

FOLIO OF COMPOSITIONS

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Abstract

This folio presents eight works, composed between 2007 and 2013. The works represent the outcomes of my research which has focussed on the development of compositional approaches that bring together techniques and materials from different areas of musical practice, including electroacoustic music and electronic dance music.

All of the pieces use algorithmic compositional techniques to some degree. A visual component is important in four of the pieces. *The Bridge* is a film soundtrack, *8 Switches*, *Algorithms for Electronics Fake Woodwind and Strings* and *Bastard Structures 2* are audio-visual works. In two of the pieces, *Some Trees* and *Untitled (Two Pieces for Surround)*, 5.1 surround sound is used as a compositional element.

The commentary serves to give background information, placing the work in context with other work in the field and to explain the compositional approaches that have been taken.

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Declaration

All of the compositions presented in this folio are entirely my own work, with the following exceptions. *The Sick Rose* and *Bastard Structures 2* were produced in collaboration with Monika Načeva and Theo Burt respectively, details of the nature of the collaboration are clearly set out in the text. *Feet of Courage* and *Some Trees* use vocal recordings made by Nancy Elizabeth and John Ashbery. The text is original and has not been presented before.

1. Introduction

This folio consists of eight pieces of work which I completed between 2007 and 2013. The work is presented in three formats: stereo audio, surround audio (5.1) and video files with stereo audio. Two of the pieces, *The Sick Rose* and *Bastard Structures 2* involved significant collaboration with other artists, Monika Načeva and Theo Burt respectively.

The research I have undertaken has been practice based, the outcomes of the research are embodied in the recordings and scores in the folio. This document functions as an accompaniment to that work and gives background and additional information to outline the aims and creative strategies of my research, to clearly define my role in the collaborative pieces and to place my work in a wider context.

2. Background

In the first part of this section I am going to give an overview of how my personal experience of four areas of musical practice have been important in establishing a context for my current work as a composer.

In 1982, at the age of twelve, I was taken to a concert by BEAST (the Birmingham ElectroAcoustic Sound Theatre) at the Barber Institute in the University of Birmingham. Up to that point my exposure to music had been a typical mix of school music lessons, BBC Radio 1 and my parents' record collection (small but including some classics of the 1960s and 1970s: *Pet Sounds*¹, *Dark Side of the Moon*² and *Tubular Bells*³). Hearing electroacoustic music for the first time was a profound

1 The Beach Boys, *Pet Sounds* (Capitol Records, 1966).

2 Pink Floyd, *Dark Side of The Moon* (EMI Records, 1973).

3 Mike Oldfield, *Tubular Bells* (Virgin Records, 1973).

experience for me; I vividly remember the event and the way it made me feel. I had never heard *sound* presented or organised in that way before. I could hear structures which I associated with music but the material that was being organised did not appear to have anything to do with music as I knew it. (I've established since that I probably heard an early performance of *Klang*⁴ by Jonty Harrison. *Klang* begins with raw recordings of two clay jars being handled, goes through a development section where the sound is processed electronically before ending with a recapitulation of the original material.)

In the following years I grew dissatisfied with mainstream pop and found myself drawn to the darker worlds of industrial noise and anarchist punk rock. Bands like Non, Nurse With Wound, Test Department, Crass, Throbbing Gristle, Psychic TV and Coil were fascinating to me on one level because their use of extreme and often confused cultural and political symbolism⁵ suited my outlook at the time. But more importantly I was fascinated by the fact that they were putting together what I might have considered to be non-musical sounds to make music, to my ears at least. These artists were combining environmental recordings with noise, extracts of radio programs, screaming and cut-ups of other peoples' music. I also had an intense intuitive response to this music — it affected me emotionally.

These musical interests were in contrast to my formal musical education; as a violinist with the Birmingham Schools' Symphony Orchestra I played major works by composers including Elgar, Britten, Mahler, Sibelius, Shostakovich and Stravinsky. My involvement in classical acoustic music lead me to investigate

4 Jonty Harrison, *Klang*, 1982.

5 Boyd Rice of Non flirts with Nazi/fascist symbolism in his lyrics and, at the other end of the political spectrum Crass were active anarchists and committed revolutionaries.

contemporary experimental music in that tradition which had a similar emotional effect on me as the noise music. Examples of music I was listening to on my walkman at the time include Ligeti's *Atmospheres*⁶, *Eight Songs for a Mad King*⁷ by Peter Maxwell Davies, *Metastasis*⁸ by Xenakis, Alfred Schnittke's *Concerto Grosso No.1*⁹.

