

Portfolio of Electroacoustic Music Compositions

**A thesis submitted to the University of Manchester for the
degree of Doctor of Philosophy in the Faculty of
Humanities**

2010

Manuella Blackburn

School of Arts Histories and Cultures

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Word count – 15,469

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Accompanying media

CD 1 (audio CD) – Portfolio of electroacoustic music compositions

<i>Kitchen Alchemy</i>	11'34
<i>Origami</i>	15'16
<i>Cajón!</i>	9'18
<i>Spectral Spaces</i>	10'40
<i>Dance Machine</i>	20'11
<i>Vista Points</i>	10'14

DVD 1 (Data DVD) – Portfolio of electroacoustic music compositions

Karita oto (multi-channel audio tracks)

CD 2 (Audio CD) – Music appendices 1, 2 and 3

Cajón! (acousmatic version) 9'01

Karita oto (stereo version) 14'54

Denis Smalley *Wind Chime* soundfiles (3 – 16)

CD 3 (Audio CD) Music appendices 4 and 5

Bird Movements (1 – 13)

Splice Girls samples (14 – 17)

Abstract

This commentary details the methods and ideas involved in creating the seven portfolio works. The portfolio is comprised of stereo acousmatic works, one mixed work and a multi-channel work, forming the practice-based research completed during the Ph.D programme at the University of Manchester.

The works explore a number of aesthetic concepts encompassing instrumental timbres, cultural sound objects, rhythm incorporation, habitual spaces (the kitchen), imaginary and real objects (jukebox), and visual art sculpture (origami).

Uniting the portfolio works is the use of Denis Smalley's spectromorphology (1997). In its intended function, this tool provides the listener of electroacoustic music with thorough and accessible sets of vocabulary to describe sound events, structures and spaces. The use of this descriptive tool need not stop here. Fortunately, and often unconsciously for the composer, it does not, since all composers create music that is spectromorphological with or without an awareness of its presence at work. In a reversal of conventional practice, my research approaches spectromorphology from an alternate angle, viewing the vocabulary as the informer upon sound material choice and creation. In this reversal, vocabulary no longer functions descriptively; instead the vocabulary precedes the composition, directing my compositional pathway in each piece. This new application, used as a method for selecting and creating sound in the creation of each portfolio work, is an attempt at systemisation and an effort to partly remedy the seemingly endless choice of possibilities we are faced with when beginning a new work.

Declaration

No portion of the work referred to in the thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning

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Dedication

I would like to dedicate this Ph.D to my supportive and loving family, Anthony, Martha and Marianna Blackburn.

I would also like to acknowledge my supervisor Dr Ricardo Climent for his stimulating inspiration, time and effort.

Gratitude is owed to Dr David Berezan for sharing his great passion for electroacoustic music with me and for igniting my fascination with sound. Thank you for your enthusiasm, motivation and endless encouragement.

Further thanks go to Denis Smalley for his concept of spectromorphology, that without this research would not be possible.

Thanks are also due to the Arts and Humanities Research Council for their generous support throughout the research.

This work has been funded by
the Arts and Humanities Research Council (AHRC) award



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Chapter 1: Introduction

Spectromorphology¹ and the portfolio works

Applications of Denis Smalley's spectromorphology (a descriptive tool based on aural perception²) have so far remained in areas of analysis³, visual representation and notational functions⁴. My portfolio research has explored, through practical means, spectromorphology as a tool for composition. My electroacoustic music compositions have individually trialed this alternative application, implementing discrete areas of spectromorphology's descriptive vocabulary to inform aspects of the creative process. The research was focused primarily upon the creation of sound material in acousmatic works, providing the subject matter for the discussion that follows.

Methodology

Exploration of spectromorphology and its compositional potential took place by isolating diagrammatic word-sets⁵. These word-sets, comprised from commonly used language and addressing qualities that sounds inherently possess, were employed as outlined in the works list (Table 1). Each word-set provided a unique focus for each of the seven portfolio works.

¹ Denis Smalley, "the two parts of the term refer to the interaction between sound spectra (*spectro*-) and the ways they change and are shaped through time (-morphology)", 'Spectromorphology: explaining sound-shapes', *Organised Sound*, 2(2), 107, 1997.

² Ibid.

³ Lasse Thorensen, 'Spectromorphological analysis of sound objects: An adaptation of Schaeffer's typomorphology', *Organised Sound*, 12 (2), 129 – 149, 2007.

⁴ Kevin Patton, 'Morphological notation for interactive electroacoustic music', *Organised Sound*, 12(2), 123-128, 2007.

⁵ All word sets in diagrammatic form can be found in Denis Smalley, 'Spectromorphology: explaining sound-shapes', *Organised Sound*, 2(2), 107-126, 1997.

Composition	Word-set(s) utilised	Vocabulary description
<i>Kitchen Alchemy</i> (2007) 11' 34	<i>Structural functions</i>	How something starts, how it continues and how it ends ⁶ .
<i>Origami</i> (2007) 15'16	<i>Motion and growth processes</i>	“Directional tendencies” ⁷ .
<i>Cajón!</i> (2008) 9'18	<i>Spectral space</i> <i>Spectral density</i> <i>From note to noise</i>	The occupancy of <i>spectral space</i>
<i>Spectral Spaces</i> (2008) 10'40	<i>Qualifiers of spectral space</i>	The distance between the lowest and highest audible frequencies. Activity of materials within <i>spectral space</i> .
<i>Dance Machine</i> (2009) 20'11	<i>Texture motion</i>	Longer sound materials, often in collective patterns or groupings.
<i>Vista Points</i> (2009) 10'14	<i>Behaviour</i>	The relationships between materials and their positioning in <i>spectral space</i> .
<i>Karita oto</i> (2009) 14'54	<i>Spatiomorphology</i>	Spatial properties and spatial change ⁸ .

Table 1. Works list

This methodology allowed a thorough investigation of vocabulary functionality as informers upon sound material choice and creation. The ultimate goal of the research

⁶ Denis Smalley, ‘Spectromorphology: explaining sound-shapes’, *Organised Sound*, 2(2), 115, 1997.

⁷ Ibid. 116.

⁸ Ibid. 122.

was to identify useful vocabulary and formalise a collection of compositional strategies (based on an understanding of vocabulary concepts) to be applied and refined in future works. Knowledge of appropriate vocabulary and compositional strategies was acquired cumulatively from piece to piece. A progression and fluency with these strategies can hopefully be observed chronologically across the portfolio works.

To discuss these research findings in greater depth, my portfolio works are described individually and in order of their creation. Areas of spectromorphology associated with each portfolio work are introduced in diagrammatic form, appearing within respective chapters.

Research context

My compositional practice sits firmly within the acousmatic music tradition. *Cajón!*, the only mixed work of the portfolio, does not escape this tradition, as it is also of acousmatic origin. Typical of my music is the great value I have placed upon the aesthetic qualities of each sound during the processes of selection and creation. Attention to ‘play’ and enjoyment of the sound material were aspects adopted into my own *oeuvre*, observable throughout the portfolio and used as a vehicle for expressing my pleasure in working with sound. Consolidation of these contextual inputs occurred simultaneously, influencing and impacting upon the development of my research into organized sound⁹, aided by the spectromorphological strategies developed over the course of the PhD.

An accompanying issue to those outlined above is the hybridisation between spectromorphologically informed structures and cultural influences, apparent within the works *Origami*, *Cajón!*, *Dance Machine* and *Karita oto*. In searching for new sound materials, I found myself reaching across to other cultures in order to achieve desired results within these compositions. Incorporations were varied, including traditional instrument recordings and rhythmic patterns, and more abstract ideas of visual art, specific to countries and cultures. The incorporation of these cultural elements posed a number of research questions regarding the transference and de-contextualization of these materials from one genre to another. Compositional treatment of sonic material post de-contextualisation provided an anchor point for consideration within this hybrid format, since transformative activity was able to disguise or fully expose a sound’s source and cultural significance. Further to the compositional process, audience reception of these hybridised works prompted reflection upon the consequences of such borrowing in electroacoustic music, promoting a more positive perspective on cultural appropriation and encouraging additional research in this somewhat delicate and controversial field.

⁹ Richard Franko Goldman, “This confidence must extend to *Poème électronique*, which Varèse, disdaining the term *musique concrète*, describes simply as organised sound.” *The Musical Quarterly*, Vol. 47(1), 1961, 133.

Preliminary notes

The strategies developed from spectromorphology, provided in the commentary, should be regarded as compositional aids rather than solutions or formulas for electroacoustic music creation. They present possible starting points for the development of sound materials, events and structures. These are then subject to other intuitive decision-making processes.

To distinguish spectromorphological terminology amidst the text, I have italicised each appearance in order to clarify the context of their use. For the purpose of discussing sounds and their assemblage, visual shapes and symbols are employed subjectively to illustrate points within the text. Some diagrams indicate ‘snap-shots’ of spectral space where time corresponds to the horizontal axis and frequency to the vertical (Figure 1). In these visualisations, shape corresponds to amplitude and timbre, while relative positioning of shapes corresponds to spectral occupancy.

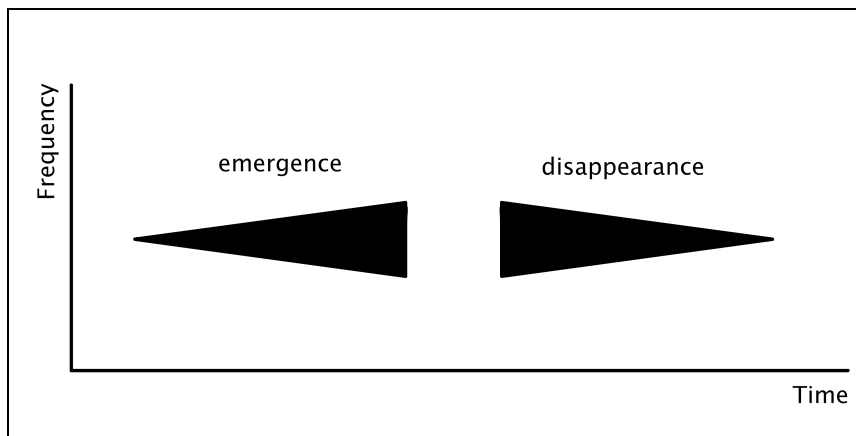


Figure 1. Frequency versus time axis

Format: Stereo, acousmatic

Kitchen Alchemy was inspired by the medieval concept of alchemy while decisions on structure and sound placement were informed by the *structural functions* word-set selected from Smalley's spectromorphology.

Alchemy

An analogy can be established between the so-called 'elixir' catalysing the creation of gold from base metals, and the studio software capable of facilitating ordinary (real-world and raw) to extraordinary sound transformations. This analogy prompted the creation of seemingly precious and elaborate sounds bearing no similarity to the original source materials of kitchen utensils and electrical appliances. This concept informed further field recordings conducted at a chemical engineering laboratory¹⁰ to capture sounds of chemical activity in a large industrial space. Sound transformations were guided by the idea of alchemical transformation, and processed material was favoured if all semblances to its kitchen-source origin had been removed; thus more heavily processed and manipulated sound was retained. This accounts for the high degree of abstract sound material evident in the piece. As with 'gold,' so highly sought after in the alchemic process, pitched resonances exhibiting bright and harmonic timbres were particularly favoured in the sound selection process. The passage between 1'56 – 2'12 provides an example of this preferred sound quality. Unpitched sound was often followed with pitched material to further represent the transformation process of creating polished and precious substances. For example, at 2'14 a granular texture is layered and eventually overcome by a high-pitched drone, outlining the transition between 'unadorned' and 'elaborate' sound. Again at 8'02 a high-pitched *plane* (level stretch of sound) pushes through a

¹⁰ Recordings were conducted at the Morton Laboratory, The University of Manchester, UK.

timbrally muted sound world, splintering into an explosion of greater harmonic and spectral detail.

Sound material collected from the kitchen environment yielded suitable results from the transformation process. Particularly favorable were the transformations derived from strikes and scrapes of metallic utensils, supplying complex timbres and resonances (6'06 – 6'22). Filtering of the kitchen appliances enabled the retention of their mechanical nature (for example, the blender from 3'22 – 3'30), providing a notable contrast to the more pitched-based resonances.

Structural functions

Three compositional strategies were developed from experimentation with the *structural functions* vocabulary (Figure 2). Beginning the research with this word-set was appropriate, since I regard it as highly fundamental to most music – every sound has a start (*onset*), middle (*continuant*) and end (*termination*).

<u>onsets</u>	<u>continuants</u>	<u>terminations</u>
departure	passage	arrival
emergence	transition	disappearance
anacrusis	prolongation	closure
attack	maintenance	release
upbeat	statement	resolution
downbeat		plane

Figure 2. *Structural functions*¹¹ word-set

¹¹ Denis Smalley, 'Spectromorphology: explaining sound-shapes', *Organised Sound*, Vol. 2, (1997) 116.

(i) Vocabulary informing sound material choice

The vocabulary was able to inform the selection of sounds. Since the sound sources had been decided by the idea of alchemy, the vocabulary informed sound material choice within this predetermined pool of kitchen and engineering laboratory sourced sound. For example, when using the word *release*, the sound of steam escaping from a pressure valve in the chemical engineering laboratory was selected as well as the sound of a toaster ejecting a slice of bread (10'51). When using the word *attack* I chose the sound of a microwave door closing (3'30).

(ii) Vocabulary informing sound sculpting

Vocabulary informed the shaping and manipulation of single sounds. Choosing a word from each column dictated the sculpting of a single sound through the accentuation of its inherent features. This allowed a sound to be composed into a desired shape; for example, a high-pitched sound was composed into an *emergence* at 9'00 by applying an increasing volume envelope, and *prolonged* for 30 seconds by looping its original duration.

(iii) Vocabulary informing sound unit creation

Beyond the shaping of individual sounds, the *structural functions* vocabulary was found to be particularly useful in articulating structures. Between 0'48 – 1'00 an *attack*, a *passage* and a *release* informed the creation of three separate sounds. Once assembled together they formed a new shape, which I refer to as a 'sound unit' (Figure 3).

