is the opposite of direct listening, which is the “natural” situation where sound sources are present and visible. The acousmatic situation changes the way we hear. By isolating the sound from the “audiovisual complex” to which it initially belonged, it creates favourable conditions for reduced listening which concentrates on the sound for its own sake, as sound object, independently of its causes or its meaning.<sup>39</sup>

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<sup>39</sup> ‘L’ écoute acousmatique s’oppose à l’écoute directe, qui est la situation naturelle où les sources des sons sont présentes et visibles. La situation acousmatique renouvelle la façon d’entendre. En isolant le son du “complexe audiovisuel” dont il faisait initialement partie, elle crée des conditions favorables pour une écoute réduite qui s’interéresse au son pour lui-même, comme objet sonore, indépendamment de ses causes ou de son sens’. In Chion, M. (1983) *Guide des objets sonores. Pierre Schaeffer et la recherche musicale*, Paris: Bibliothèque de Recherche Musicale Buchet- Chastel. p. 11.

At the beginning of a mixed composition with electronics, after having established the general concept and the instrumentation, I begin to search for suitable sources of sonic materials. For this, I also consider three fundamental assumptions with which Trevor Wishart opens his book *Audible Design*:

- 1) Any sound whatsoever may be the starting material for a musical composition; 2) The ways in which this sound may be transformed are limited only by the imagination of the composer; 3) Musical structure depends on establishing audible relationships amongst sound materials. <sup>40</sup>

Depending on the qualities of the chosen sound material, I then establish the type of recording and microphones required. The majority of the recordings of the compositions presented here are stereo recordings, made using the resources of the Birmingham Electroacoustic Music Studios. For these recordings, I have followed the indications given by Michael Dickreiter <sup>41</sup> which lay down the concrete specifications for the setup of each composition. Giving attention to the audio and recording levels, source position and space, I have experimented with several different recording methods such as time-of-arrival stereophony (A-B), intensity stereophony (X-Y), mid/side stereophony (M/S) and Near-coincident (ORTF). I normally combine different microphones and recording methods simultaneously, in order to obtain several different sound qualities (which can vary in amplitude and timbre). Considering microphone characteristics as operating principle, frequency response and directionality, I decide which microphones would be better to capture a particular sound of a source and its unique qualities. This is a particularly useful guide in recomposing the spectrum of a sound, modifying it or filtering it. In other cases, I have experimented with trajectories and movement, as the composer Jonty Harrison does:

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<sup>40</sup> In Wishart, T. (1994) *Audible Design: A Plain and Easy Introduction to Sound Composition*, York: Orpheus the Pantomime Ltd. p.1.

<sup>41</sup> Dickreiter, M. (1987) *Handbuch der Tonstudiotchnik Band 1 & Band 2*, München: K.G.Saur.  
Dickreiter, M. (2003) *Mikrofon- Aufnahmetechnik*, Stuttgart: Hirzel Verlag.

The microphones were placed very close to the bowls to maximise the movement within the stereophonic image.<sup>42</sup>

After the recordings, I edit and organize the sounds in folders in relation to source, frequency range and sound qualities, in order to have easy access to these primary sources. The next stage is the exploration of the sound by means of signal processing.

In some cases, the audible features of the sounds suggest specific electronic processes that might help establish analogies between two or more of the sources – for example, linking granular textures produced through granular synthesis with other recordings of sound sources with similar characteristics of granular behavior. This was the case of the water sounds in my composition SOLAREINSTIEG, where I mixed recordings of boiling water from the laboratories in the *Fraunhofer Institute* in Freiburg with other generated sounds using granular synthesis in Max/MSP. In another example, I filtered some frequencies from a sound source in order to highlight certain frequency components and then linked them with other sounds in a similar frequency range. These kinds of connections provide lively and organic musical spaces full of motion.

In general, I develop the form of my acousmatic pieces in direct relation to the chosen sound materials, relying during this process entirely on my own listening. I then spatialize these sound events in relation to the musical gesture and spaces.

For the compositions using live electronics, I normally make a recording of the instrumental part first, in order to test and work out in detail the transformations in Max/MSP. After designing the patch and testing the transformations and changes of values in each process used, I then finalize the score. Each cue is related to one (or more) live transformation processes, and

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<sup>42</sup> In Harrison, J. (1982) *Klang*, [Online], Available: <http://sfsound.org/tape/Harrison.html> [30 Oct 2014].

sometimes a cue also includes the playback of sound files, which may or may not be transformed, as well as spatialized.

During the first rehearsals with the musicians, I may change again some values in accordance with the performing space and the controlling levels, or I may add some extra filtering to avoid feedback. Despite the large amount of time and resources required, the use of live electronics allows me to experiment with performance for a space and a moment, and it is for me a very important composition practice.

### 3.2 Commentary on the works

#### *...tiempo (2012)*

For tenor saxophone, piano and live electronics [8-channel].



Figure 14: Clock of the black forest.

*Deutsches Uhrenmuseum*

*'El tiempo es decidido,  
no suena su campana,*

*se acrecienta, camina,*

...'<sup>43</sup>

\*

*'Time is decided ,*

*does not ring its bell,*

*it grows, walks,*

...'<sup>44</sup>

*"Oda al tiempo" - Poemas de Pablo Neruda*

...*tiempo* (...*time*) is a piece commissioned by Ramon Souto and the Vertixe Sonora Ensemble, during their artistic residency at the Museum of Contemporary Art in Galicia. The project focused on four movements (Time - Infinity - Repetition - Presence) proposed by the Spanish artist Esther Ferrer. The ensemble Vertixe Sonora requested four composers to write pieces involving one of these concepts.

Although the theme assigned to me by the ensemble was *Time*, the composition was influenced by all four of these interrelated concepts, reflected through the basic measure of time: the endless repetition of the *tick* and its presence through the clock. The instrumental material creates repetitive, variable and audible analogies between the instruments and the clock mechanism. The piece works with fixed samples together with the live processed transformation of the input sound of the saxophone and piano.

The audio samples used as part of the electronic sound were recorded especially for this project at the *Deutsches Uhrenmuseum* (German Clock Museum) in Furtwangen, Germany in March 2012, where I was kindly provided with access to the collection of more than 60 historical

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<sup>43</sup> Neruda, P. (1956) *Oda al tiempo*, Poemas de Pablo Neruda [Online], Available: in <http://www.neruda.uchile.cl/obra/obraodaselementales7.html>.

<sup>44</sup> Except as otherwise indicated all translations are those of the author.

timepieces. I would like to thank the Museum, especially the Director, Prof. Eduard C. Saluz, and the Restorer, Matthias Hüttlin, for their assistance and for placing the exhibits at my disposal. My special thanks to Ramon Souto and the Vertixe Sonora Ensemble for making this project possible.

The diagram for the first performance of the piece in 8-channel was established as follows:



Diagram 1: Setup for ...tiempo in *La casa encendida* Madrid. Performance February 2013.

## Compositional Process

As the commission had to be based on Esther Ferrer's artistic work, compositional decisions were made following her minimalistic aesthetic and concepts: Time – Infinity – Repetition – Presence. My idea for this composition was to use the two instruments in a non-traditional way by focusing on many tiny percussive elements which, at first sight, could be considered to be 'parasitic' sounds. Noises generated through the act of playing, such as percussive finger tapping on the saxophone, or the sound produced by hitting or sliding a metal object directly against the strings of the piano, were made more significant through amplification, whereby all minimal differences in the sound spectrum become increasingly apparent. This principle, endlessly repeated, seeks to generate a vibrant acoustic color whereby the instrumentation is conceived as a unit – both players have to be exactly coordinated in time and gesture, constructing a dialectic and a dialogue with the electronic samples, which must be triggered exactly on time.

Recordings were made in April 2012, during the historical watches exhibition, which included one of the most important collections from the last two centuries. The recordings were made in stereo at a sampling rate of 192kHz, using a Sound Devices 744T recorder and two DPA 4061 miniature microphones. The high resolution of this kind of recording allowed me to process the sound without loss of quality and also to work with the 'parasitic' sounds mentioned above.