In 1988 I moved to Manchester University to study physics and became aware of the profound social and musical changes occurring in that city. DJs were starting to play acid house and early rave music records at illegal warehouse and squat parties, and before long in established nightclubs. It seemed as if in the space of a year, people from disparate social and ethnic backgrounds, punks, hippies, casuals, students and former football hooligans were all mixing and going to the same parties. I was incredibly excited by what I saw and heard in the dance music of that time. It seemed as if dancers were responding directly to *sound* being manipulated, to the physicality of sound, to abstract timbral changes. The most discussed example is the Roland TB303 Bass Line that provided the signature 'acid' sound, subtle modulations of envelope, filter resonance and cut-off were enough to keep dancers going for hours. An example of a track I was aware of at the time is Phuture's *Acid Tracks*¹⁰ released in 1987. The other striking feature of the early acid house scene is that the music was faceless and functional. In an almost Pythagorean

6 György Ligeti, *Atmosphères*, 1961.

7 Peter Maxwell Davies, *Eight Songs for a Mad King*, 1969.

8 Iannis Xenakis, *Metastasis*, 1954.

9 Alfred Schnittke, *Concerto Grosso No. 1, for Two Violins, Harpsichord, Prepared Piano and Strings*, 1977.

10 Phuture, *Acid Tracks* (Trax Records, 1987).

sense¹¹ the producers were invisible, it did not matter who had made the music as long as it functioned well on the dance floor.

In 1992 I made the decision to study for a masters degree in Music Technology at the University of York. I was exposed to music which I have come to think of as traditional electroacoustic music, for example Trevor Wishart's *Vox Cycle*¹², *Pentes* by Denis Smalley¹³, *Mortuos Plango, Vivos Voco*¹⁴ by Jonathan Harvey. I had a complex, and in many ways misguided, response to this music. I had the idea that there was something fundamental about electroacoustic music, as if the use of sophisticated audio processing was revealing something absolute or universal in a Platonic sense about the source material¹⁵. I was excited by the often repeated idea that with modern technology it was possible to create any sound that could be imagined¹⁶. I was impressed by the fact the processes being used by composers were so computationally intensive that only those with access to mainframe computers in universities could use them. In a stark contrast to my experience with acid house, these assumptions were reinforced by a sense of elitism that I felt resulted from the academic aura that surrounded the music – the music only seemed to be performed in

11 In order to focus his students' minds on his teaching Pythagoras placed a veil between them and himself.

12 Trevor Wishart, *Vox Cycle* (Virgin Classics, 1990).

13 Denis Smalley, *Pentes*, 1974.

14 Jonathan Harvey, *Mortuos Plango, Vivos Voco*, 1980.

15 It took me a long time to disabuse myself of this idea, in fact the process of working on an acousmatic piece (now abandoned) in the early stages of my research was a key factor in addressing this issue.

16 An idea that I have since rejected in favour of the thinking that new sounds that one could not have imagined in the first place come about through an interaction with technology.

universities to small groups of other academics and their students.

Music technology was in an accelerated period of change throughout the 1990s. The availability of cheaper hardware synthesisers, samplers and sequencers that had been driving acid house and rave was followed by much wider access to computer-based MIDI sequencers, and then to digital audio workstations (DAWs). This contributed to the creation of a multiplicity of genres and sub-genres of electronic dance music.

As students in the early 1990s we were using the Composers Desktop Project¹⁷ on Atari ST desktop computers to run offline digital synthesis and signal processing tools that had previously only being available to composers with access to time on mainframe computers. Within a year or two of leaving York, I was using CSound¹⁸ in real time with the graphical user interface Cecilia¹⁹. I naïvely hoped that the same rapid process of democratisation and stylistic diversification that had happened in dance music might happen in the world of academic electroacoustic music.

In the fifteen years that followed I pursued a career in the music industry releasing a substantial catalogue of records, the majority of which were experimental dance oriented electronic music. The initial excitement I felt about dance music did not completely come to an end, but the optimism that accompanied my experience of participating in the early stages of the phenomenon was fairly short lived. I quickly witnessed its faceless, meritocratic nature diminish as the established music industry

17 *Composers Desktop Project* (Composers Desktop Project)

<http://www.composersdesktop.com/>.

18 Barry Vercoe, *CSound* <http://www.csounds.com>.

19 Jean Piché and Alexandre Burton, *Cecilia* <http://www.csounds.com/cecilia/>.

and press started creating the marketable stars that they needed to continue to function²⁰; certain genres and record labels became dominant to the point where in my experience more innovative approaches to music making or performance were not given the opportunity to develop.