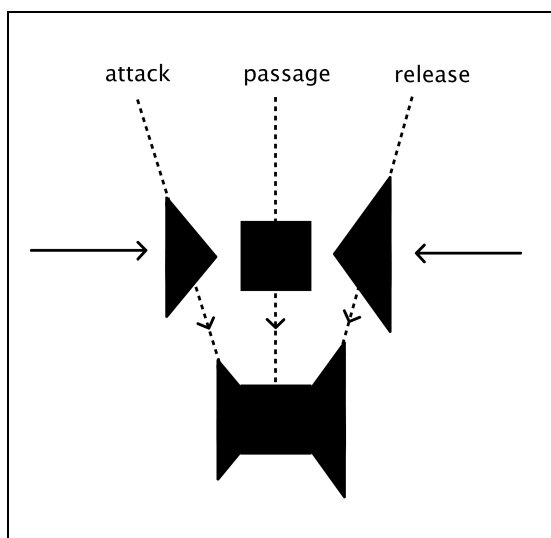


Figure 3. Sound unit construction

Construction

Creating sound units became the basis for the entire composition of *Kitchen Alchemy*. Sound units were connected to one another in series so they no longer existed as isolated events in time. This stringing technique formed longer phrase lengths called *morphological strings*¹². The first minute of *Kitchen Alchemy* displays sound units placed together in a *morphological string*. This horizontal extension resulted in sounds displaying dual functionality. Figure 4 demonstrates the structuring of materials between 1'01 – 1'26. An *arrival* (c) doubles as a *termination* for the first sound unit (1) and as an *attack* (*onset*) for the second unit (2). The second unit's *termination* (e) provides the *onset* (*attack*) for a third unit (3).

¹² Denis Smalley, "But morphologies are not just isolated objects. They may be linked or merged in strings to create hybrids", *Spectro-morphology and Structuring Processes*. In Simon Emmerson (Ed) *The Language of Electroacoustic Music*, 71, 1986.

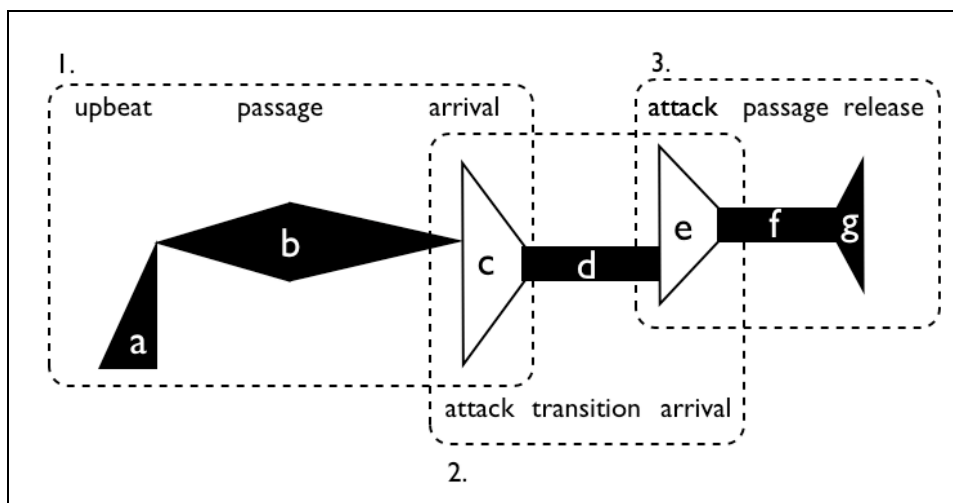


Figure 4. *Morphological string*

A sonogram reveals this detail in Figure 5, showing the points of connection in the stringing process. Through this process, *terminations* were hidden and only noticeable at the end of phrases.

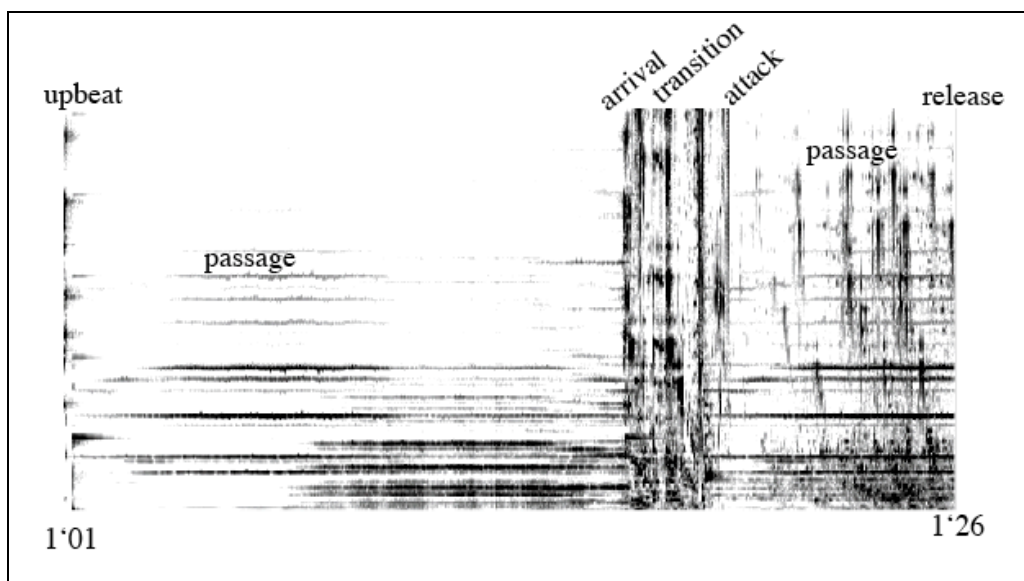


Figure 5. Sonogram, *Kitchen Alchemy* (1'01 – 1'26).

In addition to creating sound units and *morphological strings*, this linking strategy was applied to create phrases, sections and eventually, the entire composition. In this case *Kitchen Alchemy* was composed completely from sound units connected to form *morphological strings*.

Categorical features developed amongst the structural shapes composed. For example, *continuants* acted as pedal points, providing sustained stretches of sound (observable in the sonogram, Figure 5), while *onsets* behaved as short energy bursts driving the *continuants* onto the next *onset*. *Terminations* were more apparent when followed by a silence. Piecing together sound materials at this building block level developed into a sound world of ‘micro’ level detail. Consequentially, this stylistic feature took precedence and continued throughout all the portfolio works.

Kitchen Alchemy’s initial experimentation with spectromorphological vocabulary suggested its usefulness in initiating starting points and ideas for compositional activity. The establishment of sound unit construction had not only provided a structuring method suitable for the following works, but it had also paved the way for other spectromorphological word-sets to be implemented in the following works.

Format: Stereo, acousmatic

1. The Fortune Teller 0'00 – 3'10
2. The Crane 3'11 – 5'16
3. The Dragonfly 5'17 – 8'35
4. The Goldfish 8'36 – 11'40
5. The Leaf 11'41 – 15'16

Origami is a collection of acousmatic miniatures, each based on a particular shape of origami. Dimensions and movement belonging to specific origami shapes were coupled with Smalley's *motion and growth processes* vocabulary to aid the creation of trajectories within the work.

Origami

The visual images, three-dimensional movement and complexities of construction¹³ associated with the Japanese art form of origami provided the focus for the composition. I intended to create a work that represented this paper-folding tradition to establish multi-dimensional connections with this visually-orientated form.

Applying spectromorphological vocabulary in *Kitchen Alchemy* had not only stimulated the creation of sonic structures, but also inspired the shapes of the graphic illustrations as shown in Figures 3 and 4. This early development suggested the potential of using visual and more tactile forms for the same constructive purpose. Similar to the concept of alchemy, the assemblage of origami art appeared analogous to the creation of acousmatic music in the studio, taking something ordinary (plain paper) and creating elaborate transformations (origami shape). Extra-musical ideas

¹³ Shapes ranged in their complexity. Some involved up to 31 instruction steps, as in the dragonfly, Appendix 2.

detailing metamorphosis linked these two works, providing underlying concepts that guided their creation.

Five origami shapes supplied the title for each miniature and informed the sound material selected for the work. For example, the goldfish shape inspired the recording of associative sounds of water, bubbles, drips, swirls and splashes. Integration of these real-world sounds required them to be pieced together in a manner similar to the *onset-continuation-termination* process outlined in *Kitchen Alchemy*.

To establish a tangible link to origami, sound recordings were made of paper folding. Close microphone techniques captured paper sounds that revealed low frequency content, as well as sound akin to granular noise (7'45 – 7'52). The overall timbre of the paper exhibited a 'plainness' occupying a rather discrete frequency range, ideal for representing the mundane and ordinary. Slow creasing and folding produced delicate and subtle gestures (0'33 – 0'50) to represent the contemplation and light-fingeredness required in the constructing process. Furthermore, paper scores, tears, scrunches and flapping provided highly gestural material (3'12 – 3'20), expressive of the more frustrating side (for some individuals) of origami creation.

Motion and growth processes vocabulary

As motion was specific to each origami shape, both literally and metaphorically, it was possible to use these ideas in conjunction with Smalley's *motion and growth processes* word set (Figure 6) and the *seven characteristic motions* (Figure 7) to determine sound choice and creation.

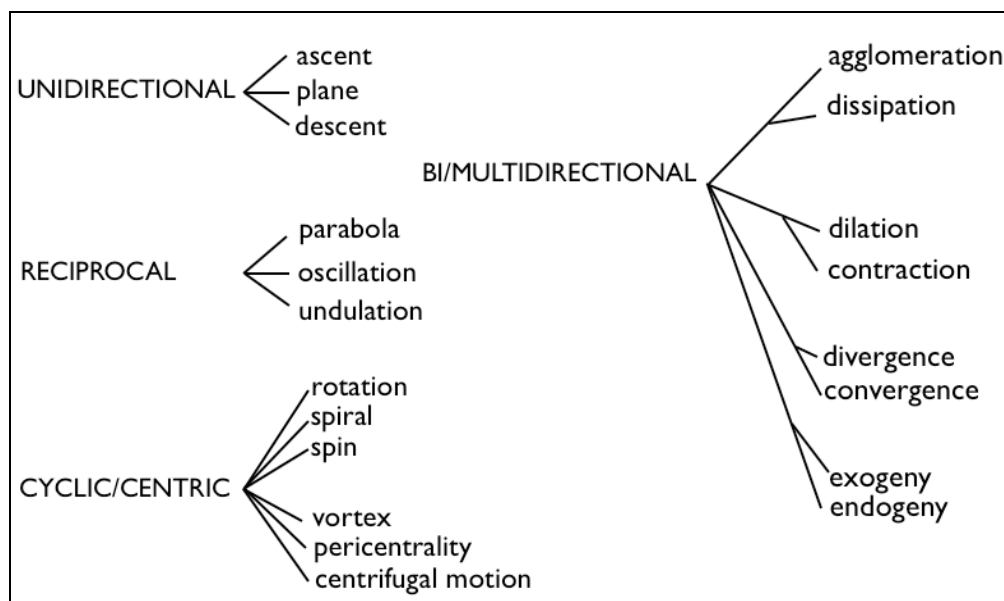


Figure 6. *Motion and growth processes*¹⁴

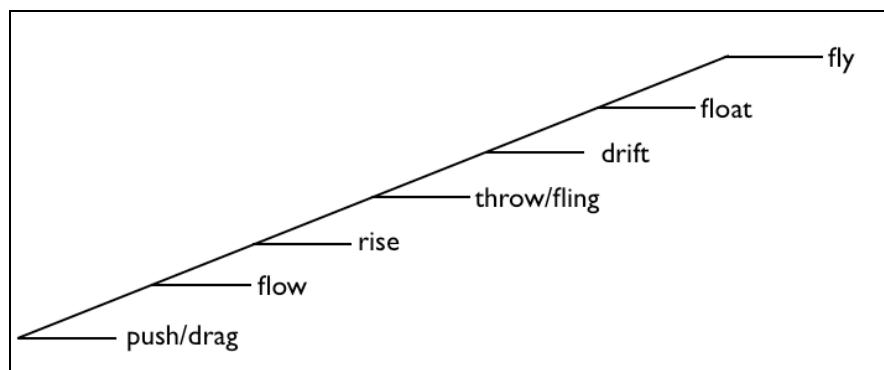


Figure 7. *Seven characteristic motions*¹⁵

In *The Crane*, ideas of bird flight, swift motions, gliding and swoops were linked to the spectromorphology words *fly*, *parabola*, *float*, *ascent* and *descent* in the word set. Combining the influences of origami art, real world and spectromorphological vocabulary presented a prescriptive compositional approach. Materials were generated in response to these preconceived ideas. This style of composing presented a degree of rigidity, dictating the choices that were made, as musical

¹⁴ Denis Smalley, 'Spectromorphology: explaining sound-shapes', *Organised Sound*, Vol. 2, (1997) 116.

¹⁵Ibid. 117.

outcomes were not only a response to word meanings, but also a representation of a physical shape or character.

In addition to this prescribed approach, I considered both the human involvement in paper folding and how issues of precision and regularity in origami construction could transfer over into the music. Through its musical structure, *The Fortune Teller* provides a commentary on its inherent shape flexibility (photograph, Appendix 2). From 0 – 1’45, abstract gestural materials *fly* out from the paper scorings in a *reciprocal* fashion. Silences separating events depict a sense of concentration between folds. Between 2’31 – 3’04 a rhythmic pattern commanding the placement of regular gestures represents the natural collapsing and stretching of the fortuneteller’s shape. The fortuneteller was the most symmetrical and flexible of all the shapes I chose to work with, thus influencing my decision to use a regular rhythmic pattern to end the miniature.

Singular and composite words

Use of the *motion and growth* vocabulary in *Origami* revealed a division within the collection of spectromorphological vocabulary: words can be realised sonically as singular or composite (Table 2).

Word type	Examples	Definition
Singular	<i>Attack, ascend, plane, emergence</i>	Words informing the creation of a single sound
Composite	<i>Multidirectional, turbulence, flocking, streaming</i>	Words requiring multiple or ‘composite’ sounds working in conjunction with each other

Table 2. Word types

An individual word informing the creation of one sound is given the term ‘singular’ as in Figure 8.

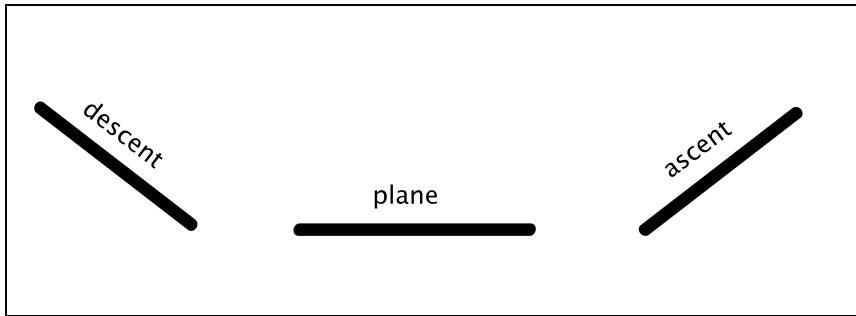


Figure 8. Three singular motions

Alternatively, a composite word is one that informs multiple or composite sounds working in conjunction with each other. For example, the word *agglomeration* is suggestive of sounds traveling together and forming a collective mass (Figure 9). This is considered to be composite since more than one sound is essential in creating an *agglomerating* motion. An *agglomeration* could of course be comprised from multiples of the same sound; this is still regarded as composite and can be described more fully as a *monomorphological*¹⁶ composite.