After editing, denoising and equalizing, sound transformations for the work were programmed in Max/MSP.<sup>45</sup> An important process during this piece was the extension of the resonance of both instruments into a complex pedal tone, spatialized in real time. Despite the fact that this technique can cause a strong tonal effect, the pedal tone was used here as a way of defining the microtonality of the piece by creating *Klangspaltungen* and complex textures, which place the audience in different spaces.

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<sup>45</sup> Max/MSP version 6.0.8.

Multiphonics from the tenor saxophone, which were selected in terms of quality and register, and the piano resonance – played with the second and third pedals – were processed, transposed and spatialized in real time. The harmonic/inharmonic spectrum from the mixture of both instruments was suspended via a freezing process, in an attempt to find different textures, types of interferences and beats, thereby producing an increasingly complex spectrum.

In this work, I used FFT to analyze the input signal and filter specific frequencies. In some cases I froze them or transposed them minimally in real time at a very slow tempo, thus creating complex textures that are in continuous movement, which I then spatialized across eight channels using ambisonics. This process generates a complex pedal tone that changes constantly, moves in space and acts as a resonator which envelops the audience in a sonic surface. FFT was used for the freezing process, and the spatialization was done using an adaptation of one of the ambisonics patches by the Institute for Computer Music and Sound Technology in Zürich (ICST).

### ***The Garden of Earthly Delights (2014)***

Acousmatic work. [8-channel].

*The Garden of Earthly Delights* is based on Hieronymus Bosch's famous and enigmatic triptych of the same name, dating from around 1500. Bosch's work allegorizes the process of deformation of a natural and magical environment represented as Paradise and its devastation through violent and intense activity. The rich colors, fantastic and illustrative details, the double meanings, secrets and symbolism as well as the use of light, space and perspective are the influential features of this acousmatic work. They follow the chronology of the painting, reading from left to right, from inside to outside.

The sound materials were initially recorded and synthesized using various techniques, including BEASTtools for some processes such as granular synthesis, and Max/MSP and Pure Data for other processes such as frequency modulation and FFT (cross synthesis, denoising, filtering and spatialization). The spatialization process was done with ambisonics in Max/MSP. The piece was composed during February-May 2014 in the context of an Artist-in-Residence programme at the Elektronisches Studio Basel (ESB) in Switzerland. I would like to thank Prof. Dr. Erik Oña and Prof. Volker Böhm from the Elektronisches Studio Basel, who generously gave me the opportunity to work at these studios and make full use of their facilities.

Acousmatic music is the only sonic medium that concentrates on space and spatial experience as aesthetically central. <sup>46</sup>

I made the decision to compose this piece in 8 channels with the aim of gaining more experience in working with the possibilities of spatial sound, as well as developing sonic surfaces and textures which would involve and *carry* the audience into different sound spaces. <sup>47</sup>

For the premiere, I had the exciting experience of working with the BEAST <sup>48</sup> system at the Bramall Music Building, University of Birmingham. The opportunity of using this extraordinary set-up enabled me to experiment with trajectories of sound, to simulate distances and to work with the creation of resonances in space, through the manual control of the faders. By manipulating these faders, I was able to create very quiet and intimate spaces as well as uncanny, eerie, large and/or massive spaces, as appropriate for each of the various sections of

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<sup>46</sup> Smalley, D. (2007) 'Space-form and the acousmatic image' *Organised Sound*, 12(1), Cambridge University Press pp. 35–58.

<sup>47</sup> Ibid. pp-35-58.

<sup>48</sup> 'Founded in 1982 by Jonty Harrison, Birmingham ElectroAcoustic Sound Theatre is a large, non-homogenous loudspeaker presentation system. In its current incarnation we are capable of mounting systems of sizes in excess of 100 loudspeakers (circa 80 is typical), each addressable as a discrete channel.' in Wilson, S. and Harrison, J. (2010) 'Rethinking the BEAST: Recent developments in multichannel composition at Birmingham ElectroAcoustic Sound Theatre' *Organised Sound* 15(3), Cambridge University Press pp. 239–250.

the piece. Being able to diffuse my works within a large system <sup>49</sup> has given me more awareness of spatiality and has led me to a deeper listening experience, not only in my music, but also in everyday situations.

Focusing on space as the key, integrating element requires a reorientation of listening priorities and attentions: in my experience we are not that used to listening out for spatial attributes, for spatial forms, and space-form, partly because there is so much else to listen out for. <sup>50</sup>

### ***Distorted Seasons (2014)***

Extracts from *The Garden of Earthly Delights* (2014)

Choreography by Jorge García Pérez

Dancers: Cintia Decastelli, Sidney Elizabeth Turtschi, Anthony Ramiandrisoa & Jorge García Pérez.

Music: Teresa Carrasco & Max Richter



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<sup>49</sup> 'The term diffusion is used herein to refer both to the performance practice, and to the qualitative aspect of sound which describes its relative localizability within a space.' in Wilson, S. and Harrison, J. (2010).

<sup>50</sup> Smalley, D. (2007) p.35.

Figure 15: *Distorted Seasons* performance.

Facts are facts and things come in a certain order. Of order we are certain. Spring buds follow winter chill, summer warms before the autumn winds blow. Except for the exceptions. Our understanding is thus shaken, our expectations undermined. Was this an invention of our education? Waiting for the distortions to fall back into place, we are left with the certainty of uncertainty. We cannot trust in a summer day, rely on statistics or predictions. Men and women are negotiating anew over and over, again and again. But distortion is the order so we must order the distortion. Reinvention awaits. (*Jorge García Pérez*).<sup>51</sup>

The musical extracts from *The Garden of Earthly Delights* were used as antithetical sections punctuating the recomposed Vivaldi's *Four Seasons* by Max Richter. A new and intimate space is presented here, also indicated by the lighting and contrasting movements of the dancers. The objective was to create a disturbing atmosphere which leads into the climax of the choreography. The last part of the piece *The Garden of Earthly Delights*, evoking the final third of the tryptic, portrays in my opinion the perfect character to incite these impressions.

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<sup>51</sup> García Pérez, J. (2014) *Distorted Seasons*, [Online], Available: <http://www.jorgegarciaperez.com/distorted-seasons/> [1 October 2014].

## 4. Pieces in collaboration with the *Ballett Basel*

### 4.1 General observations

When I was first approached to compose for *Ballett Basel*, I soon became aware that the two most important tasks involved were:

- *Finding a common concept in collaboration with the choreographer; and*
- *Establishing a common aesthetic language [or approach].*

In addressing these concerns existing works were analyzed and discussed by the choreographer and myself, in order to discover common criteria for the process of creation.

Some of the examples we examined included the following collaborations:

#### 1. Merce Cunningham – John Cage

*Variations V* (1965)<sup>52</sup>



Figure 16: Performance of *Variations V*.

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<sup>52</sup> Cage, J. and Cunningham, M. (1966) *Variations V*, [Online], Available: <https://www.youtube.com/watch?v=yOAagU6cfBw> [30 Oct 2014].

## 2. Jiří Kylián – Leoš Janáček

*Joyous choreography* (1978)

Janáček Sinfonietta ballet <sup>53</sup>



Figure 17: *Joyous* performance.

## 3. Jiří Kylián – Dirk Haubrich

*Hubbard Street Dance Chicago* (2002) <sup>54</sup>



Figure 18: *Hubbard Street Dance Chicago* performance.

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<sup>53</sup> Kylian, J. and Janacek, L. (1978) *Joyous*, [Online], Available: <http://www.youtube.com/watch?v=H2U9DU91jlc> [30 Oct 2014].

<sup>54</sup> Kylian, J. and Haubrich, D. (2002) *Hubbard Street Dance Chicago*, [Online], Available: <http://www.youtube.com/watch?v=L8t1DFs0qVM> [30 Oct 2014].

In composing the music for a dance project, I soon became concerned with two further issues: To compose the music for a ballet involves not only the creation of music with the function of being heard, but also with the function of producing movement. Merce Cunningham<sup>55</sup> describes the art of dance as being a movement phenomenon with physical, psychological and mental variables. Its programmatic expression remains concealed.