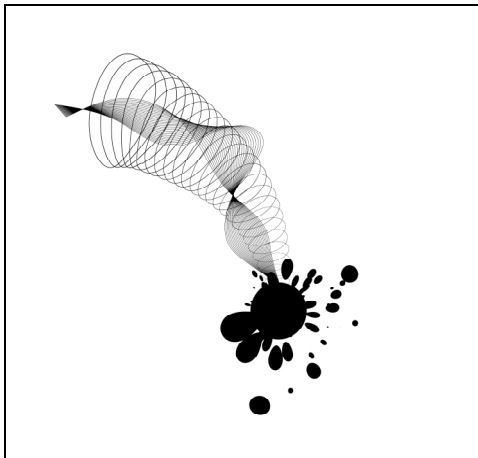


Figure 9. Composite *agglomeration*

¹⁶ Denis Smalley, “The central trio of terms identifies three typical categories of internal motion design, textures which may be made up of either a single morphological type (monomorphological) or a mixture of morphologies (polymorphological).” *Spectromorphology and Structuring Processes*. In Simon Emmerson, ed. *The Language of Electroacoustic Music*, 1986, 77.

Creating motions and textures from composite words has proven to be a complex and challenging strategy to engage with. Since multiple sounds are subject to sculpting and shaping, more decision-making was inevitably involved. A greater degree of control was required to manage simultaneity of sound materials and there was a need to take a more impressionistic view on how certain effects would be achieved. Blurring often occurred between the types, as singular words were used as composite words on many occasions. For example, the word *attack*, categorised as singular, was almost always constructed from several stacked sounds sounding as a whole. Composite words, however, could not be comprised from a single sound; they do not have this flexibility. In *The Crane*, there is a singular *descent* constructed from a single bird chirp (3'31). Between 4'32 – 4'52 a composite *undulation* is constructed from multiple sounds layers interacting with each other to create a smooth wave-like motion.

The discovery of this categorisation promoted singular words to a fundamental level of importance in terms of their ease in informing material choice and generation. This simplicity is favourable, especially in the early stages of composition. It is particularly welcomed when considering appropriate vocabulary for pedagogical use, providing an accessible 'way in' for composers new to electroacoustic music. This pedagogical application is discussed in further detail in Appendix 3.

Additional vocabulary

Additional vocabulary was employed to create particular character references to the origami shapes. In *The Dragonfly* the vocabulary pool was expanded to include adjectives associative of dragonflies and their behaviour to aid choices on processes and creation (Figure 10). These words informed my decision to use *iterative* material throughout the miniature, since these words were more suggestive of the programmatic requirement (5'34 – 5'48).

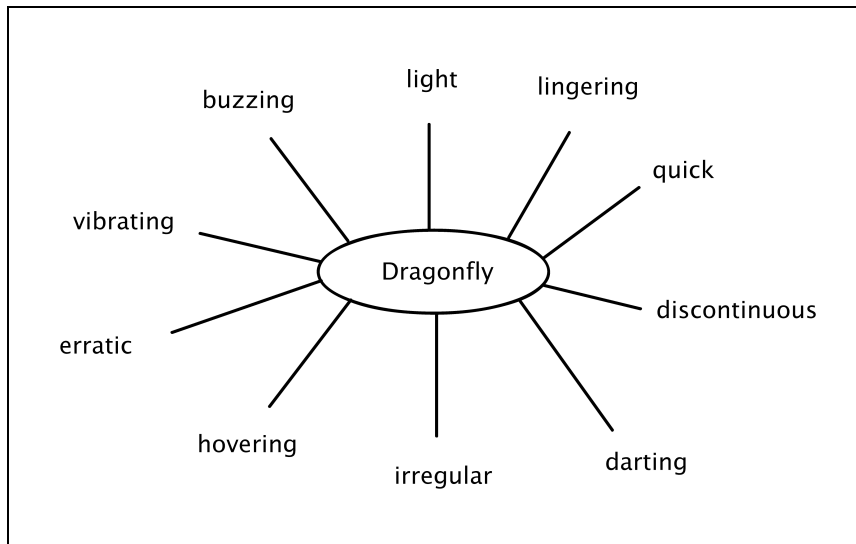


Figure 10. Additional vocabulary

Further extensions included additions to the *seven characteristic motions* (Figure 7), presented in Figure 11. This new word-set was capable of informing the creation of downward motions and was developed after considering the behaviour of fish moving through a variety of depths. The gestural content between 8’59 – 9’05 was informed by the word *dive*, followed by a *reciprocal rise* to resurface.

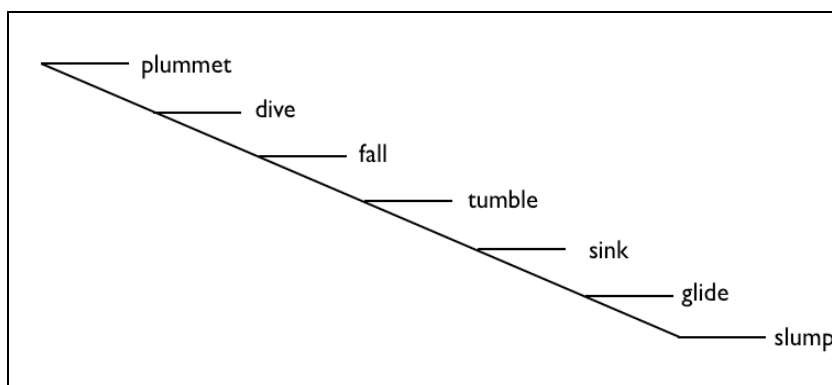


Figure 11. Seven additional descending motions

Visual movement

Between 3’52 – 4’22, multiple *ascends* and *descends* of different durations were combined to create a composite *multi-directional* texture. This composite motion was informed by the visual characteristics common to bird flight with swift, agile

movements together with the visual representation of *multi-directionality* (Figure 12). From 4'24 – 5'10 sharp shifts from the imaginary to real-world paper sounds are presented. This series of changes aims to represent the angularity of the crane's paper folds and dimensions, while also representing the darting quality of bird flight in nature. The miniature ends in frustration as the paper is crumpled and tossed into the bin (5'05 – 5'10).



Figure 12. *Multi-directionality*

Another example of a visually-informed motion is the composite *vortex* occurring between 12'38 – 12'49 in *The Leaf*. This spiraling movement was based upon a leaf's circular path, gliding fluidly through the air as it falls from the tree. This passage was composed using a number of overlapping and *descending* motions with sweeping panning to create the spatial illusion.

Circular motion perception

At 9'04 in *The Goldfish*, a *pericentral* motion represents the water swirls of the goldfish's environment. Composing a circular motion presented a challenge when working in a stereo format. At this point I chose to compose the cyclic impression using a repetitive pattern that appeared to centre around a point. In my research the accuracy of visual shapes representing circular motions has been questioned. Figure 12 represents a number of *ascending* and *descending parabolic* sounds occurring as part of the *multi-directional* composite. At certain points these shapes suggest sound

is traveling backwards. This impossibility is an aural illusion where circular motion is imagined as a curving trajectory in music's temporal existence.

Emotive representation

From the outset it was my intention to create a work playful in nature, characterising the lighthearted side of origami so appealing to young children. Simultaneous to this, I wished to provide an aural commentary on creating aesthetic beauty and complexity from a single sheet of plain paper. I envisioned sound objects, both from real and imaginary sound worlds, 'springing' out from the mundane paper sounds to suggest this creative activity. In reality, this 'jack-in-a-box' movement is impossible, but the medium of acousmatic music allows us to experience these incongruent feats. Objects flung out from a fortune teller (0'30 – 0'33), water dripping from a series of paper folds (8'42 – 8'51), and a bird springing to life from a scrunch of paper (3'19) are all examples of this. A sense of amusement is created through these 'impossible' juxtapositions. Seamless connections between paper sounds and the real-world sounds (bird chirps, water bubbles, insect buzzing) reinvented their context to achieve this result. *The Goldfish* exhibits this humour between 8'42 – 8'51 where each paper fold terminates in a water bubble pop. Setting another stylistic precedence for the portfolio was the idea of lightheartedness and sense of play. My inclination for clear, polished sound and highly gestural, energetic motions were other features developed in *Origami* and continued throughout the portfolio.

Imaginary spaces

Guided by the idea of paper to origami transformation, I wanted to transport the listener from one space to another as a means of following this transformative progression. The close microphone recordings of the paper sounds achieved an intimate space, capturing the delicate and tactile nuances of paper creasing. The sound material obtained from environments of birds, insects, water, and leaves provided contrast to this intimacy, carrying with them their own inherent space. My

intention was to maximize this shift in context from the studio (microphone space¹⁷), to an imaginary sound world. Processed and abstract materials layered in combination with real-world sounds created this ‘imaginary’ frame¹⁸; after all, origami art does not result in the construction of a real live bird, goldfish or dragonfly, but only paper imitations of reality. Interplay of ‘documentary’ and the ‘surreal’ became key features of the music, functioning with the premise of sound displacement and de-contextualization. At 10’37 a static stretch of sound provides a dramatic change of environment, submerging the listener ‘under water,’ where the sound is blurred, lacking detail in the space.

Analogous discourse

Of the portfolio works, *Origami* and *Dance Machine* are the only works to maintain raw sound (not of instrumental origin) purposely to communicate extrinsic threads¹⁹ and meaning through their use. The discourse established in Trevor Wishart’s *Red Bird* provided an influential approach when dealing with real-world sound.

Wishart’s mediations between real-world and abstract created a “matrix”²⁰ of metaphorical links, “the sonic transformation from ‘lisss’ to birdsong [from the phrase ‘listen to reason’], the voice ‘takes flight’ so to speak.”²¹ An allusion to ‘machines’ is created “from phonemes or body-like visceral sounds, whilst the

¹⁷ Denis Smalley, “microphone space is a primary compositional tool for creating proximate spaces which beam to us small and microscopic presences and details of spectral space”, ‘Space-form and the acousmatic image’, *Organised Sound*, 12(1), 2007, 43.

¹⁸ Simon Emmerson, “ the frame (a defined area of interest) applied progressively from the largest to the smallest scale”, ‘Aural Landscape: musical space’, *Organised sound*, 3(2), 1999, 138.

¹⁹ Denis Smalley, “The wide-open sonic world of electroacoustic music encourages imaginative extrinsic connections because of the variety and ambiguity of its materials, because of its reliance on the motion of colourful spectral energies, its emphasis on the acousmatic, and not least through its exploration of spatial perspective.” ‘Spectromorphology: explaining sound-shapes’, *Organised Sound*, 2(2), 110, 1997.

²⁰ Trevor Wishart, Sound symbols and landscapes. In Simon Emmerson, ed. *The Language of Electroacoustic Music*, London, 1986, 54.

²¹ Ibid.

squeaks and squeals of the machinery's operation are vocal, animal or bird noises.”²²

Rather than use a recording of mechanical activity, unrelated real world sounds instead comprise the mechanical effect. In his work, sounds take on characteristics that would not usually be associated with them. Inspired by this construction of metaphor, my approach involved sculpting materials so that they might allude analogously to the real and/or origami shape that they were based on. Paper swimming through water like fish (The Goldfish), paper crunching like crisp autumn leaves (The Leaf), and paper flapping through the air like birds in flight (The Crane) are examples of this analogous realization.

Through *Origami*'s composition I had identified a second fundamental word-set for informing sound choice and creation. All sound inherently possesses directionality, so exclusively addressing this quality was conducive to the creative process and construction of sound units.

²² Ibid.

Format: Live - percussionist and stereo soundfiles

Recording: Studio realisation

Cajón! is a mixed work for percussionist and triggered soundfiles focusing on rhythmic juxtapositions. Sound materials were composed and arranged using the concept and vocabulary of *spectral space* as a virtual frame. *Spectral density* vocabulary informed the number of materials occupying the space and strata of *spectral space* at any given time throughout the piece.

The cajón

Sound recordings of an improvisation performed on a cajón were made in 2007. This African-Peruvian percussion instrument²³ provides a relatively large array of timbral variety due to an unfixed front panel that vibrates when struck with the palms. Additional snare drum strings are attached to the inside of the instrument to produce a more resonant timbre and longer decay time per strike. Attracted to this sonic variety and rhythmic potential, I became inspired to compose a work dedicated exclusively to and for the instrument. The rhythmic patterns produced by the performer were recorded and isolated in the studio, then categorized into groups depending on tempo, duration, crescendo, diminuendo, loops, complexity and simplicity. These patterns provided the majority of the sound material used in the work.

The exact origins and developments of the cajón are somewhat uncertain and a lack of documentation has caused some ambiguity regarding its heritage. More recently it has established itself within the Spanish flamenco music tradition; however my

²³ The cajón most likely originates from the transportation of slaves to South America who used the wooden transportation crates as musical instruments.

impetus for recording this instrument was to capture and explore the rhythmic links it has with Cuban rumba²⁴.

Acousmatic construction

Cajón! was initially composed as an acousmatic work. Materials were arranged using the spectromorphological strategies developed from *structural functions* and *motions* vocabulary. Much of the rhythmic content provided by the cajón was incorporated into the work in an unprocessed state, only subject to light editorial adjustments. In addition to the main sound material, a clapping technique called ‘palmas’ was incorporated into the piece (1’42 – 1’47 and 3’46 – 3’50). After completing the acousmatic work, it became apparent that a percussionist would be able to perform the unprocessed parts live in conjunction with the remaining sound materials. These cajón sections were extracted, removed from the mix, and transcribed for the performer. The remaining materials functioned as an accompanying electroacoustic ‘tape’ part, subsequently segmented into 11 soundfiles to be triggered at points within score. Importantly, this approach achieved strong causality between performer and soundfiles, unlikely to be achieved through working in a more conventional manner, by notating the work first. The cohesion of sound materials accomplished in the acousmatic version (Appendix 4) was preserved by setting up cause and effect relationships between performer and tape. This transcription exercise was conducted as a collaborative venture with percussionist Toby Kearney, to whom the work is dedicated. Working with a specific performer in mind provided the opportunity to configure a tailor-made scoring technique, whilst working out material additions and improvisation possibilities.

²⁴ Courlander, Harold, “Two old dances, the *Taona* and *Yambu*, are also thought of as *Rumbas*. According to one informant, the traditional instruments for the *Yambu* are a *quinto*, a wooden box (*cajón*) played with the hands and fingers as a bass drum, two spoons which are beaten on the table, and a door, which is beaten by hand by the fourth musician.” ‘Musical Instruments of Cuba’, *The Musical Quarterly*, Vol.28 (2), 227-240, 1942.

Performance considerations and the score

A score (Appendix 4), which I prefer to describe as performance instructions, was transcribed for the live version of *Cajón!* These instructions function as a hybrid between a graphic score and an events list, displaying how the cajón and sound files align and interact. Important sonic signifiers leading up to and around the cajón interjections are the main components of the instruction documentation. This somewhat unconventional practice of scoring a work in the latter stages of a composition achieved positive results when working collaboratively with the performer. Amendments to striking techniques and solo improvisation passages were added as a result of this collaborative post-composition scoring. Requested by the performer was a two-lined stave for the cajón notation, loosely corresponding to the vertical areas upon the cajón that were to be struck. Notation below or above these two lines represented the extreme striking areas of the cajón.