Dancing to me is movement – people moving in time and space. It has nothing to do with sentimentality or love but with activity.<sup>56</sup>

For John Cage:

Music does not create a rhythm for the dancers, but a space, an ambient. It is like the street where human activity has nothing to do with the soundscape. Dance is movement, and movement has no excuse.<sup>57</sup>

Despite the particular approach of Cage and Cunningham's creative process, including the implementation of random processes, both were seeking to reproduce nature and its actions. This fact, as well as their conception of time, space and movement, have been essential influences for me in composing for dance.

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<sup>55</sup> Huschka, S. (1998) *Merce Cunningham und der Moderne Tanz: Körperkonzepte, Choreographie und Tanzästhetik*. Würzburg: Königshausen & Neumann. p.207.

<sup>56</sup> Merce Cunningham in Huschka, S. (1998) p.206.

<sup>57</sup> Cage, J. (1985) in *Merce Cunningham y John Cage actúan juntos en Barcelona*. John Cage. El País 25/07/1985. [Online], Available: [http://elpais.com/diario/1985/07/25/cultura/491090405\\_850215.html](http://elpais.com/diario/1985/07/25/cultura/491090405_850215.html) [30 Oct 2014].

As music could be defined as sound in time and dance as movement in time, and both disciplines develop in a space, we could accordingly establish the following association:

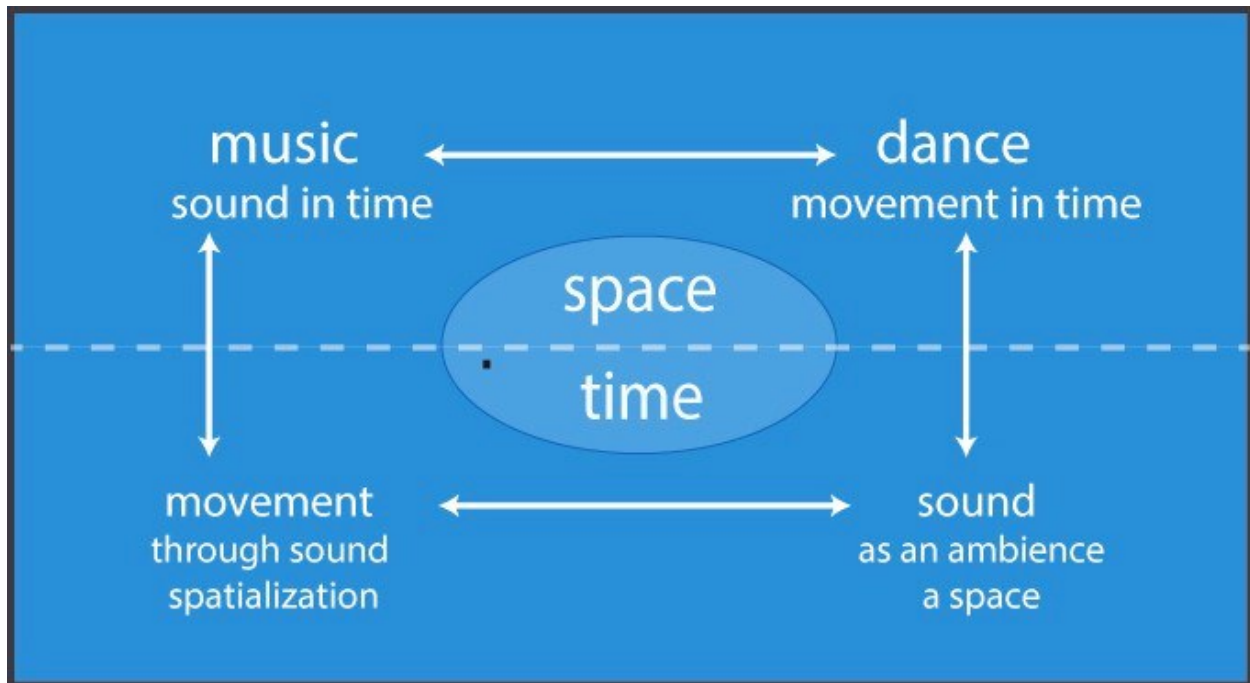


Diagram 2: Music and Dance in space.

In fact, movement in music could be produced through the trajectories of spatialized audio in a multichannel system. In dance, the movement is usually perceived as being linked to sound impulses. For both, space becomes a common fundamental medium for interaction and development.

In my own approach to working with dance and sound, I was searching for a unity between both disciplines through experimenting with interactivity, generating tones or modifying some aspects of music, such as dynamics, pitch or panning, through the parameters obtained from movement, position and body gesture. The challenge for me was that dance and music joined together in their common space as a unity.

Usually, movements by dancers have a tiny delay in relation to musical accents. Through using an interactive set-up the dancers are actually responsible for triggering and controlling the sound and the movement in a truly synchronised way. Additionally, the possibility of generating sound trajectories and movements in relation to space and body gesture offers us the possibility to experiment with different musical spaces and sonic gestures. Another approach existing between the disciplines is the possibility of developing motion processes. Such processes can also be generated by interactive systems and allow me to develop variations in spectrum or sound space, carried by interactions between two or more parameters of sound and gesture over time.

Musical spaces and body gestures can also be accentuated by the use of other elements on the stage, such as staging, lighting and the inclusion of video or other visual projection as we did in some of the collaborations with the *Ballet Basel*.

## 4.2 Commentary on the works

### ***MATCH[ING] SOUNDS (2011)***

For Wii-controller and live electronics.

Interactive ballet in 8-channel for 8 dancers.

Commissioned by Jorge García Pérez & Theater Basel – Sperber Kollegium.

This project started as part of a Music-Dance Competition Project at the Theater in Basel in the 2010-2011 season, within the framework *DANCELAB 3*. Ten choreographers, including six involved in the competition, collaborated with six composers to create a ballet.

*MATCH[ING] SOUNDS* is a ballet with a duration of 12 minutes (the maximum time allowed under the competition conditions) for 8 dancers. The music is an 8-channel electroacoustic composition with interaction where the music is influenced by the dance. The position, speed and direction of the dancers' gestures modify the sound in space. The lighting also plays an important role – it is coordinated with the music and thus highlights both musical and visual spaces on stage.



Figure 19: *MATCH[ING] SOUNDS* performance.

### **Compositional Process**

The first stage in the creation of the work was to come to a broad agreement with the choreographer, after discussing the similarities and differences in our musical and choreographic thinking, about the general theme of the work, along with aspects of time, space, movement, sound, trajectories, dimensions, symmetries, asymmetries and interaction. For me personally, it was an exciting challenge to compose a piece of music which is not only audible, but which also generates movement. Our first joint decision was to establish the form of the music in relation to the form established by the choreographer.

Then followed decisions about how the physical gestures of the dancers might influence the music, how the sound could be effectively synchronized in relation to gesture, pulse, texture and

structure, and we explored the many different ways of linking musical gesture with bodily gesture.

After this phase came the numerous technical decisions concerning such options as: webcam or the *EyesWeb* software, the use of sensors on the body of the dancers, kinetic space from the X-Box; and the possible use of a Wii controller.<sup>58</sup>

The decision to use the Wii remote controller was finally made on account of its ergonomic shape – it was easy for the dancers to carry, could be quickly transferred between them and could be used without a cable because it was connected to the computer via Bluetooth. Also, its functionality was appealing, as it contains an accelerometer and an infrared sensor which is able to detect the position of the dancers.

The communication between the Wii-controller and *Max/MSP*<sup>59</sup> was done with OSCulator (Open Sound Control protocol – OSC). For the first programming tests in *Max/MSP*, I connected the Wii controller to the computer via Bluetooth and then the Osculator to *Max/MSP* through a *Max/MSP* patch included in the OSCulator utilities. After doing several tests to check the stability of the Wii controller at different distances, I found out that by using the software oscillator, I could obtain a very stable signal up to a distance of 10 meters.

The next step involved the recording of many sounds from different igniting materials such as matches and sparklers of different sizes, burners, lighters as well as an ancient grinder and a tambourine. I decided to record fire because I am fascinated by the sound qualities and harmonic richness of burning materials, especially at the moment at which they are ignited. This theme, as well as the similar semantic qualities of *Matching* and *Match* led us to choose the title of the piece.

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<sup>58</sup> EyesWeb [Online], Available: [http://www.infomus.org/eyesweb\\_ita.php](http://www.infomus.org/eyesweb_ita.php) [1 Oct 2014].

<sup>59</sup> *Max/MSP* version 5.1.9.

Most of these recordings were made at the *Südwestrundfunk (SWR)* recording studios in Freiburg, Germany. For the stereo recording, I used a pair of Neumann KM 184 and a pair of Schoeps MK 5 microphones. The cardioid characteristics from both types of microphone, and the possibility of switching mechanically between omni and cardioid patterns on the *MK 5* capsule of the *Schoeps* microphone allowed me to record a clearly defined sound, especially in the high frequencies, giving precise information on the localization of the original source, as well as the angle and direction of the origin sound-source in relation to the listener. This information becomes extremely important when working with sound trajectories and sound movements in space.

Using these recordings, I then set about composing an acousmatic work in 8 channels, as well as some stereo sound files for live processing and interaction. For the composition itself, I used Nuendo 3 as well as BEASTtools, and realized the live transformations in Max/MSP.

The processes used were mainly 8-channel granulation, pitch shifting, vocoder, EQ and synthesis (AM and FM). At a later point I realized the spatialization in 8-channel in the Birmingham Electroacoustic Music Studios. For the live interaction sound processing, I mapped the parameters from both sensors of the Wii controller, sent them to OSCulator, and from OSCulator to Max/MSP. The X,Y and Z axes of the infrared sensor were then taken from the Wii-controller to get the exact positions, after which I mapped the scaled and fractionally delayed parameters in order to connect them to the speed input of the *sfp/ay~* object in Max/MSP through a linear function in real time.

For the acceleration parameters in the X, Y and Z axes – obtained from the acceleration sensor from the Wii-controller – I programmed a similar process. Here, I mapped, scaled and fractionally delayed the constantly changing parameters and sent them to a linear function

connected to an envelope which influences the amplitude of the sound-files from the same *sfplay~* object in real time. The acceleration parameters influence the spatialization process from one of the sound objects, spatializing the sound. <sup>60</sup>

Other processes used for the composition were FFT for convolution, which is activated by switching button A on the Wii-Controller. By switching the button *Up*, a sound-file from a buffer is randomly triggered, this being influenced by the position of the dancers on the stage. As a safety precaution, both switch buttons work only when the button B (behind) is also pressed.

The lights were controlled by MIDI. A metro object activated a MIDI note, synchronizing light and music at different time points that were specified for each scene. For every scene, the MIDI notes of the previous scene controlled the next preset on the stage lighting mixer.

In the production and staging of the piece *MATCH[ING] SOUNDS*, everything grew out of the music. Stage, lighting and costumes were designed in order to bring out the principal theme, fire. Sonic spaces and movements were changing swiftly as they were 'fire-like' movements, and the spatilization of sound followed the principle. Matching sounds shows us a disturbing atmosphere in continuos change, full of energy, dynamism and activity.

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<sup>60</sup> Programmed under the supervision of Prof. Erik Oña in the context of my Diploma in Composition 2005-2010, Switzerland.

***Bipolar Skin* (2012)**

Music extracts and sound design.



Figure 20: *Bipolar Skin* performance.

Created: February 2012.

Premiere: 6th April 2012.

Choreography: Jorge Garcia Perez.

Dancers: Alba Carbonel Castillo, Jorge Garcia Perez.

*Bipolar Skin* is about what it is to be a human being, about the difference of expressing when you are alone and when you are with others, the double personality that we have and which makes us change from one state of mind to another very quickly. Even having our natural skin colour sometimes we mix it with the colour of others trying to express that everything is normal but at the end we all have and conserve our unique essence.<sup>61</sup>

The principal process used to compose these short interventions is the change of velocities of many recorded sounds, and developing these in a manner similar to those used for the composition of my acousmatic pieces. Following the ideas formed during the collaboration period between the choreographer and myself of expressing the concept of bipolarity, through music and dance, I explored the many aspects involving changes of motion, applying fast speed transformations and using vivid timbres as a contrast.

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<sup>61</sup> García Perez, J. (2012) *Bipolar Skin*, [Online], Available: <http://www.jorgegarciaperez.com/bipolar-skin/> [1 Oct 2014].

**SOLAREINSTIEG (2013)**

8-channel acousmatic music.

*Compose music to –change society–.*<sup>62</sup>

*SOLAREINSTIEG* is an 8-channel acousmatic piece with a strong social and political background. It presents a sustained level of energetic change, based on the concept of renewable energy – in particular solar energy. (*Solareinstieg* – Entrance to the Solar Age). For this project, many different machines and turbines in the production and development laboratories for solar cells were recorded. These textural sounds, sonic surfaces and repetitive percussive mechanisms of the solar energy technologies and processes constitute the musical basis of *SOLAREINSTIEG*.

Alongside the growing wave of protests and demonstrations in Europe (especially in France, Switzerland and Germany), aiming to force the closure of the Fessenheim nuclear plant on the French-German border as well as the nuclear plant near Görlitz on the Polish-German border, and following the fatal consequences of the disaster on the 11th of March, 2011 in Fukushima, *SOLAREINSTIEG* is a statement in support of clean and sustainable energy. Alternative and clean technologies nowadays have established a productive, efficient and consolidated infrastructure of industrial knowledge, so why has nothing changed?

Many connections between music and politics have been made throughout history. To name but three composers, the idea of political freedom in certain works of Ludwig van Beethoven<sup>63</sup> and

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<sup>62</sup> 'Musik komponieren, um –die Gesellschaft zu ändern–' Lachenmann, H (1972) 'Zur Frage einer gesellschaftskritischen (-ändernden) Funktion der Musik' in Lachenmann, H. (1996) Musik als existentielle Erfahrung. Schriften 1966-1995, Wiesbaden: hg. von Josef Häusler, p.98.

<sup>63</sup> 'There have always been political connections, above all with the texted Ninth Symphony and the opera Fidelio' in Pederson, S. (2005) 'Beethoven and Freedom: Historicizing the Political Connection' Beethoven forum, No. 1, S. 1-12. Inv.-Nr. 05.751 HB, p.5.

Giuseppe Verdi <sup>64</sup> or the works included on the album *Voices of Protest*, <sup>65</sup> composed by Luigi Nono, are clear statements of social denunciation through means of music composition. The composer Helmut Lachenmann writes about the political function of music as a means of communication, being able to compromise the individual capacity of reflection, learning and performing. For Lachenmann, music may be used as a political weapon:

[...] namely artistically, mediated as a transcendental experience. <sup>66</sup>

and he continues:

Music can give genuine evidence of her spirit and revolutionary intention, when she no longer continues to simply extend the usual areas of communication, turned humorously inside out or appearing estranged in some other known or unknown direction, but is prepared to risk setting everything at stake, and by means of concrete, alternative communication, where reflection and critical attitudes are not comfortably rehearsed and repeated, but make an open challenge, taking all the consequences. <sup>67</sup>

As a politically engaged composer, I share Lachenmann's ideas about music as an unlimited mean of communication and its capacity to risk and take sides. *SOLAREINSTIEG* is an attempt to express through music, as a *transcendental experience*, that only the investment in renewable energy and the reduction of fossil fuel consumption can construct a clean and sustainable society. One might ask: How can a piece express something like that?

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<sup>64</sup> Especially in his opera *Nabucco* (1841).

<sup>65</sup> Nono, L. (2000) *Voices of Protest*. Voxnova. New York: Edition Luigi Nono, Volume 1, mode records.