Spectromorphological vocabulary informed the performance instructions where sonic events are described with vocabulary in the tape part, indicating for the performer the sound qualities that they would interact with. This proved to be a useful application of spectromorphology for the performer, providing tangible reference points when performing from memory.

The *causality* and synchronicity of sound materials apparent in the acousmatic version of the work (Music Appendix 1) was transferred over to the performance instructions using diagrams throughout, to provide the performer with a visual link to the accompanying soundfiles. Some of the raw cajón material was retained in the accompanying soundfiles and not transcribed for the performer. This aimed to create a sense of confusion²⁵ in distinguishing instrumental sounds from those of the soundfiles, from an audience perspective. The passage between 4'39 – 5'23 (trigger points 5 – 9 in the score) highlights synchronicity between the performer and the

²⁵ Flo Menezes, “in fusion a doubt condition is established. To a certain extent, fusion implicates willfully, on the composer’s part, confusion for the listener”, ‘For a Morphology of Interaction’, *Organised Sound*, 7(3), 2002, 309.

soundfiles, creating the illusion of the performer causing these sounds to occur through striking the instrument. To add to this illusion, the performer was asked to strike the cajón in different places, including the sides with knuckles, to visually suggest that different areas of the cajón's surface resulted in the production of different sonic events (occurring in the soundfiles) from an audience member's viewpoint.

Hybridisation

Incorporating cultural aspects into electroacoustic music was an area of research initially explored prior to my doctoral degree. These earlier investigations integrated traditional instrument and dance-music samples, examining methods and implications of cultural borrowing in the electroacoustic music medium²⁶. A conclusion drawn from a questionnaire distributed to Latin American composers now displaced from their cultural geography highlighted an affinity, amongst the composers, for culturally linked sounds apparent within their own music. As a consequence of this research, I began experimenting with gestures and physical movements associated with traditional Latin American dance forms as sound material. Mapping strategies for sound material distribution in a 5.1-channel composition, *Sonidos Bailables* (2006), were based on Latin American dance movements. Research into cultural borrowings continued and manifested itself in four of the portfolio works, with *Cajón!* following on from these findings.

Rhythm

The incorporation of rhythm, as a borrowed Latin American influence in *Cajón!*, provided the defining feature of the work. Rhythm was treated and presented in a fragmentary fashion and in brief fleeting moments (for example, between 0'15 – 0'19). On many occasions, rhythmic fragments were juxtaposed in quick succession, presenting an interesting challenge for the performer when these fragments were

²⁶ Manuella Blackburn, 'Latin American influences and their incorporations into electroacoustic music', Masters degree submission, The University of Manchester, 2006.

extracted for transcription. The performer was rarely allowed to settle into a rhythmic groove, as the incorporation of rhythm was continuously varied. A consequence of composing in this fragmentary style was the creation of a rather interjectory role for the performer. The weighting in terms of interest and sonic detail undoubtedly remained with the soundfiles accompanying the performer.

My decision to make use of rhythmic content was not done without concern. I was aware of a school of thought unconvinced of electroacoustic music's abilities to accommodate rhythmic sound. Incorporations of rhythm in electroacoustic music have previously faced a degree of resistance, causing "unease, [and] even disquiet."²⁷ It has been suggested that rhythmic patterns detract from the practice of 'reduced listening'. Attention to spectromorphological detail is 'hijacked' and converted into prediction²⁸ for future rhythmic repetitions. Emmerson (2008) argues that if "rhythm takes up some of our listening power" then "it is possible we will be less attentive to other passing detail."²⁹ To support this argument Emmerson presents a 'scale' demonstrative of the consequences of incorporating rhythm into electroacoustic music for varying durations with 'attention' at one end and 'boredom' at the opposite extreme. In considering this phenomenon of 'entrainment' it was my intention to avoid lengthy blocks of rhythmic content, opting instead for shorter snapshots of these patterns (3'24 – 3'40).

Spectral space and spectral density

In addition to the compositional strategies developed from *structural functions* and *motion and growth* vocabulary, *Cajón!* was also informed by the spectromorphological concepts of *spectral space* and *spectral density* (Figures 13 and 14).

²⁷ Simon Emmerson, Pulse, metre, rhythm in electro-acoustic music, *EMS proceedings*, electronic resource, www.ems-network.org/ems08/papers/emmerson.pdf, 2008.

²⁸ "Pulse has a special effect on our attention. This is known as entrainment – the attention system holds information in short term memory, if repeated this is used to 'predict' the next event", Ibid.

²⁹ Ibid.

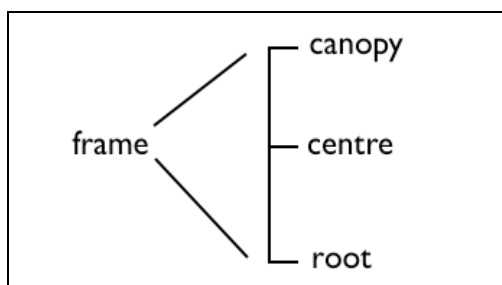


Figure 13: *Spectral space*³⁰

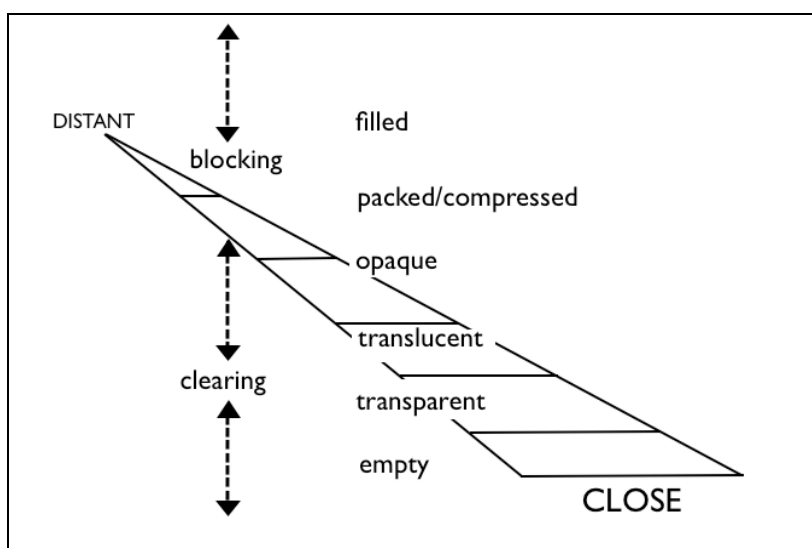


Figure 14. *Spectral density*³¹

The application of these two latter word-sets differed to earlier strategies mentioned so far since I did not wish to use these words to inform creation of materials, but instead, to set up a virtual *frame* in which my music would exist. *Spectral space* vocabulary supplied this virtual frame, making it is possible to imagine where sounds would be placed and how sounds might interact with each other. The *spectral density* word-set provided vocabulary detailing how full or empty a spectral space frame might be. In order to create an *emptier*, less dense passage, it became clear that a second passage more densely packed, in close linear proximity, would further

³⁰ Denis Smalley, 'Spectromorphology: explaining sound-shapes', *Organised Sound*, Vol. 2, (1997) 121.

³¹ Ibid.

the impact of the *emptiness* when heard. This relationship of opposites became a significant tool in constructing a range of spectromorphological strategies throughout the portfolio. My first endeavor with this idea occurred between 0 – 1’24 where contrast between a *filled* spectral space occupied with many layers of activity, and one much starker and emptier was constructed. Additional contrasts were also explored. Extreme highs of the frequency spectrum were paired oppositely with the extreme lows, and noise material was paired with more pitch-orientated sound. (One example between 2’06 – 2’46 displays pitched resonances alternated with noise-like material.)

Noise

Noise-based materials played a major role in *Cajón!* marking a departure in my stylistic approach and preference for pitched materials. My decision to incorporate these ‘often-discarded’ and degraded sounds was influenced by the noise-like material generated from the paper folding and scrunching used in *Origami*. In composing *The Dragonfly* I had started to experiment with more abrasive timbres belonging to the paper recordings and I became fascinated with the impact of similar sounds when placed with more pitched-based materials. I was keen to further explore the outcomes of using noise within my work. The words *saturate* and *granular* (Figure 15) provided starting points for this investigation. The isolated explosions between 4’45 – 5’23 incorporate *granular* noise materials to create decays for each large impact. A more continuous example of this *granular* noise is apparent between 6’45 – 7’30. Variants of *granular* noise continued to feature in my portfolio works from this point, often used as *disappearance terminations* (6’28 – 6’41 in *Vista Points*) for sound units, or *planes* acting as connective materials between episodes and sections (11’46 – 11’53 in *Dance Machine*).

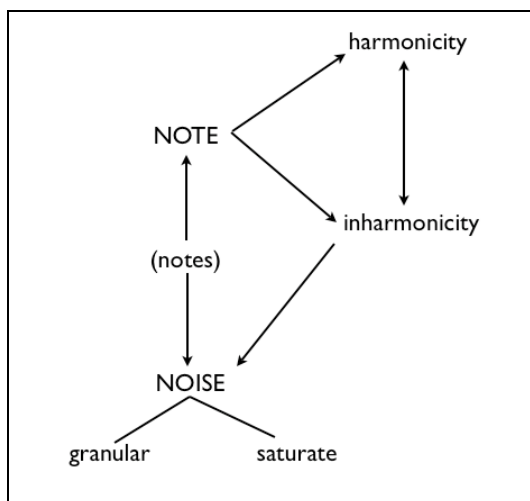


Figure 15. From note to noise³²

³² Denis Smalley, 'Spectromorphology: explaining sound-shapes', *Organised Sound*, Vol. 2, (1997) 120.

Format: Stereo, acousmatic

Spectral spaces was composed exclusively from sound materials donated by composer Denis Smalley. These materials were used by Smalley in the creation of his acousmatic work *Wind Chimes*, composed in 1987. *Spectral space* vocabulary continued to inform sound material creation, this time focusing on texture construction.

Sound material

Work on *Spectral Spaces* began in 2007 through my participation in a group project where new acousmatic pieces were composed using sound materials from Denis Smalley's composition *Wind Chimes* (1986). Smalley provided 13 soundfiles, most of which he had subjected to studio processing for the original work (Music Appendix 3). The brief of this commission was to compose new works exclusively upon the use of these soundfiles. This commission was given to eight composers, including myself, with the end result culminating in a CD compilation of the eight different works, with each composer subjecting the soundfiles to their own individual creative impulses.

Transformations

Working with the prescribed soundfiles proved challenging. The materials provided were few in number, and prior processing had imprinted upon the sounds vestiges and artifacts of earlier manipulations subjected by Smalley. To gain a wider pool of sounds I employed multiple processing techniques. Several applications of filtering and frequency enhancement facilitated this, while pitch-shifting devices added harmonic detail to resonant attacks and sustains.

Sound identity

An issue surrounding my decisions on transformations was whether or not the identity and integrity of the soundfiles should be retained. I questioned whether my

approach should be strictly in line with their heritage and origin, aiming for enhancement rather than annihilation. In other words, I questioned whether my transformations should pay ‘homage’ rather than innovate or reinterpret, and whether or not there should be an audible link to the characteristics of Smalley’s original work. Due to these considerations, my approach addressed both possibilities for transformation, aiming for a middle ground between the two possibilities. Between 9’23 – 9’31 Smalley’s original sound objects can be heard emerging through the background texture. This inclusion is the most literal quotation used in the work. Another notable quotation retaining its identity is found in the third section of the piece (5’09 – 6’50) where a reference to Smalley’s wooden wind chime sound appears in and out of focus. At the other end of the transformative scale is the sound material subjected to abstraction. Between 6’54 – 7’30, stretches of *iterative* material are presented, produced from granular forming plug-ins and time freezing to produce a stuttering effect. This abstract material links back to sonic vocabulary developed in my other portfolio works: *Kitchen Alchemy* (6’23 – 7’16), and *Origami* (2’00 – 2’23).

Qualifiers of spectral space

The completion of *Cajon!* revealed the fundamentality of *spectral space* for compositional activity. Enthused by the significance of this spectromorphological aspect, research continued into its associative vocabulary, in particular, that vocabulary termed *qualifiers of spectral space* (Figure 16).

<u>four qualifiers of spectral space</u>
1. emptiness - plenitude
2. diffuseness - concentration
3. streams - interstices
4. overlap - crossover

Figure 16. *Qualifiers of spectral space*³³

³³ Denis Smalley, ‘Spectromorphology: explaining sound-shapes’, *Organised Sound*, Vol. 2, (1997) 121.

These composite words, detailing the expansive linear occupancies of spectral space, are suggestive of summative structures. Aurally realising these words relied on combinations of *intrinsic* detail and specific interaction types to evoke particular impressions. For example, the word *diffuse* requires materials to be spread out and dispersed along a time frame. Selecting the *qualifiers* vocabulary, suggestive of textural material, as the informing factor upon this work seemed appropriate since my works so far had featured a high degree of gestural content, and I was keen to direct my attention solely to the creation of textural materials.

Stylistic departure

A very different strategy for the creation of material evolved since the words used were descriptive of spectral space's horizontal domain (for example, *streams*, and *overlap*). Preference was given to much longer sound material, involving vertical stacking of materials directed toward linear goal posts (for example, a drawn out crescendo). Due to the predetermined soundfile resources and the focus on textural material, *Spectral Spaces* accordingly took on a very unique overall sound. A departure from gestural creation sets this work apart from the other portfolio works, while exclusivity with Smalley's sound materials imposed further limitations, removing the 'safety net' of more familiar sound selection strategies used in earlier works. In composing textural materials I was restricted from using 'tried and tested' transformation techniques developed for gesture construction; therefore I had to go beyond these methods to formulate new approaches for constructing texture.

Structure

Spectral Spaces was structured into four sections, resulting in an episodic form. Each section focused on a representation of the four *qualifiers* vocabulary (Figure 16). This exercise in sound sculpting helped define contrasting characters in each section.

The second section was comprised solely of *overlapping streams* (3'11 – 4'37). Many sustained layers were vertically stacked, informed by the *streams* in the visual representation (Figure 17). Evolving together, these layers gradually *filled* the space, competing for more foreground positions. Together these materials contribute to a *compressed spectral density*, *saturating spectral space*, as any further detail would be masked. While composing this section, I considered how diffusion in concert performance might enhance the movement of these materials. I imagined this section to flow through the space in an immersive fashion, with a degree of fluidity. This section in particular was influenced by the textural continuity and pace of evolution in François Bayle's work *Toupie dans le ciel*.