<sup>66</sup> 'und zwar künstlerisch, als transzendente Erfahrung vermittelt' in Lachenmann, H (1996) p. 98.

<sup>67</sup> 'Von revolutionärem Geist und Willen kann Musik glaubwürdig zeugen, indem sie ihren bislang geläufigen Kommunikationsbereich nicht bloß erweitert, humoristisch umstülpt oder in irgendeiner bekannten oder unbekanntenen Richtung verfremdet, sondern indem sie anhand konkreter Alternativen Kommunikation selbst aufs Spiel setzt und Reflexion und kritisches Verhalten nicht bequem vorexerziert, sondern mit aller Konsequenz herausfordert.' (Translation by Hilary Johnson). Ibid.

John Street, Professor of Politics at the University of East Anglia writes in his book *Music and Politics* (2012) that both politics and music 'are not to be seen as separate entities whose worlds collide only occasionally, but rather are extensions of each other.' He continues:

I would like to persuade readers that music embodies political values and experiences, and organizes our response to society as political thought and action. Music does not just provide a vehicle of political expression, it is that expression.<sup>68</sup>

Street makes a detailed study of the connections between music and politics, including censoring music, music policy, musical and political communication, representation and participation, music as mobilization, the sound of ideas and ideology, and music as a political experience. He argues:

What all these dimensions of music's engagement with politics have in common – whether we are talking about political values and ideals, political organization or community – is the thought that music makes it possible to experience them... Adorno shares the view that music is integral to the social order and that aesthetic distinctions express political and moral values.<sup>69</sup>

In a similar way, I would like to raise the questions of whether it is possible for the revolutionary experience of music to help us attain a fair system which supports the needs of the whole population, and whether the artist has to become an *active ideologist* to reach this goal.

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<sup>68</sup> Street, J. (2012) *Music and Politics*, Cambridge: Polity Press. p.1.

<sup>69</sup> Ibid.

The composer Mathias Spahlinger, faced with the question of '*wie entgeht man der rolle des – aktiven konzeptiven ideologen –*' ['how can one escape the role of being an – active conceptive ideologist –'] answers:

In view of the unspeakable, it seems that art has only the choice between cynical, indolent glass bead games or childish vulnerable narcissism and, where it has political ambitions, the risk of producing monstrous kitsch. <sup>70</sup>

Ultimately, I agree with Lachenmann when he writes:

As for the rest, however – individual reflection on what should “be”, what has to happen and what each one of us has to learn, has to achieve –: without music, please. <sup>71</sup>

For the production of this piece, I would like to acknowledge the cooperation of the Fraunhofer Institute for Solar Energy Systems in Freiburg, Germany, which wholeheartedly supported the project by allowing me to record their machinery and laboratories. My special thanks go to Prof. Dr. Eicke R. Weber, Prof. Dr. Hans-Martin, Christian Schetter and Claudio Ferrara from Fraunhofer ISE in Freiburg, Germany, for their collaboration, and to Kultur Basel Land (kulturelles.bl) for making the project possible. This entire piece was used as a part of the Choreography *Möbius Symphony* by the choreographer Jorge García Pérez in 2013.

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<sup>70</sup> 'die kunst scheint angesichts des unsäglichen einzig die wahl zu haben zwischen zynisch indolenten glasperlenspielen oder läppisch-verletzlicher selbstbespiegelung und, wo sie politische ambitionen hat, dem risiko zum monströsen kitsch' in Spahlinger, M. (1993) *inter-mezzo –128 erfüllte augenblicke – in dem ganzen ocean von empfindungen eine welle absondern, sie anhalten*. Mainz: CD Wergo.

<sup>71</sup> 'Den Rest aber – Nachdenken des Einzelnen, was denn „sein“ solle, was geschehen müsse und was er selbst dazu zu lernen und zu leisten habe –: bitte ohne Musik.' (Translation by Hilary Johnson). In Lachenmann, H. (1996) p.98.

## 5. Music Theater Works

'...das Leben  
in seiner problematischen Vielschichtigkeit  
die Kultur  
in ihrer problematischen Vielfaltigkeit!  
EINSCHLIESSLICH MUSIK, UND WIE!!!' <sup>72</sup>

'... Life  
in its problematic complexity  
culture  
in its problematic diversity!  
INCLUDING MUSIC, AND HOW !!!'

My experience with the Ballett Basel at the theater, including all aspects developed through it, such as staging, movement and gestures of dancers, the use of space, light, scenery and costumes, has enabled me to experience what, for me, is a new musical genre: music theater and scenic composition. <sup>73</sup> This opened up new questions about notation, aesthetics and compositional techniques for me to research and develop, as well as leading to new means of expression and communication.

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<sup>72</sup> Lachenmann, H. (1996).

<sup>73</sup> 'Scenic composition [ is a ] collective term for the experimental directions of the avant-garde musical theater since about 1960 [ It ] includes instrumental theater (Mauricio Kagel), "Visible Music" (Dieter Schnebel ) and other manifestations of a dramatized music or a musicalized theater.' Danuser, H. "Music 20. Jhdt." p.426 in Heilgendorff, S. (2002) *Experimentelle Inszenierung von Sprache und Musik. Vergleichende Analysen zu Dieter Schnäbel und John Cage*, Freiburg im Breisgau: Rombach Verlag.

## 5.1 General observations

The German composer Dieter Schnebel developed in the sixties the concept of *Sichtbare Musik* (Visible Music), stressing the meaning of space in music, the movement of the musicians and their gestural acting, and the inclusion of extra-musical elements and other art forms, such as theater, visual arts and film.

As Schnebel writes:

If the conventional is thus pushed off the tracks, then that which has been invisible up to now, as if through a silent, tacit agreement, suddenly appears before our eyes . The absurd moments for instance, surrounding ceremonies – bowing, standing up, sitting down – appear exactly as they are. <sup>74</sup>

The composer Mauricio Kagel also experimented with the concepts of music composition and performance. Kagel's *instrumental theatre* employs facial expressions, movement patterns and spatial aspects, as well as multi-media tools combined with elements of everyday life as a means of criticizing traditional and ritualized concert forms. <sup>75</sup>

The idea of *instrumental theater* – understood as an orchestrated or orchestrated action, as a staged sound – is not sparked off by the actual scene as in the opera, but in the scenic ritual of the concert, so that Kagel in his own words – during a

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<sup>74</sup> 'Wird das Konventionelle also aus dem Geleise gestossen, steht das bisher Unsichtbare, das von stillschweigender Übereinkunft wie mit einer Tarnkappe bedeckt war, plötzlich vor Augen. Die absurden Momente etwa des Zeremoniells: Verbeugungen, Aufstehen, Sich- Setzen erscheinen unversetzt'. Schnebel, D. *Sichtbare Musik*. (Translation by Hilary Johnson). In Heiligendorff. S. (2002) p. 111.

<sup>75</sup> *Musizieren als Theater bei Kagel und Schnebel*, Mannheim: Bibliographisches Institut & F. A. Brockhaus AG, [Online], Available: [http://m.schuelerlexikon.de/mobile\\_musik/Musizieren\\_als\\_Theater\\_bei\\_Kagel\\_und\\_Schnebel.htm](http://m.schuelerlexikon.de/mobile_musik/Musizieren_als_Theater_bei_Kagel_und_Schnebel.htm) [30 Oct 2014].

composition of instrumental music can no longer distinguish whether a musical idea actually touches the theatrical or if it remains in the realm of 'absolute' music –.<sup>76</sup>

In this section I include two of my works which have been influenced by the concepts of music theater referred to above, which includes instrumental and vocal sound composition in relation to the composition of non-sounding materials – motion and movement by performers – as well as visual materials in relation to music, such as body gestures in relation to musical gestures.

Here, I have taken into consideration the 'scene dimension' which involves other indications in the composition, such as position on stage, indications concerning feelings, expressions or duties, which allow the performers a certain flexibility within the interpretation.

For both these works I have used a graphic notation in order to include all these indications as well as to develop the form of the works in time and in a flexible and practical way.

Amongst the post-war avant-garde, there was a revolution in the use of the notation signs used in musical scores which in works of visual art often concern a structural viewpoint.<sup>77</sup>

The forms of notation [notated graphically and verbally and not in great detail] in turn provide open fields for the interpreter, so that each performance leads to a different

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<sup>76</sup> 'Die Idee des *Instrumentalen Theaters* – als instrumentierte bzw. instrumentalisierte Aktion, als veranstalteter Klang verstanden – entzündet sich nicht an der realen Szene der Oper, sondern im szenischen Ritual des Konzerts, so dass Kagel nach eigener Aussage bei einer Komposition von instrumentaler Musik nicht mehr unterscheiden kann, ob eine musikalische Idee bereits das Theatralische berührt oder im Bereich der -absoluten- Musik bleibt' in Gruhn, W. "Die instrumentale Inszenierung des Klanges bei Mauricio Kagel" in Heilgendorff. S. (2002) p. 121.

<sup>77</sup> 'Im New Yorker 'SoHo' und 'Greenwich Village' liessen sich ab etwa 1950 immer mehr Künstler verschiedenster Sparten nieder, die der damaligen experimentellen Avantgarde zuzurechnen sind und die in ihren geräumigen Lofts bis heute immer wieder zu multimedialen Performances und Happenings einladen... Unter ihnen waren/sind die Musiker der "Downtown School" Earle Brown, Cage, Norton Feldman, David Tudor und Christian Wolff, der Tänzer Merce Cunningham, die bildenden Künstler Philip Gusto, Jasper Johns, Willem de Kooning, Claes Oldenburg, Jackson Pollock, Robert Rauschenberg, und Mark Rothko, der Dichter Dick Higgins, der Aktionskünstler Nam June Paik und die Schauspielerin Alison Knowles'

'Around 1950, in New York 'SoHo' "and 'Greenwich Village' more and more artists from different fields, who can be identified as the so called experimental avant-garde and who even today hold Multimedia Performances and Happenings in their spacious Lofts... Among them, were/are the musicians from the 'Downtown School' – Earle Brown, Cage, Norton Feldman, David Tudor and Christian Wolff, the dancers Merce Cunningham, the visual artist Philip Gusto, Jasper Johns, Willem de Kooning, Claes Oldenburg, Jackson Pollock, Robert Rauschenberg and Mark Rothko, the poet Dick Higgins, the action artist Nam June Paik and actress Alison Knowles' (Translation by Hilary Johnson). In Heilgendorff. S. (2002) p.108.

result, which in many cases, often permit criticism of imprecise representation which allows mimetic repetition. [...Graphic scores] have the chance to make immediately visible what exactly should sound. Hence, scores which are set out in this way are able to become objects of visual art.<sup>78</sup>

In this context, I tried to make my graphic music theatre scores enjoyable and interesting to look at in their own right.

## 5.2 Commentary of works

### ***LUMMELUNDAGROTTAN. Natural Sounds of my Conscience (2012)***

For cello, percussion and natural objects.

#### **Commissioned by *Ume Duo* in Sweden**

A journey into darkness: humidity, stones, wood, water. These natural elements in combination with other materials, percussive and cello sounds, constitute the basic elements of LUMMELUNDAGROTTAN. The piece was influenced by the possibilities of acousmatic music and the ideas behind *musique concrète*. For this composition I distributed a list of *objects sonores* which must be used/played in accordance with the graphic notation. Firstly, each player

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<sup>78</sup> 'Die Notationsformen [graphisch und verbal notiert und nicht bis in Detail] ihrerseits bieten offene Felder für die Interpretierende, so dass jede Aufführung zu einem anderen Ergebnis führt, was vielfach zur oftmals berechtigten Kritik an unpräzisen Darstellungenveranstalte, Ihren Graphiken andererseits aber mimetische Qualität ermöglichte. [...Graphische Partituren] haben die Chance, unmittelbar sichtbar zu machen, was klingen könnte. Daher würden die in diesem Kontext entstandenen Partituren auch zu Objekten der bildenden Kunst'. (Translation by Hilary Johnson). In Heiligendorff. S. (2002) p.123.

had to collect their own *objects sonores*, elaborating through his or her own act of listening to the list of *timbral objects*, as a personal melody of sounds.<sup>79</sup>

The musicians choose these specific sound objects by their qualitative features and, in this way, can influence the development of timbre throughout the work.

With the exception of time, which must always be rigorously measured, the *objets sonores* which form the piece are exposed to change in relation to the situation and materials used. As stipulated in the score, the musicians have to choose their own *objects sonores*, and they have to intensively develop the act of listening to guide these decisions. Players should be able to properly select the sound materials, relating what they hear to what they playing, reacting at each moment and recreating different atmospheres in relation to the materials and spaces and making live changes to the sounds that they are creating.

In a sense, this is a Sprachkomposition [Speech Composition]. This is defined as:

[Speech Composition] is a new form of vocal composition, where the texts are not only sung, but – as in old melodramas – are spoken, whispered, called, breathed, murmured or as occurs in chanting, are recited at an approximate pitch.<sup>80</sup>

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<sup>79</sup> 'Musikalische Kontexte, in denen es keine eindeutigen Tonhöhen gibt, liefern die deutlichste Beispiele für *Klangfarbenmelodie*. Nicht dass die Höhe eliminiert werden kann – es gibt immer höher und tiefer – aber in Kontexten, wo die Höhen nicht systematisch geordnet sind, sind Tonhöhenintervalle (pitch intervals) entsprechend weniger wichtig für die Struktur. Unter diesen Umständen 'schwacher Tonhöhe' ('weak pitch') ist jede *Klangfarbenmelodie* näher an der Idee einer Abfolge farblicher Objekte (timbral objects), eine Melodie der "Klänge".'

'Musical situations where there are no clear pitches give the clearest example of *Klangfarbenmelodie*. Not that pitch can be eliminated – there is always higher and lower – but in situations where the pitches are unsystematized, pitch intervals are correspondingly less important for the structure. Under these 'weak pitch' circumstances, any *Klangfarbenmelodie* is closer to the idea of a succession of timbral objects, a melody of "sounds".' in Erickson "Sound structure in Music" (1975) in Wilson P. "Empirische Untersuchungen zur Wahrnehmung von Geräuschstrukturen" Karl Dieter Wagner Verlag, Hamburg, 1984 pp.31-32.

<sup>80</sup> '[Sprachkomposition] ist eine neue Form der Vokalkomposition, bei der Texte nicht nur gesungen werden, sondern– ausgehend vom alten Melodram – auch gesprochenen, geflüstern, gerufen, gehaucht, gemurmelt oder mit angenäherter Tonhöhe, im Sprechgesang rezitiert vorkommen'.

in Ulrich Dibelius *Moderne Musik 1945–65*, München in Heiligendorff, S. (2002) p.115.

The musicians trace the pitch contours of whispered and breathed words in this piece. I used the special colour-structural qualities of the voices, with their acoustical characteristics, the process of physiological voice production and properties of auditory perception. The interpreters whisper the text using their voices as breath – breath that still resonates in the journey of travellers from the past.

The text 'Min lilla vrå bland bergen' is a famous poem by Johan Anders Wadman, a Swedish poet. Excerpts from the poem must be recited with a breathy voice, as written in the score, similar to the way Ligeti did in his compositions *Aventures*<sup>81</sup> and *Nouvelles Aventures*.<sup>82</sup>

My intention in LUMMELUNDAGROTTAN was to emphasize timbral similarities between the vocal and instrumental sounds, such as relating whispering sounds to noises produced by bowing on the bridge of the cello, *pp*, or by the percussionist dragging a brush over a piece of wood.

...a complex structure based on phonetic-gestural expression, which blends with the sound-gesture material of the artists' instruments.<sup>83</sup>

This work can be performed in two versions. The first version is played in absolute darkness which allows both performers and listeners to focus on the "act of hearing". In this case, players could use a tiny light to display the score and other materials. In the second version, and

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<sup>81</sup> Ligeti, G. (1962) *Aventures* [Online], Available: <https://www.youtube.com/watch?v=JPa4XAhSYhE> [30 Oct 2014].