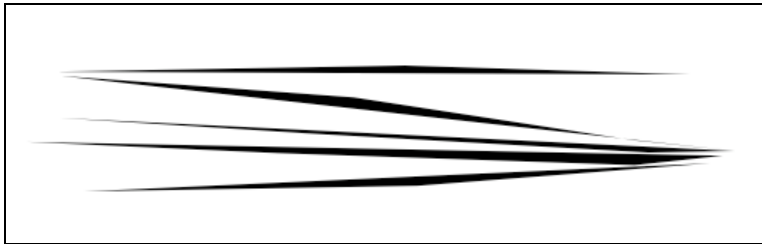


Figure 17. *Streams*

Section three (5'09 – 6'53) provided contrast, presenting less plentiful density. The *streams* and *overlaps* were created as *diffuse* – repeated peaks and troughs create a sense of slow, sedate movement, as materials gradually *emerge* and *disappear* into the texture.

Vocabulary application in *Spectral Spaces* extended beyond micro-level sound creation. In this case, words informed longer stretches of sound with entire sections modeled around their influence. This revealed the feasibility of a more 'macro-scale' approach for texture creation.

Format: Stereo, acousmatic

Dance Machine is a large-scale work involving rhythmic patterns modeled on Latin American dance forms. Textural material continued to be a focus, this time using *texture motion* vocabulary to inform sound materials of varying complexity.

Texture motion

Texture motion vocabulary (Figure 18) provided the focus for *Dance Machine*. I had already begun to compose composite textures in my previous work, *Spectral Spaces*, and was better placed in the following works to create more detailed and directional textural constructions.

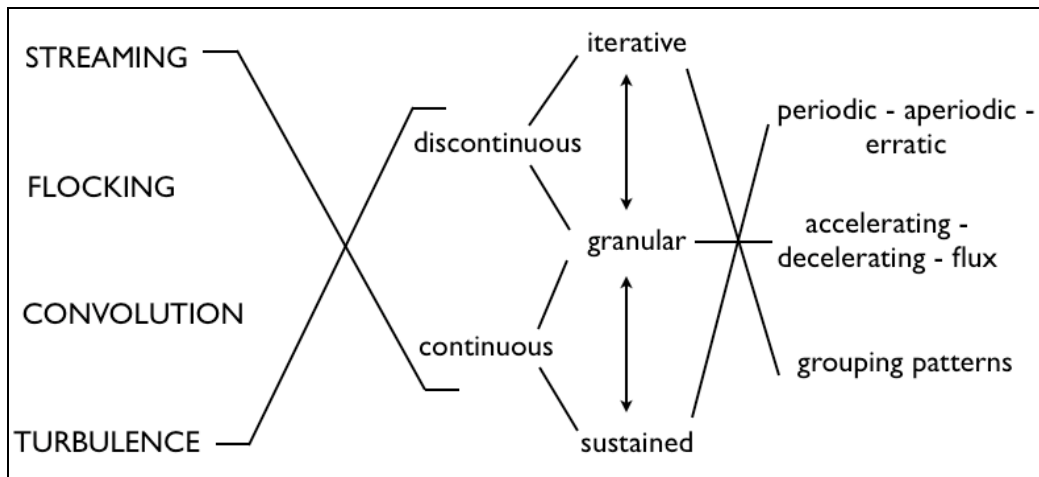


Figure 18. *Texture motion*³⁴

I was inspired by the composite words *streaming*, *flocking*, *convolution* and *turbulence*, and the ways “in which the internal textural components may collaborate in motion”³⁵. Diagrams of these textures helped to visualize ideas for sound material construction. The word *flocking* influenced the grouping and layering of materials in

³⁴ Denis Smalley, ‘Spectromorphology: explaining sound-shapes’, *Organised Sound*, Vol. 2(2), 1997, 118.

³⁵ Ibid, 117.

the composition (Figure 19). Between 5'41 – 5'47, for example materials move collectively as a *flock*. Another sequence at 6'19 shows a more collective dispersal of sounds.

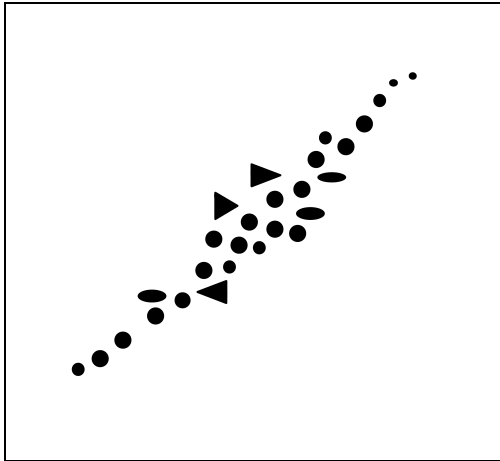


Figure 19. *Flocking*

Rhythm mapping

With the completion of *Cajon!* I was eager to further research the communication of Latin American culture through rhythmic means in a new work. Instead of incorporating instrumental samples, I intended to assemble rhythmic materials using the idea of *grouping patterns* through rhythm mapping. This process involved importing examples of typical Latin American rhythmic patterns (tango, samba, bossa nova and cumbia) into a Pro Tools session, while ‘culturally neutral’³⁶ sound materials (clocks ticking, foot steps and marbles) were arranged and mapped around the amplitude peaks of the pattern’s waveform through volume enveloping. Once adequate materials were in place, (ie. enough to carry the pattern, unaided by the soundfile), the soundfile containing the original rhythm was removed from the session mix. This resulted in a rhythmic pattern constructed from many sounds without any use of direct sampling, leading to a much less palpable incorporation (for example: 2'44 – 3'01, 10'24 – 11'03 and 12'15 – 13'05).

³⁶ I refer to culturally neutral sounds as those that are less associative of a particular culture.

The constructed materials maintained a sense of pulse, while the connection with the original rhythmic pattern was more dilute. In accordance with rhythmic treatment in *Cajon!* I used the rhythm appearances in a relatively fragmented manner. An unexpected but ultimately useful consequence of this mapping technique was the quasi-mechanical nature the piece exhibits. The Latin American rhythm incorporations had provided an aural ‘stencil’; however, references to their organic nature and musicality had not been transferred. This dramatic re-working of these culturally linked sound materials obscured their incorporation from audience perception.

Large-scale form and the sonic journey

Structure was an aspect shaped by a ‘sonic journey’ akin to a narrative “directing the listener on an aural voyage.”³⁷ This discourse was refined in *Dance Machine*, where compositional practice of real-world mimesis was incorporated to provide a handle³⁸ for engagement across a lengthy duration. A strategy identified to maintain interest and unity across such duration was the employment of a thematic ‘thread’ providing an aural signpost to return to. Sound materials evolved and traveled in different directions, but always came back to a central idea governing the piece. My concept for this work was to establish a sort of virtual ‘jukebox’ where ‘tunes’ appeared to be selected. This concept allowed many musical ideas to be played sequentially, granting me the freedom to exchange and alternate materials mid-flow, representing a ‘change of mindset’ in the music selection (transition at 13’05). These conditions provided the ideal environment to explore and display different rhythmic incorporations using the mapping strategy outlined above.

³⁷ Leigh Landy, *Understanding the Art of Sound Organization*, Massachusetts, 2008, 74.

³⁸ Leigh Landy, Chapter 1: From Intention to Reception to Appreciation: Offering Listeners Some Things to Hold On To, *Understanding the Art of Sound Organization*, Massachusetts, 2008, 21.

Sonic signposts loosely structured this piece, working on the premise of jukebox real-world functionality. One such signpost uses the sound of money inserted into the mechanism that begins the work (0 – 0’10), and the subsequent selection of a track or tune. Others simulations included occasional internal mechanisms from the jukebox, for example the lever crank between 1’22 – 1’27 and vinyl crackle between 5’33 – 5’50. In one instance, indecision between tracks runs riot, developing into a series of starts and shifts (16’32 – 18’10) and finally malfunctioning as the work terminates (19’19 – 20’11).

Composing in large-scale form challenged the implementation of my spectromorphological compositional strategies within an extended time frame. Sound material construction based on spectromorphological structures had so far involved piecing sounds together to compose small sound units. This gestural micro-level construction, building detailed *morphological strings*, so typical of my work, appeared to be more suitable for works shorter in duration to achieve an effective result. The episodic form resulting from the piecework technique across the entire portfolio was tested in the creation of long duration form. Detailed sound unit composition of gestural content is difficult to sustain over long durations. This consideration altered my approach somewhat in *Dance Machine*. Furthermore, a balance between varied spectromorphological concepts is required to maintain interest and attention over time. This balance was sought in more equable sustained passages with lower level activity. This revelation continued to be implemented in the works proceeding *Dance Machine* (*Vista Points* and *Karita oto*).

Perspectives

In an area of more sustained and less active material, I used the analogy of ‘aural microscope’ for sonic magnification, aiming to expose otherwise hidden perspectives within the more placid stasis. A particularly noticeable example of this magnification occurs at 8’40 where my intention was to ‘zoom in’ to the detail of a vinyl record rotating slowly, having come to the end of its final track. Five rotations, created through panning and volume enveloping, cycle before the sound *disappears*.

This passage aimed to bring the audience closer to the sound, to a more intimate vantage point, metaphorically inside the machine, while providing a moment to 'breathe' and contemplate.

Format: Stereo, acousmatic

All sound materials in *Vista Points* were derived from electric guitar sounds performed and provided by Carlos Charles Lopez. The positioning and interaction of these materials were informed by the *behaviour* word-set vocabulary.

Motion passage in the horizontal passage

Vista Points began as two studies investigating the creation of ‘*pressured*’ and ‘*voluntary*’ sound material. These two concepts were taken from the *behaviour* word-set in Figure 20.

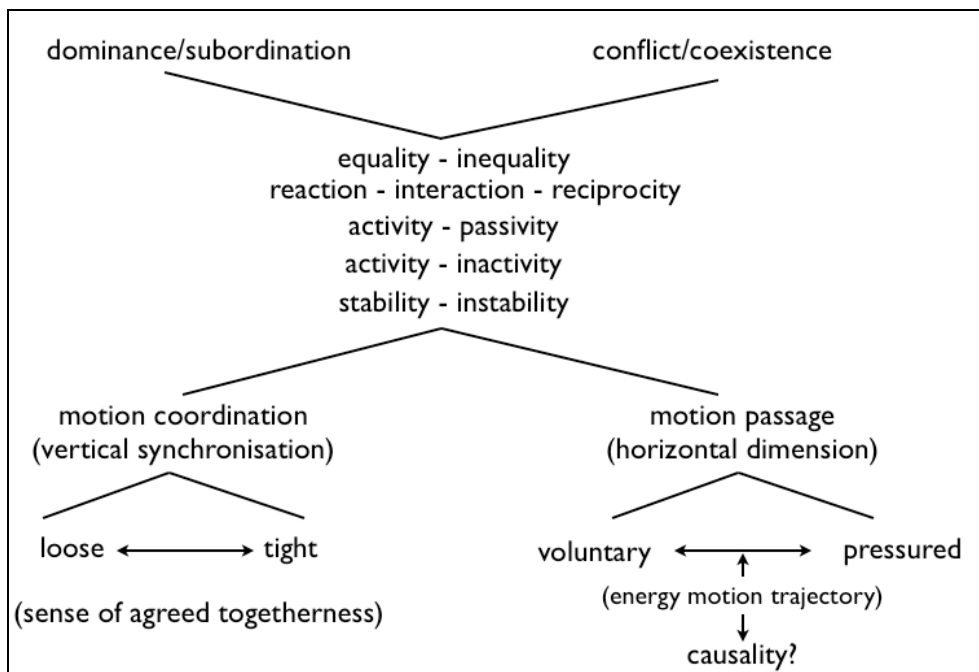


Figure 20. *Behaviour*³⁹

³⁹ Denis Smalley, ‘Spectromorphology: explaining sound-shapes’, *Organised Sound*, Vol. 2(2), 1997, 119.

Consideration of the *horizontal dimension* as a virtual time frame provided a useful structure for composing these opposing *behaviour* types. Varying the position of materials (in relation to other events) along this time frame determined the *behaviour* exhibited by the events. It became clear that composing a sound with a *pressured behaviour* required initiation by a preceding force, while a *voluntary* event occurred independently of any force, often in an impromptu manner.

Pressured Behaviour

All materials had been generated from the electric guitar using a number of different pedal effects and add-ons, including ‘wha wha’ pedal, ‘humbucker’ pickup and ‘whammy’ bar. These provided a vast amount of material to work with. My interest in electric guitar sounds had begun during my Masters degree with my work *Causal Impacts* (2006) whereby sounds from the guitar had been manipulated and disguised through transformation processes. This sound material lent itself particularly well to processing techniques due to the harmonic content and frequency range, producing a wide variety of timbral qualities extractible from the instrument. With *Vista Points* it was my intention to put the real-world sound source on clear display, retaining its identity.

The first study, focused on *pressure*, was constructed from a string of sounds with one yielding to the next (*morphological strings*), creating a sense of causality since “a chain of activity links a cause to a source.”⁴⁰ To maximize this effect, the sounds selected were short in duration, possessing dynamic qualities, often with quick *ascending* and *descending* motions (0’02 – 0’06) and *pushed* or *flung*-like characteristics, loaded with energy (0’36 – 0’40). The desired result was similar to the visual effect of dominos tumbling successively onto one another. A visual representation of *pressured* behaviour (Figure 21) presents sound-to-sound contact in a chain of activity. The opening material in *Vista Points* (0 – 1’28) demonstrates

⁴⁰ Denis Smalley, ‘Spectromorphology: explaining sound-shapes’, *Organised Sound*, Vol. 2(2), 1997, 111.

pressured behaviour containing approximately 28 causally linked gestures in a relatively short time frame.

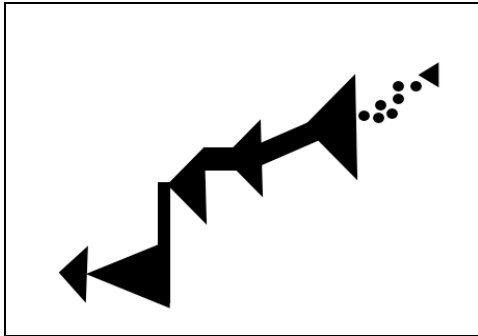


Figure 21. *Pressured* behaviour and sound-to-sound contact

***Voluntary* behaviours**

A sound exhibiting *voluntary* behaviour requires horizontal distance from neighbouring events. These *behaviours* require no *onset* preparation, since preparation from a preceding force implies *causality*. This also results in spectral isolation (where an event is surrounded by a silence), creating a perceptively heightened sense of expectation, and uncertainty concerning the entry of subsequent events. A fine line was discovered between the construction of *voluntary* events and events lacking in function or direction. Too much horizontal separation led to disconnection or flow breakdown. The lack of propagation energy, responsible for linking sounds in the *pressured* chain, can result in less perceptual engagement with the sound material. As listeners we engage in a process of detection, seeking to understand how a sound is caused and how it relates to surrounding materials. If we cannot detect how a sound has been instigated it may appear spontaneous and unprepared. This *behaviour* type is a powerful tool, useful in conjuring a sense of surprise within the music. An event placed after a silence can increase its effectiveness. A brief pause before the *voluntary* event at 5'34 enhances the event's spontaneity. Fragmented interjections of glitch-like material between 8'18 – 8'39 presents a variation on this idea of constructing surprise. Each glitch sound was constructed as a miniature spectral isolation. Their recurrence, separated with increasing lengths of silence, culminate in an explosive event at 8'40, providing a

termination for the fragmented glitch material. This unexpected entry, following a silence, provides a sense of surprise. Figure 22 presents a visual representation of *voluntary* behaviour where events are surrounded with silence, arranged without *onset* preparation.