<sup>82</sup> Ligeti, G. (1962-1965) *Nouvelles Aventures* [Online], Available: <https://www.youtube.com/watch?v=EhLV68whca0> [30 Oct 2014].

<sup>83</sup> 'ein komplexes Gefüge lautlich-gestisch verankerter Expresseme, die er klanglich-gestisch mit dem Material der mitwirkende Instrumente abstimmte.' in Heilgendorff, S. (2002) pp.117-118.

influenced by the ideas of Mauricio Kagel and Dieter Schnebel exposed above, the work is performed with lighting in order to dramatize the acting and gestures of the players.

**“Min lilla vrå bland bergen” by Johan Anders Wadman**

Jag vet en vrå emellan bergen,  
En liten vrå, som tillhör mig,  
Der ingen flärd innästlat sig,  
Der ingen oskuld skiftat färgen.  
Hvart än mig ödet kasta må,  
Jag längtar åter till min vrå,  
Min lilla vrå bland bergen.

Hon är befast, min lugna hydda,  
Så otillgängelig som säll,  
Ty mörka skogar, höga fjäll  
Mot världens stormar henne skydda.  
Hvart jag af ödet jagas må,  
Jag längtar åter till min vrå,  
Min lilla vrå bland bergen.

Jag jagade i ungdoms-åren  
En brokig fjäril, prydd med gull,  
Jag vilse gick, jag föll omkull,

Jag stötte mig — än svida såren —  
Men jag var lycklig nog ändå  
Att åter hitta till min vrå,  
Min lilla vrå bland bergen.

Att lyckans yra fjäril fånga  
Jag löper aldrig mer omkring,  
Ty jag har lärt att ingenting  
Man vinner så med mödor många.  
Nej, jag har lycka nog ändå:  
Min sköna fånge i min vrå,  
Min lilla vrå bland bergen!

‘My little nook among the mountains’ by Johan Anders Wadman

I know a nook between the mountains,

a small nook, which belongs to me,  
where no flamboyance infiltrated itself,  
where no innocence shifted colour.

Wherever fate may throw me,  
I long back to my corner,  
my little nook among the mountains.

She is fortified, my calm/quiet hut,  
So inaccessible,  
because of dark forests,  
high mountains.

She is protected against  
the world's storms.

Wherever I may be hunted by fate,  
I long back to my corner,  
my little nook among the mountains.

I hunted in my youth.

A colorful butterfly,  
adorned with gold, I got lost, I fell  
I hit myself - the wounds still sting-  
But I was lucky enough anyway,  
to find my way back to my corner,  
my little nook among the mountains.

The happy dizziness  
caught the butterfly.

I never run around any more,  
for I have learned that one  
wins nothing with so many troubles.

No, I have luck enough anyway:  
My beautiful prisoner in my corner,  
my little nook among the mountains!

(Translated by Karolina Öhman)

### ***Two peas in a pot (2014)***

A short music–theatre work for cello and trombone.

### **Commissioned by *Two New Duo* in Switzerland**

*Two peas in a pot* was commissioned by the TWO NEW DUO – Ellen Fallowfield (cello) and Stephen Menotti (trombone). The piece explores not only the musical possibilities of both instruments as a duo, but also their stage potential, with the musicians performing on stage as actors who play roles in which music replaces words. The work is full of humor and irony. It is a

portrait of two opposing roles seeking to discover and form a common identity through play, interaction, judgement and strong competition using each sound and gesture in these processes.

To introduce humor and irony in a work, as in Mauricio Kagel theater works, certain materials and conditions of perception should be prepared:

Comedy begins at the point where the signs between the theatrical and the acoustic contexts or through certain conditions of perception collide with each other in a special way, either while an awareness for these signs has been awakened at an earlier point or while they are taken for granted as stereotypical.<sup>84</sup>

The comical emerges in Kagel by a strict control of materials and, in particular, the relationship between the visible and audible.<sup>85</sup>

Additionally, instrumental theater may be an artistic expression to denounce or manifest:

Kagel's sense of the comical is both critical and concrete. With him, the laughter arises at the moment of (self-) awareness. The fading away of the music in *Sonant* becomes completely flooded by the ever-increasing commentary and the entire commercialization in *Sur Scène*, the disillusion demonstrated by the dubious street

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<sup>84</sup> 'Komik ist da angelegt, wo die theatralischen und akustischen Zeichenkontexte untereinander oder mit bestimmten Wahrnehmungskonditionen auf besondere Art kollidieren, seien diese vorher geweckt worden oder als stereotype vorauszusetzen' in Zarius, K. "Danse Macabre", in Klüppelholz, W. (1991) *Kagel .../1991* Köln: DuMont, p. 254.

<sup>85</sup> '...die Komik in Kagel [entsteht] durch die strenge Kontrolle der Materialien und insbesondere des Verhältnisses von Sichtbarem und Hörbarem' in Rebstock, M. (2007) *Komposition zwischen Musik und Theater. Das instrumentale Theater von Mauricio Kagel zwischen 1959 und 1965*, Hofheim: Wolke Verlag, p.159.

clown in *Pandoras Box*, designed as a critique of the whole music industry, whereby the music industry acts only as a focal point of society as a whole.<sup>86</sup>

Although the most significant aspect of this work is a search for a unity between musical gesture and bodily gesture, it also contains touches of humor influenced by personal happenings in everyday life, in the way that, as John Cage comments concerning his pieces:

[...] one could view everyday life as a theatre.<sup>87</sup>

At this point I wish to emphasize the influence of the work *Aphasia* by Mark Applebaum, where gestural development is extremely rich and theatrical, and likewise involves a very detailed notation. Here, the synchronization is treated from another point of view: in *Two peas in a pot*, the two musicians generate both sound and movement on stage, and must constantly synchronize the to and fro of their musical gestures and movements. All these movements, gestures, expressions form a unity with the *sound objects*. *Two peas in a pot* is the result of the rich experience gained through my working with ballet. It represents a genre which I intend to extend and develop in the future.

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<sup>86</sup> 'Kagels Komik ist konkret und kritisch. Das Lachen entspringt bei ihm aus dem Moment der (Selbst) Erkenntnis. Das Verschwinden der Musik in *Sonant* das überschwemmt Werden der Musik durch den ausufernden Kommentar und den ganzen Vermarktungsbetrieb bei *Sur scène*, der Irrsinn, den der zwielichtige Gaukler in *Pandoras Box* vorführt, zielen auf eine Kritik am Musikbetrieb, wobei der Musikbetrieb nur als Brennglas für die Gesellschaft insgesamt fungiert'. Ibid. p.159.

<sup>87</sup> John Cage in Kirby, M. and Schechner, R. (1965) 'An Interview with John Cage' *The Tulane Drama Review*. Vol. 10, No. 2, p.50.

## 6. Perspectives for the future

The compositional and analytical research contained in this portfolio, together with the research undertaken using the *BEAST* system, the multichannel studios and further valuable resources at the University of Birmingham, has opened up a world of endless, exciting possibilities. Extending my knowledge of these techniques, keeping abreast of the newest developments, and incorporating these technically and artistically into my music compositions will form the basis of my future work.

In particular, it is my intention to extend and develop my work in the specific areas in which I have a deep personal interest:

1. The relationship between music, space and movement; this will involve the composition of further electroacoustic and instrumental works for dance performance.
2. The concept of timbre and spectra, where I plan to investigate the classification of multidimensional descriptors of timbre given by Peeters, Giordano, Susini, Misdariis and McAdams,<sup>88</sup> and develop these concepts in relation to the theories of space, movement and motion.
3. Exploring new possibilities in 'n-channel composition' techniques,<sup>89</sup> together with mathematicians. Our aim here is to develop the concept of *n-Dimensional music* by implementing mathematical models of *n-dimensional space* in a multichannel system.

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<sup>88</sup> Peeters, G., Giordano, B.L. Susini, P., Misdariis, N., and McAdams, S. (2011).

<sup>89</sup> Wilson, S. and Harrison, J. (2011).

4. To further the development of sound trajectories and transitions between sound spaces, by testing and analyzing the results of different microphone set-ups in the field of multichannel recording.
  
5. To consider including in my future composition active statements on relevant present-day social and political situations.

In this way, I hope to contribute personally through my composition to the future and advancement of music and to its role in contemporary society.

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- 5.- Alegrías de Córdoba - "Tu boca chiquita" - Curro de Utrera
- 6.- Alegrías/Guitarra - "La Barrosa" - Paco de Lucía
- 7.- Alegrías/Baile - "Los corazones" - Dolores Vargas
- 11.- Bulerías - "Dicen que van a temblar" - El Pele
- 12.- Bulerías - "Ganas me dan de volverme" - La Perla de Cádiz
- 13.- Bulerías - "Con el ritmo dentro" - Chano Lobato
- 14.- Bulerías - "En la puerta con tu madre" - Terremoto
- 15.- Bulerías - "Monte Calvario" - El Borrico de Jerez
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- 17.- Bulerías - "Na es eterno" - Camarón de la Isla
- 18.- Bulerías - "A Luis de la Pica" - Marina Heredia
- 19.- Bulerías - "Familia Habichuela" - Pitingo

CD 2:

- 1.- Bulerías/Guitarra - "Gitanos andaluces" - Paco de Lucía Sextet
- 2.- Bulerías/Baile - "No seas tan egoísta" - La Tolea
- 3.- Bulerías por soleá - "El cante es mi buen amigo" - Manolo Caracol
- 4.- Bulerías por soleá - "El día que me echas de menos" - Pepe "El Culata"
- 5.- Bulerías por soleá - "Qué loquita son tu gente" - Sordera de Jerez
- 6.- Bulerías por soleá/Guitarra - "Antonia" - Paco de Lucía

CD 12:

- 21.- Zapateado - "Zapateado de las campanas" - Rosa Durán

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## 8. Appendices

### Appendix 1: Performances

#### ***Danza de la pena negra (2012)***

46. Internationalen Ferienkurs für Neue Musik Darmstadt.  
Ensemble Dal Niente (Chicago).

<http://dalniente.com/>

World premiere:

46. Internationalen Ferienkurs für Neue Musik Darmstadt.  
14 – 28 July 2012

*Teresa Carrasco selected composer & selected piece for the Composition Workshop project with Prof. Hans Thomalla & Prof. Lucas Fels.*

I wish to thank the University of Birmingham for their generous support which enabled me to attend the workshops in Chicago and in Darmstadt.  
Darmstadt, Germany.

#### ***Miniaturen (2014)***

CM - Concert Series.

<http://www.chaoticmoebius.net/CM.html>

Patrick Stadler – saxophone

Brian Archinal – percussion

20.05.2014

unternehme mitte - SAFE.

Basel, Switzerland.

***Fehlerfrei. Scherzo für Perfektionisten (2014)***

Ensemble Lemniscate.

[www.ensemblelemniscate.com/](http://www.ensemblelemniscate.com/)

08.09.2014

Kunstraum Walcheturm

Zürich, Switzerland.

09.09.2014

Basel Ackermannshof

Basel, Switzerland.

10.09.2014

Zentrum PROG Bern

Bern, Switzerland.

***...tiempo (2012)***

Festival SON: La nueva generación de compositores y artistas sonoros españoles.

Akane Takada, piano and David Cristóbal – saxophones.

Nina Kraszewska and Ángel Arranz – audio

<http://www.musicadhoy.com/concierto.php?id=278>

10.03.2013

Patio Concierto

La Casa Encendida

Madrid, Spain.

25.09.2012

Ensemble Vertixe Sonora *...tiempo* for piano, saxophone and live electronics.

Stereo version.

World premiere: Auditorio Centro Gallego de Arte Contemporaneo (CGAC)

Santiago de Compostela, Spain.

***The Garden of Earthly Delights (2014)***

BEAST in the Bramall.

02.05.2014

03.05.2014

Elgar Concert Hall, Bramall Music Building.

<http://www.birmingham.ac.uk/facilities/BEAST/>

Birmingham, United United Kingdom.

***Distorted Seasons (2014)***

International Choreography Competition Hannover

21.06.2014

22.06.2014

<http://jorgegarciaperez.com>

Hannover, Germany.

15.07.2014

Certamen Internacional de Coreografía Burgos & New York. Second prize.

<http://www.iberarte.com/index.php/artes-escenicas/danza/7753-palmares-del-xiii-certamen-internacional-de-coreografia-burgos-nueva-york>

Burgos, Spain.

***MATCH[ING] SOUNDS (2011)***

DANCELAB 3. *Ballett Basel*.

03.06.2011

08.06.2011

World premiere. Theatre Basel

Choreography: Jorge Garcia

Music & Programming: Teresa Carrasco

*1. Prize in Composition by Sperber Kollegium Jugendförderpreis der Stadt Basel 2011,*

Basel, Switzerland.

***Bipolar Skin (2012)***

Choreography by Jorge Garcia.

Dancers: Alba Carbonel Castillo, Jorge Garcia Perez.

06.04.2012

Choreographic International Competition Copenhagen. Second prize.

Copenhagen, Denmark.

23.04.2012

Hannover Choreography Competition. Finalist choreography.

Hannover, Germany.

26.04.2013

Certamen Internacional de Coreografía Burgos & New York.

Winner audience prize *Cross Connection*.

Burgos, Spain.

***SOLAREINSTIEG (2013)***

Birmingham electronic music festival.

24-26.05.2013

World premiere: CBSO Centre Birmingham [UK] – *Vanishing Point*

Birmingham, United United Kingdom.

18.05.2013

20.05.2013

03.06.2013

08.06.2013

Dancelab 5 (2013).

Theatre Basel. Ballett Basel.

*Möbius Symphony*. Ballet for 10 Dancers and Live Video.

Music by Teresa Carrasco.

Choreography by Jorge Garcia.

Kinect Technology by Permi Jhooti.

Video by Tabea Rothfuchs.

Dancers: Cintia Decastelli, Debora Maiques, Alba Carbonel, Camille Auble, Lydia Carusso, Jeremy Nedd, Sergio Bustinduy, Anthony Ramiandrisoa, Jia Yong Sun, Florent Mollet.

<http://www.theater-basel.ch>

Basel, Switzerland.

03.08.2013

"NIT ELECTRO-SONORA AL CASTELL DE FLIX"

*Diàleg entre patrimoni històric/cultural, paisatge i músiques sonores.*

organized by Joan Bages.

[www.joanbages.com](http://www.joanbages.com)

Castell de Flix, Catalunya.

**LUMMELUNDAGROTTAN. Natural Sounds of my Conscience (2012)**

Noam Bierstone – percussion

Bryan Holt – cello

12.04.2014

Music Gallery Toronto's Centre for Creative Music.

CCMC Music Gallery.

<http://noambierstone.com>

<http://www.bryanholt.ca>

<https://www.musicgallery.org/fulltreffer/>

Toronto, Canada.

UMEDUO

Erika Öhman – percussion

Karolina Öhman – cello

13.01.2012

World premiere. Queen Elisabeth Hall *The Front Room*.

London, United Kingdom.

27.01.2012

Theater der Künste, Bühne A  
Zürich, Switzerland.

29.09.2012

Samtida Musik, Stockholm  
Capitol, S:t Eriksgatan 82  
Stockholm, Sweden.

16.10.2012

Chaotic Moebius  
Unternehmen mitte. Safe  
Basel, Switzerland.

11.11.2013

Gävle Teater  
Gävle, Sweden.

13.11.2013

Växjö konsthall  
Växjö, Sweden.

15.11.2013

Göteborgs Konserthus  
Göteborg, Sweden.

***Two peas in a pot (2014)***

Two New DUO.  
Ellen Fallowfield – cello  
Stephen Menotti – trombone

08.10.2014

PROG.  
Bern, Switzerland.

07.12.2014

Ackermannshof Basel

Basel, Switzerland.