Figure 22: *Voluntary behaviour*

The challenge of creating convincing *voluntary* events was unexpected. My portfolio works were largely developed with a concentration upon *causal* relationships and a preference for triggered gestures, making this departure difficult. In response to this challenge I constructed *voluntary* events using long decays that *overlapped* with unprepared events that appeared impulsive (1'47 – 4'32). Although silences do not isolate these events linearly, the difference in vertical strata occupancy (*root* and *canopy*) in *spectral space* allowed for the perception of spontaneity. This consideration is demonstrated between 3'16 – 3'42 where the first event encroaches upon the second's space, yet the (second) *voluntary* event appears unprepared (Figure 23).

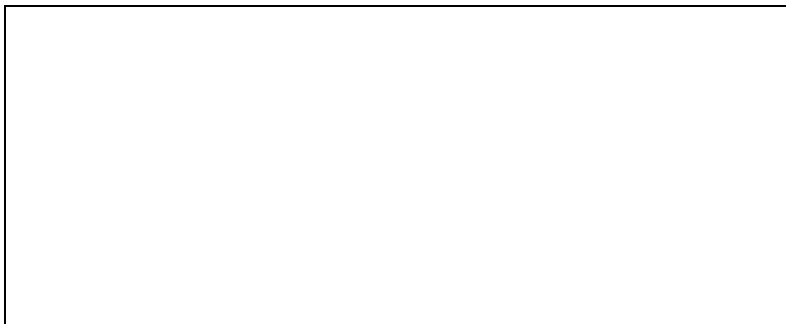


Figure 23. *Voluntary behaviour without silence*

Motion coordination

Causality from *pressured* behaviour was enhanced through the consideration of *vertical synchronisation* (word-set, Figure 20). This feature (typical of all my works) was intentional. It is realised through stacking and alignment of materials vertically (in the Pro Tools environment) with precise synchronicity. This created linearly clean lines and variation in the spectrum (*root*, *centre* and *canopy*), with multiple stacked soundfiles contributing to the overall perception of a single sound.

Pace was also revealed to be a product of composing *behaviours*. Choosing where to position sounds, and their rate of occurrence within a given time frame, determined how pace evolved. The string of *pressured* events occurring at the start of the work is an example of fast-paced music with compact and compressed events. Conversely, *voluntary* events required a substantial amount of distance surrounding their position, and thus pace decreases at the rate at which we hear events within a given time frame.

Instrumental integration

Unprocessed electric guitar material is evident throughout the piece so as to retain the identity of the source instrument and the timbral quality of the instrument's sound. This composition, in many respects, was a collaborative effort between guitarist, Carlos Charles Lopez and myself. The collaboration was conducted remotely, with file sending and communications executed over the internet to overcome geographical distance between the UK and Mexico.

Requests detailing the materials that I required drew upon the descriptive vocabulary of spectromorphology. For example, *attack*, *sustained*, *ascent*, *fly*, *erratic* and *turbulence* were used to guide the performer to produce materials suitable for my composition. Many sounds obtained from the recording sessions, informed by the spectromorphological descriptions, were gestural. They immediately suggested functionality and inspired the transformations and timbral interactions heard within

the work. The pitch content was malleable and the subsequent transformations accordingly yielded sounds with complex harmonic detail. Electronic glitch noise, distortion and screeching drones were also incorporated (6'02 – 6'17).

The integration of raw gestures with more abstract transformed materials was directed by the strong inherent physicality of the guitar sounds. The bold, unprocessed sounds embedded themselves into the accompanying materials with relative ease. One explanation for this may have been due to the single sound source used for the entire composition as a device for creating unity. The first gesture of the piece demonstrates this integration where an unprocessed electric guitar *onset* gesture triggers an explosion of sound at 0'02. Integration of the raw material occurred frequently. Embedding raw materials as gestural templates with close shadowing and arrangements of more abstract material influenced the title of this work, since these carefully aligned points of electric guitar and processed material reveal cohesion, analogous to the vista points positioned at intervals along a roadside to provide impressive views of the otherwise hidden landscape.

Format: 8-channel, acousmatic

The final work of the portfolio, *Karita oto* makes use of traditional Japanese instrument recordings. Its construction aimed to consolidate all of the established strategies developed from spectromorphological vocabulary. By this point in the research, successful vocabulary had been isolated and refined. I had developed fluency and familiarity in employing these 'tried and tested' compositional aids. The vocabulary of *spatiomorphology* was additional vocabulary drawn upon to discover its impact on spatial distribution and trajectories applied with a multi-channel format.

Sound materials

My research into cultural incorporations, specifically Latin American influences in *Cajon!* and *Dance Machine*, provided the impetus for *Karita oto*, integrating sounds from an entirely different culture, one that I was not personally linked to in terms of my family origins. Sound recordings made in Tokyo, Japan, enabled me to capture sounds from traditional Japanese instruments. Some sounds originated from the Instrument Museum at Kunitachi College of Music, containing rare and ancient instrument specimens. Other materials were collected from recording sessions conducted at Kunitachi College of Music of student performances on traditional instruments.

These emblematic instrumental sounds from Japanese culture included the koto, shamisen, shinobue, kotsuzumi, shime daiko and taiko drums, presenting 'exotic' sounds (for the non-Japanese listener), deeply established within Japanese history. My aim was to remove these sounds from their natural context and subject them to compositional and transformational processes as used within my previous portfolio works, to form a hybridisation of vocabulary-informed strategies and cultural borrowings.

The high percentage of instrumental sound left unprocessed within the finished composition impacted upon the perceived identity of these sounds (8'02 taiko drumming and shamisen, 13'12), achieving a similar result as in *Vista Points*. In many places relatively 'light' sound transformations maintained the nature and origin of the materials, including transposition (for example, the transposed koto 0'20, 4'00). The sound selection process was based significantly upon the appealing sonic qualities, and not exclusively upon the cultural significance or function the sounds possessed in their original setting. Their inherent exoticism was another reason guiding my decision of using little processing, and I was eager to display these sonic 'souvenirs' as they were. Contrary to this, imitating stylistic aspects of the instrument's original and traditional context was not a consideration of mine in this instance.

Chosen instrumental sounds were, on the whole, short in duration. These sounds provided suitable building blocks for sound unit creation at the start of the compositional process. Percussive strikes provided ideal *onset* material and triggered explosions of activity. Often, sound units were crafted entirely from unprocessed instrumental sound (for example, 3'20). *Morphological stringing* again accounted for the piecing together of materials throughout the work. The final section of the piece displays a highly energetic and *pressured* example of this technique (13'01 – 14'50).

In addition to the prevalent use of percussive strikes and rhythmic content, preference was given to pitched materials and harmonic detail to help define the character of separate areas of the work. For example, an *iterative* koto drone supplies the harmonic backbone between 0'30 – 2'01. Brass bell bowls, whistles and organ drones contributed further pitched materials throughout the piece. During the recording session I was particularly drawn to the sound produced by scraping the skin of a taiko drum with various types of stick (metal/wooden). Asking the performer to draw *broad* circular movements across the skin provided ideal movements later to be mapped over to the 8-channel surround format, creating

dramatic sweeps in wide semi-circles. A closely placed microphone capturing this sound magnified the intensity of timbral detail, rendering the sound almost unrecognisable. Its rich and low frequency content appealed to me, exhibiting a similar quality to the paper folds and scores used in *Origami*. Trajectories made from these stick movements were often resolved by explosions of gestural eruption (for example, 1'16, 1'28, 2'15, and 7'31). After establishing this repeated behaviour, I played with the expectation of subsequent occurrences, leaving some stick movements unresolved (for example, 5'00). The sound of metal studs, holding the skin taught against the drum was also captured from this instrument. Circling these studs with sticks provided *iterative* and *continuous* lines that inherently expressed *rotational* motion (for example 11'17 – 13'01). A further unconventional, yet attractive means of sound making was from the kotsuzumi. This percussion instrument, bound together by rope, was held taught and then slackened to control pitch variation. Extreme contraction of this rope squeezed the components of the instrument, creating subtle crackling snaps of friction (audible from 5'25 – 5'40) without the instrument being struck. This material functioned connectively, providing a minimal layer of reduced activity, in contrast to the more active surrounding materials.

Rhythm was incorporated in *Karita oto*, as in *Cajón!* and *Dance Machine*. Greater extended periods of rhythm featured between 6'49 – 11'13 where collective taiko drumming forms a *distal*⁴¹ layer, existing behind more foreground activity. Although the rhythmic patterns occur for longer, they are not wholly continuous since breaks interrupt at several points (including 7'13, 7'38 and 7'53). A larger shift at 8'12 abandons rhythm entirely, marking an arrival at a more tranquil passage. This section is particularly significant, due to its relatively lengthy duration of sustained low activity material. Japanese organ and bell resonances were stretched and transposed to form long *planes* of sound, informed by ideas established in *Dance*

⁴¹ Denis Smalley, 'Space-form and the acousmatic image', *Organised Sound*, 12(1), 55, 2007.

Machine regarding large-scale works and the requirement of reduced activity in passages to achieve balance within the overall form.

Spatiomorphological vocabulary

Guiding the work's evolution was the intension to create a multi-channel work so I was eager to make use of unexplored vocabulary associated with 'spatiomorphology' to discover its impact on informing distribution style across a multi-channel format. (Figures 24 – 26)

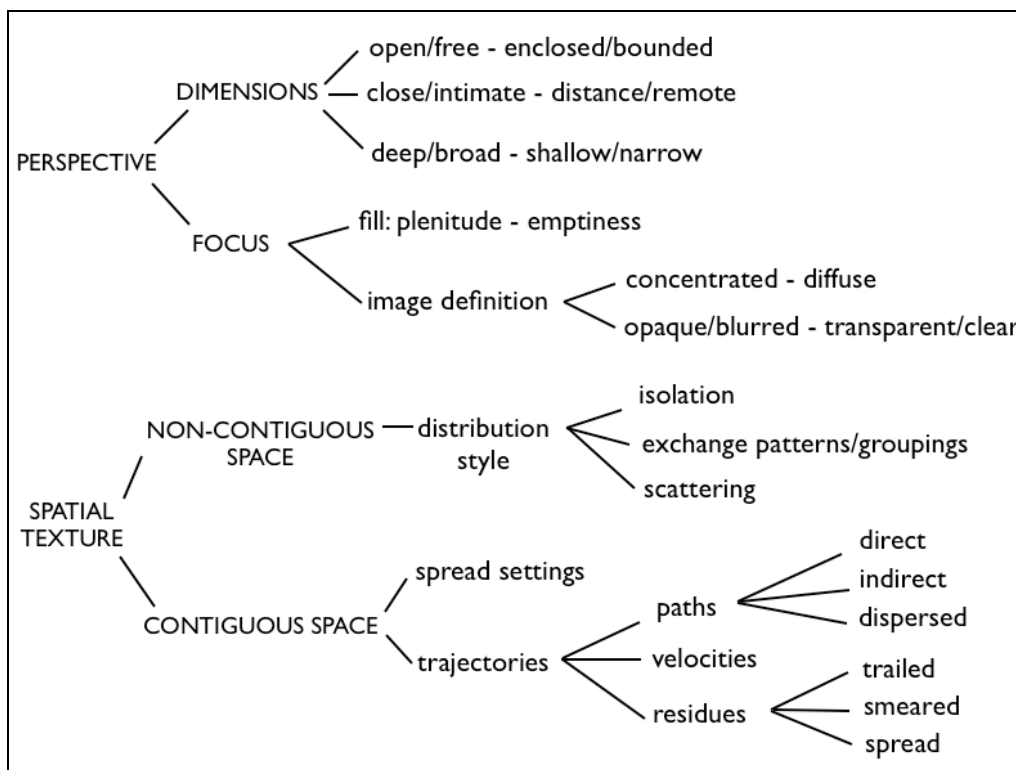


Figure 24. *External Space*⁴²

⁴² Denis Smalley, 'Spectromorphology: explaining sound-shapes', *Organised Sound*, 2(2), 1997, 123.

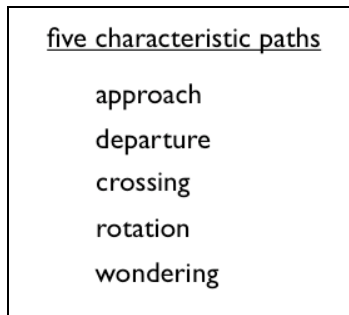


Figure 25. *Five characteristic paths*⁴³

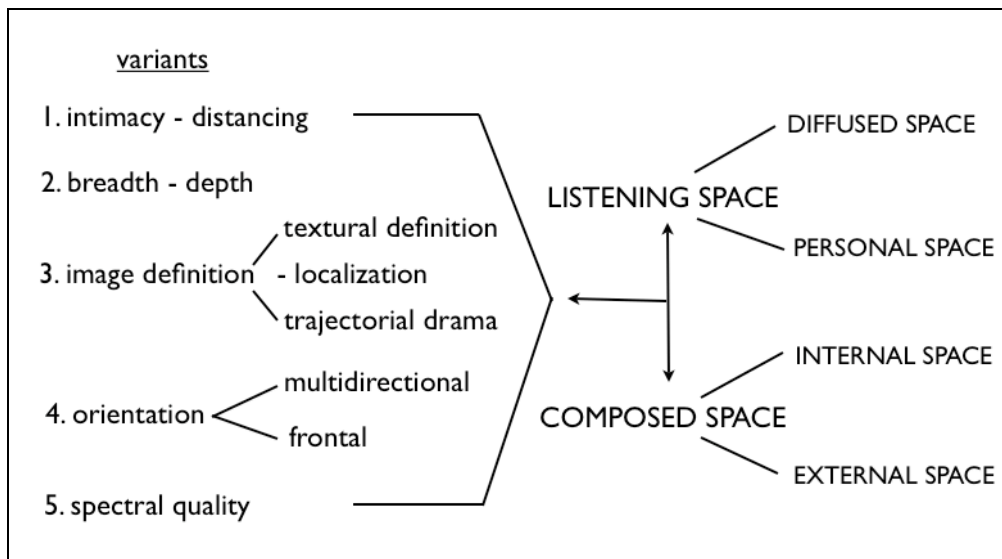


Figure 26: *Listening and composed space*⁴⁴

Performance space

Although composed as a concert piece, *Karita oto* is more suited to an intimate performance space, with a closer loudspeaker proximity, forming a more compact and cohesive listening environment. This is due to the distribution of linked materials across the loudspeakers – detailed sound unit components are shared across the multi-channel format (Figure 27). In the stereo mix (Music Appendix 2) sound material interactions rely on their close positioning in terms of *spectral space*.

⁴³ Denis Smalley, 'Spectromorphology: explaining sound-shapes', *Organised Sound*, Vol. 2(2), 1997, 123.

⁴⁴ Ibid.

Discrete placement of these sound material interactions in the multi-channel format across loudspeakers in a larger space impacts upon their functionality, as the fine detail and sculpted interplay of materials is less effective. The increased distance between loudspeakers and the size and acoustics of the space contributes to this. This is perhaps a trade-off from working in stereo first, and a common issue to consider when working in multi-channel formats.

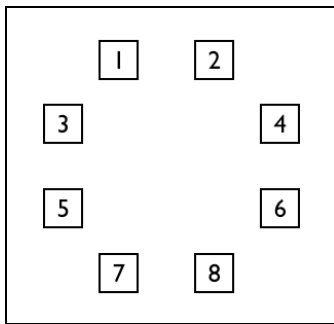


Figure 27. Eight-channel mapping

Multi-channel distribution

With this piece, my consideration for space expanded to accommodate lateral perspectives and the possibilities particular to multi-channel composition. Because *Karita oto* was initially composed in stereo, the stereo image is still evident in the 8-channel format. Several strategies aided distribution when materials transitioned from stereo to multi-channel using the vocabulary of *spectral space* and spatiomorphology. On several occasions, materials were divided into ‘zones’ in the 8-channel mix, facilitated by the idea of *spectral space* strata (*root, centre and canopy*). Tipping this frame laterally orientated lower frequencies and *rooted* materials behind the listener to loudspeakers 7 and 8. Loudspeakers 5 and 6 projected more *central*-based materials, while loudspeakers 1 and 2 displayed higher-pitched *canopy* materials (Figure 28). The section between 3’59 – 6’48 is loosely modeled around this concept for distribution.

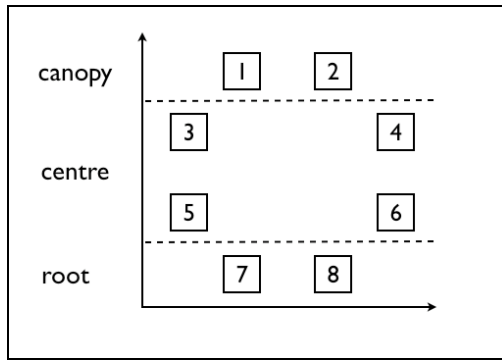


Figure 28. *Spectral space* strata distribution strategy

Localising materials in this way accentuates the perception of greater *depth* and *distancing*, while confining sounds to particular loudspeakers or areas enables materials to be spread apart. This lateral spread also creates opportunities for delicate interaction, as opposed to intensive and more immersive distribution where all loudspeakers project the same sound simultaneously. Immersive distribution was reserved for punctuating more climactic moments, for example the unison *taiko* drumming at 7'47.

Materials already exhibiting strong directional pathways, dictated their distribution across the loudspeakers. Drum *accelerandos* and *ritardandos* were distributed using the five characteristic paths (Figure 25) where their original stereo positioning was abandoned. Between 7'43 – 7'47 a stick *accelerando* is distributed in an anticlockwise *rotation*. Other percussive *crescendos* lent themselves to scattering techniques, randomly dispersing in the space (such as the single drum *ritardando* between 1'37 – 1'47).

This first foray with spactiomorphology uncovered a wealth of distribution strategies when working in a multi-channel format. Although it is possible to utilise this vocabulary for trajectory positioning in stereo works, their effect is aurally amplified in multi-channel formats.

Appropriation

Use of these culturally linked sounds did not involve stylistic imitation of traditional Japanese music; therefore the appropriation occurring in *Karita oto* can be viewed as a unique approach to working with those particular sounds. As an outsider⁴⁵ to this culture, I re-contextualised sounds and subjected them to my own creative impulses.

Cross-cultural borrowing is a sensitive subject to negotiate. In creating this work I aimed to explore, provoke and ignite thought and discussion on the act of borrowing. Previous reception of my work *Origami* in Japan had incited the creation of *Karita oto* as only positive responses were gained for this previous concept of borrowing: my work was viewed as an attempt to understand a foreign culture more fully.

⁴⁵ James O. Young, *Cultural Appropriation and the Arts*, Malden, 2008, 5.

Chapter 9. Conclusion

The descriptive tool of spectromorphology applied to compositional practice has successfully informed sound material choice and creation in my portfolio.

Innovating upon spectromorphology's analytical and descriptive function, my research has taken an exciting and novel compositional approach, inspiring methodological strategies and visual representations of potential benefit to others when selecting and creating sound for acousmatic music. The accessibility of the vocabulary, with the majority found within our everyday language, is an underlying advantage of this new application. This has also appealed to my own subjective and creative intentions and word interpretations.

My preference for gestural activity is due to its close link with, and allusion to, physicality, often suggestive, but not exclusively so, of human presence. This preference informed the exploration and adoption of useful vocabulary over the course of the research, as not all vocabulary from Smalley's spectromorphology was utilised. An inclination for certain sound material activity (for example, *causality*, *pressured* events and gestural trajectories) determines the strategies that develop in composition. Others choosing to implement this method may create and adopt alternative vocabulary to suit their own aesthetic approach and impulses.

My foray with spatiomorphology opens up a further area for future exploration beyond the scope of this PhD. A diffusion practice based upon spatiomorphology involving enacted performance presents an attractive prospect and an area that may benefit from Smalley's extended vocabulary glossary from '*space-form*'⁴⁶.

The construction of acousmatic music has, and will continue to be, my springboard into creating other musics. These include interactive mixed works (*Cajón!*),

⁴⁶ Denis Smalley, 'Space-form and the acousmatic image', *Organised Sound*, 12(1), 2007.

installation work (*Bird Movements*⁴⁷ for Messiaen's centenary, Music Appendix 4) and live laptop improvisations (*Splice Girls*⁴⁸ improvisation duo, Music Appendix 5), widening my artistic horizons as a composer. These acousmatic beginnings will form the basis for future works and further collaborative partnerships beyond the PhD.

A final remark reiterates and reflects upon the significant stages of material selection and sound transformations within my compositional process for capturing and nurturing sonic properties and timbral qualities. A sound's inherent features are of great importance, more so than whether the sound is culturally tied or more culturally neutral. Of the variety of sounds and cultural incorporations within my portfolio works, each was chosen on the basis of its appealing sonic detail and potential for integration within a larger overall form. As a composer of electroacoustic music I have had "an acoustic palette as wide as that of the environment itself"⁴⁹ at my disposal, and with my portfolio works I have attempted to expand this palette to a more global scale, reaching beyond my own immediate cultural experience.

⁴⁷ *Bird Movements* consists of miniature compositions automated within an installation environment at sounding at specific times of the day. This work was commissioned by the Royal Northern College of Music for Messiaen's centenary in 2008.

⁴⁸ Manuella Blackburn and Diana Simpson form the *Splice Girls* live laptop improvisation duo. They have worked collaboratively since 2006 making use of short soundfiles derived from their PhD portfolio works to rework their context.

⁴⁹ Simon Emmerson, Relation of Language to Materials. In Simon Emmerson, ed. *The Language of Electroacoustic Music*, London, 1986, 18.

Appendix 1. Programme notes and performances

Kitchen Alchemy

While composing this piece, I began to think of the analogy of alchemy and its applicability to the compositional process of acousmatic music. I wanted to create something seemingly precious and elaborate that showed no similarity to the ordinary source sounds of kitchen utensils and appliances.

A key feature of this piece is its use of a compositional tool developed from Denis Smalley's *spectromorphological* language, with the aim of creating structural processes and phrases within the work. Specifically in this piece there is a focus on structures created from a variety of *onset*, *continuant* and *termination* vocabulary combinations. Experimentation with this vocabulary informed the creation of small units that developed into phrases, and eventually into larger scale structures growing outwards, connecting to each other.

Performances

- 4th December 2009, Silence, Beauty and Horror Festival, The Electronic Arts and Music Festival, Harold Golen Gallery, Miami, USA.
- 1st October 2009, Washington Project for the Arts, The Philips Collection, Washington, USA.
- 22nd August 2009, Radio Broadcast, Scordatura, 91.7 KTRU, Houston, USA.
- 18th February 2009, Sonic Arts Research Centre, (SARC) Belfast, Ireland.
- 16th February 2009, SINKRO festival, Vitoria-Gasteiz, Spain.
- 6th February 2009, Sonic Spatial Perspectives, Beast diffusion system, Leeds Metropolitan University, UK.
- 7th & 15th December, Ohrenhoch, der Geräuschluden sound gallery, Berlin, Germany.
- 18th November 2008, International Electroacoustic Music Festival of the Conservatory of Santa Cecilia, Rome, Italy.
- 9th November 2008, Seoul International Computer Music Festival, Jayu Theatre, Seoul Arts Centre, Seoul, Korea.
- 24th August 2008, International Computer Music Conference (ICMC), Sonic Arts Research Centre, Queens University, Belfast, Ireland.
- 9th March 2008, Santa Fe International Festival of Electroacoustic Music, radio broadcast, KUNM 89.9 FM, New Mexico USA.
- 8th February 2008, Petit Théâtre Mercelis, Brussels, Belgium.
- 1st February 2008, Soundings festival, The Reid Concert Hall, The University of Edinburgh, UK.
- 23rd November 2007, Digital Arts Award Ceremony. Academyhills, Roppongi, Tokyo, Japan
- 18th October 2007, Technical University of Berlin, MANTIS composers concert, Berlin, Germany.
- 28th August 2007, SESC-Ipiranga Theatre, CIMESEP finalist's concert, São Paulo, Brazil.

- 25th July 2007, Atlantic Center for the Arts (ACA), Florida, USA.
- 23rd July 2007, ARTRADIO broadcast, Cornerhouse, Manchester, UK.
- 20th July 2007, MANTIS composers concert, presentation, Bangkok, Thailand.
- 6th April 2007, Centro Cultural de España, Costa Rica.
- 11th March 2007, MANTIS South/North concert, The University of Manchester, UK.

Awards

Digital Arts Award, Grand Prize for Digital Music, Tokyo, Japan, 2007.

Kraft Media Prize, Finalist, Washington Project for the Arts, USA, 2009.

Concurso Internacional de Música Eletroacústica de São Paulo (CIMESP), São Paulo, Brazil, Finalist and Honorary Mention, 2007.

Origami

1. The Fortune Teller
2. The Crane
3. The Dragonfly
4. The Goldfish
5. The Leaf

Origami is a set of five miniatures and my second work to make use of a compositional tool developed from Denis Smalley's *spectromorphological* language, this time specifically focusing on different types of motions. Experimentation with this vocabulary informed the creation of directional, reciprocal and cyclic motions that the origami structural shapes initially inspired.

Origami is the art of economy - a few simple folds can suggest an animal or shape and with slight modifications an entirely different creation can appear.

- 28th November 2008, Kitazawa Town Hall, Shimokitazawa, Japan.
- 27th September 2008, A Diamond in the Mud Soundscape & Hoerspiel exhibition, Basel, Switzerland.
- 1st August 2008, Sound and Music Conference (SMC) Berlin.
- 17th July 2008, Submerged songs installation created by Vivian Caccuri, Itau Cultural Centre, Brazil.
- 19th April 2008, Digital Media Festival 1.0, Valencia, Spain.
- 29th February 2008, Lancaster University, LICA-MANTIS Electroacoustic Music Festival, Lancaster, UK
- 15th February 2008, Stockholm, Institute of Electroacoustic Music in Stockholm, Sweden.
- 26th November 2007, CMMAS, Zamora extension concert, Mexico.
- 4th November 2007, NOVARS Launch, Cosmo Rodewald Concert Hall, The University of Manchester, UK.

Cajón!

I. Explosive II. Rumba III. Reflective

Cajón! makes use of sound recordings of the percussion instrument of the same title. Due to the top edges of the front panel being unfixed, this box-like percussion instrument produces a rich variety of sounds. This piece is structured in three sections exploring rhythmic material and timbres of the cajón.

A clapping technique known as ‘palmas’ in flamenco music is used alongside the cajón sound material to set up contrasting rhythmic patterns. In addition to these sounds, glitch and noise-based materials provide a backdrop to the activity of the gestural events.

This piece was composed at the Miso Music Lab for Electroacoustic Creation (LEC), Portugal during April 2008 and completed at the NOVARS Research Centre, The University of Manchester.

Thanks go Miguel and Paula Azguime for this commission and also to Kevin Sharyk for provided the cajón sounds used in this work.

Performances

- 1st November 2009, (Live) Nexus Art Café, Manchester, UK.
- 24th September 2009 Soundings Concert, St. Munchin’s Church, Tweak Festival, Limerick, Ireland.
- 2nd July 2009, Sixth Biennial International Conference on Music Since 1900 conference, (ICMSN) Keele, UK.
- 12th May 2009, City University, London, UK.
- 7th May 2009, Sound, Sight, Space and Play conference (SSSP), De Montfort University, Leicester, UK.
- 6th May 2009 (live version) Percussion recital (Toby Kearney) Royal Northern College of Music (RNCM), Manchester, UK.
- 21st March 2009, 8th Annual International Women’s Electroacoustic Listening Room Project (WEALR09), Fullerton, USA.
- 9th March 2009, (live version), Cosmo Rodewald Concert Hall, The University of Manchester, UK.
- 8th December 2008, Finalists Concert, CEMVA International Electroacoustic Music Contest, Teatro Marista Mestrinho, Varginha, Minas Gerais, Brazil.
- 5th November 2008, Visiones Sonoras Festival, Morelia, Mexico.
- 25th October, Dublin Electronic Arts Festival, Centre for Computational Musicology and Computer Music, Dublin, Ireland.
- 19th October 2008, Ai-Maako VII International Electroacoustic Music Festival, Santiago, Chile.
- 23rd September 2008, Musica Viva Festival, Cultural Centre of Belem, Lisbon, Portugal.

Awards

Visiones Sonoras Electroacoustic Music competition, Honorary Mention, CMMAS, Morelia, Mexico, 2008.

Diffusion Prize, Centre for Computational Musicology and Computer Music, University of Limerick, Ireland, 3rd Prize, 2008.

II Competition for Electroacoustic composition (CEMVA), Brazil, Finalist, 2008

Spectral Spaces

In *Spectral Spaces* there are four texture-based sections. These sections focus on passages of *concentration*, *crossover*, *overlap* and *interstices* which all belong to Smalley's *qualifiers of spectral space* vocabulary, outlined in his theory of spectromorphology. Thematic materials and their occupancy in spectral space are the focuses of this work.

All materials were derived from sound files from *Wind Chimes*, provided by Denis Smalley.

Performances

- 12th February, 2010, Cosmo Rodewald Concert Hall, The University of Manchester, UK

Dance Machine

Dance Machine is a large-scale work that focuses on rhythmic patterns associated with several Latin American dance forms. The presentation of this rhythmic material is not always conventional, often broken into momentary fragments and obscured by layers of activity. Sometimes these rhythms are constructed from found sounds alone.

The idea of a virtual jukebox and the process of selecting music after inserting money was a useful concept in structuring the work. This was also a useful device allowing many changes in direction and pace of the musical content.

Performances

- 9th October 2009, Ai-Maako VIII International Electroacoustic Music Festival, Santiago, Chile.
- 12th February 2009, MANTIS Matinée, The University of Manchester, UK.

Vista Points

All materials used in *Vista Points* are derived from electric guitar sounds. Often the electric guitar sounds are left raw and then layered with processed materials. When these sounds interact, there are points of *causality*, *conflict* and *turbulence*.

This work explores the effect of varying the distance between sonic events. When constructing the piece, contrasts between pressured and voluntary behaviours became a primary focus with the aim of achieving moments of activity and emptiness.

The work was awarded First Prize at the 10th Musica Viva Electroacoustic Music Competition in Lisbon, September 2009.

Thanks go to Carlos Charles Lopez for providing the electric guitar sounds for this project.

Performances

- 13th March 2010, 9th Annual International Women's Electroacoustic Listening Room Project, Fullerton, USA.
- 14th December 2009, Echochroma V Concert Series, Leeds Metropolitan University, UK
- 31st October 2009, Harvard University, Boston, USA.
- 30th October 2009, Cosmo Rodewald Concert Hall, Mantis Festival, The University of Manchester, UK
- 3rd October 2009, Sound Crawl Festival, Nashville, USA.
- 24th September 2009, Soundings Concert, St.Munchin's Church, Tweak Festival, Limerick, Ireland.
- 20th September 2009, 10th Musica Viva 2009 festival, Lisbon, Portugal.
- 8th August 2009, Orford Arts Centre, Montreal, Canada.

Awards

10th Musica Viva Electroacoustic Music Competition, 1st Prize, Lisbon, Portugal, 2009.

Karita oto

All sound materials used in *Karita oto* were recorded on a field trip to Tokyo, Japan in November 2008. These sounds all have an instrumental origin, many of which are considered to be traditional and typical of Japanese heritage and culture. Amongst these, there are sounds recorded of ancient and rare instrument specimens contained within the Kunitachi College of Music Museum archive.

Karita oto is a multi-channel work bringing together concepts of cultural borrowing and compositional strategies developed from Denis Smalley's spectromorphology. Five characteristic paths, belonging to Smalley's theoretical writing, inform the spatialization of this piece. In particular the words *approach*, *departure*, *crossing*, *rotation* and *wondering* were useful in informing the trajectories, placement and organization of materials, while the episodic form was inspired by the extremes Japan has to offer from the dense activity of the city co-existent with the tranquility of the Zen meditation gardens.

Many thanks go to Shintaro Imai, Takayuki Rai and the Shindo family in Kichijoji for all their help in planning and making this project possible. Thanks also go to Kinjiro Amano for his translation.

- 17th December 2009, demonstration session for KREA, NOVARS Research Centre, The University of Manchester, UK.
- 27th November 2009, Cosmo Rodewald Concert Hall, The University of Manchester, UK.

Appendix 2. Origami shapes

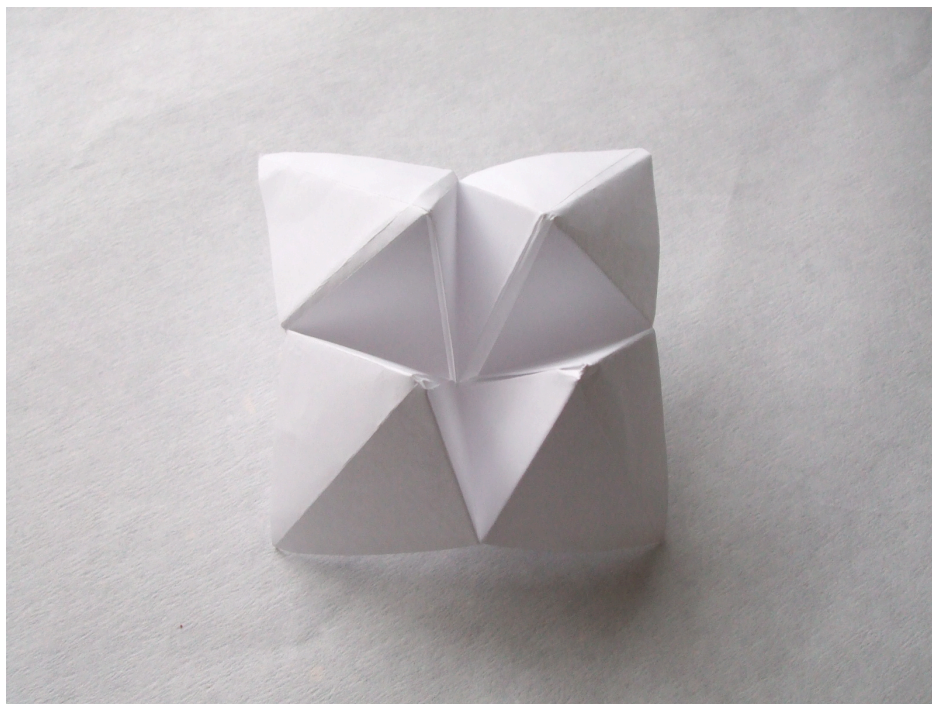


Figure 29. The fortune teller



Figure 30. The crane



Figure 31. The dragonfly⁵⁰

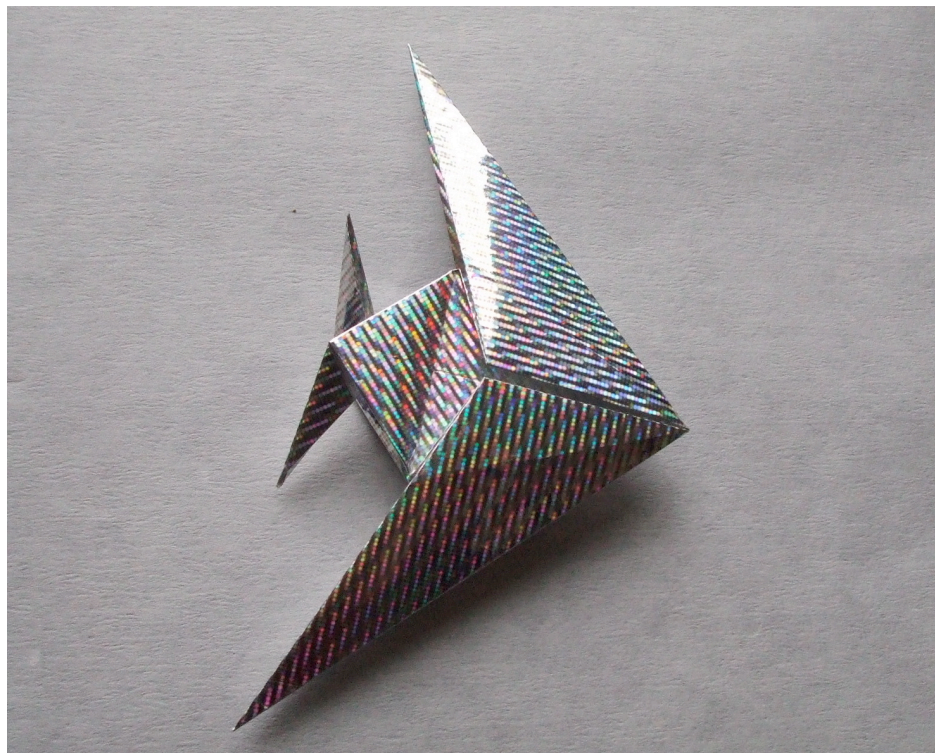


Figure 32. The goldfish

⁵⁰ Origami artist, Daniel Zajicek created the dragonfly, goldfish and leaf shapes for this project.

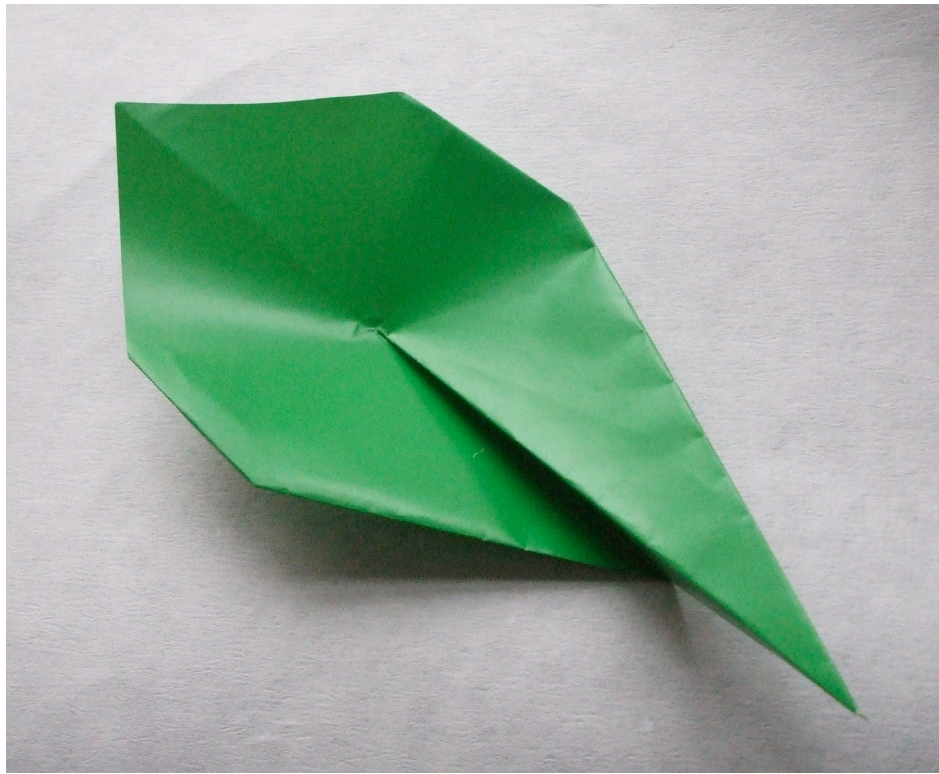
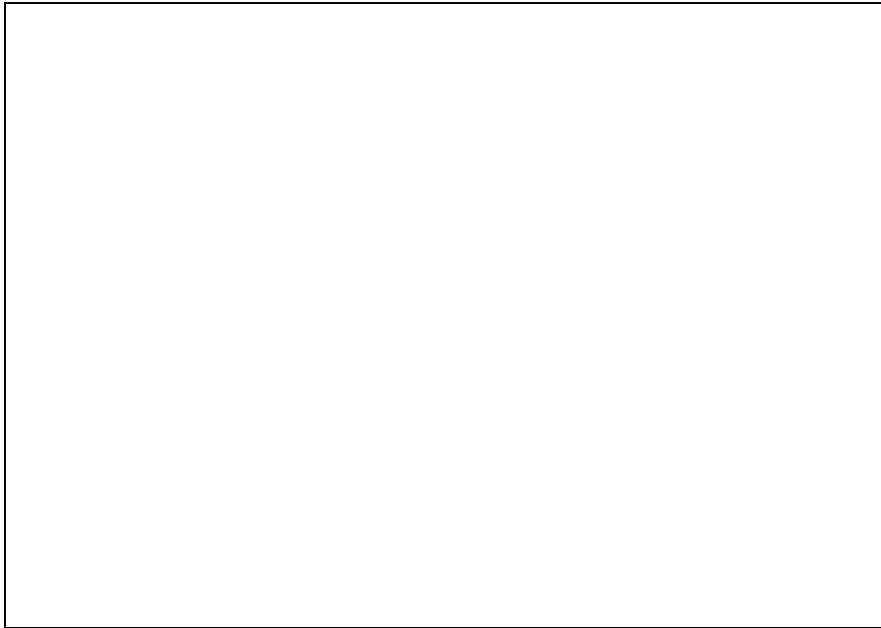


Figure 33. The leaf

Appendix 3. Pedagogy

The functionality of vocabulary has not been confined to my own use since the strategies have been successfully integrated into a pedagogical tool for undergraduates at the University of Manchester. Introducing spectromorphology as a means of sound material creation is a practice comparable to offering pitch-set theory or Schenkerian analysis to composition students as methodologies to begin a composition. This application has been implemented for two consecutive years, yielding positive results⁵¹. Composition students unfamiliar with electroacoustic music are presented with a collection of sounds, categorized as starts, middles, and ends (*onsets*, *continuants* and *terminations*). Figure 34 presents a visualisation of the sounds provided. By following a method based upon fundamental vocabulary, students develop a strong awareness of sound function due to the categorisations presented to them. Building their own ‘sound units’ using only the sounds provided to them achieves a greater sensitivity for sound positioning and starting points for creativity (Figures 35).



⁵¹ Manuella Blackburn, Composing from spectromorphological vocabulary: proposed application, pedagogy and metadata, online resource, <http://www.ems-network.org/ems09/proceedings.html> 2009.

Figure 34. Starts (*onsets*), middles (*continuants*) and ends (*terminations*)

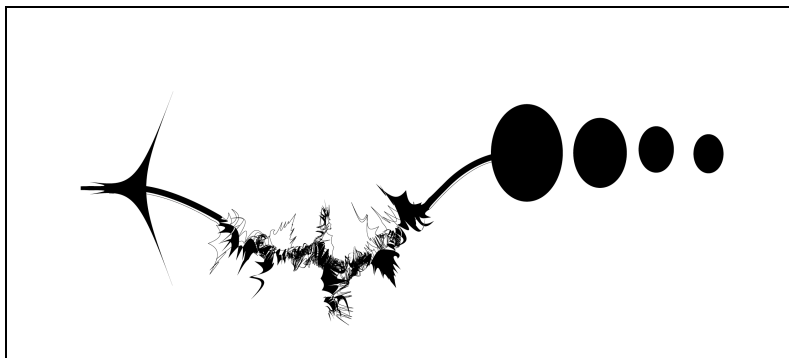


Figure 35. Pedagogy sound unit

Future advancements of this pedagogical tool will introduce other spectromorphological vocabulary to aid decision-making in composition for all ability levels.

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