2.1 Research Aims

In the previous section I have given an outline of my experience as a participant in different musical traditions to provide a context for my research. My research has focussed on developing compositional approaches that bring together techniques and materials from these different areas of musical practice, in the hope of creating work that is unexpected and new.

It is important to note that this not intended to be a top-down process of transcontextualisation, where stylistic devices from different genres are brought together because of (or maybe in spite of) their inherent cultural symbolism, but rather a bottom-up process of combining different compositional strategies in search of something novel.

2.2 Creative Strategies

Algorithmic and stochastic processes have been used in the composition of most of the work. This has enabled me to generate and control the behaviour of musical events by designing rule based systems without the need to individually define every event. An important outcome of this is that the output of the algorithmic process is often a surprise, a combination of events or a sequence of notes is generated that I would not have thought of composing by hand.

²⁰ David Hesmondhalgh, 'The British Dance Music Industry: A Case Study of Independent Cultural Production', *The British Journal of Sociology*, 49 (1998), 234–251.

Although these approaches to composition could be described as process based, the way the finished work actually sounds is more significant to me than the processes used. A consequence of this that I have experimented with different combinations of approaches in many of the pieces, often editing the process generated material and layering with live recordings or material created using a conventional digital audio workstation.

Only one piece, *Algorithms for Electronics, Fake Woodwind and Strings* (page 36) is purely algorithmic in the sense that the output from the process is left unaltered.

An unexpected area of creative activity that has become central to some of the pieces was the use of a visual component. I originally used dots to represent point sound sources as a visual aid, to allow me to see the organisational processes that I was experimenting with when I was unable to hear them. The strategies employed to develop the representational qualities of the visual systems have at their root this simple pragmatic necessity.

During the course of my research another consideration emerged which influenced my choice of creative strategies. A significant part of the time spent on many of the pieces in the earlier part of the folio was concerned with software development, where I was creating patches with Pure Data²¹ to implement my ideas. These patches were often very complex with many parameters, some of which were adjustable via a graphical user interface (GUI). Two issues became clear through this process.

Firstly I found that the state of mind required to build patches in Pure Data

21 Miller Puckette, *Pure Data* <http://puredata.info>

was very different from the one required to get the most rewarding results from their use.

Secondly I found that in several cases the patches had become like *instruments* in the sense that they required an investment of time to practise with, or to learn how to fully exploit the range of their capabilities. Two examples would be the patch I describe in Appendix II, the stochastic drum machine, and the synthesis part of the patch developed for *Algorithms...* (page 36).

The last two pieces in the folio, *Some Trees* and *Two Pieces for Surround* were both composed without a software development phase. I discuss the results in sections 9.4 and 10.1.

2.3 Instructions for Listening and Watching

Please copy all files to a hard drive to avoid glitching and dropped frames.

Feet of Courage (Germ remix) Stereo soundfile, can be listened to on domestic hifi.

The Bridge Video file with stereo audio. Ideally projected in quiet dark room.

8 Switches Video file with stereo audio. It is important that this is projected onto as large a screen as possible with the sound played as loud as is comfortable.

The Sick Rose Stereo soundfile, can be listened on domestic hifi.

Algorithms for Electronics, Fake Woodwind and Strings Video file with stereo audio. It is important that this is projected onto as large a screen as possible.

Bastard Structures 2 Video file with stereo audio. TV or computer monitor fine, dark room.

Untitled (Two Pieces for Surround) Multichannel 5.1 audio files. Channel order as

follows:

1 – left, 2 – right, 3 – centre, 4 – LFE, 5 – left surround, 6 – right surround. Must be played loud.

Some Trees Multichannel 5.1 audio file. Channel order the same as above.

3. Feet of Courage (Germ Remix)

Stereo soundfile

In 2009 I was asked to do a Germ²² remix of Nancy Elizabeth's song, *Feet of Courage* for The Leaf Label. I will give a brief account of the creative process of producing the remix and describe my adaptation of compositional techniques more likely to be found in experimental electroacoustic or contemporary classical music for use in the commercial domain.

3.1 Background

Nancy Elizabeth is a singer-songwriter described as 'the doyenne of the Manchester “young folk” scene'²³. I was not aware of her work prior to being asked to do the remix, but on hearing the original I was sufficiently impressed by her voice, in particular the purity of her vocal tone, that I agreed to do the remix.

A remix can have many functions. Early remixes, for example Tom Moulton's extended disco mixes in the 1970s, were a way of re-arranging material to make it more suitable for dancing for example by extending rhythmic sections²⁴. In this case I understood that the record label wanted to expand Nancy's audience by re-presenting the song in a different genre, (transforming it from 'young folk' to 'electronica') and

22 Germ is the name of an experimental electronic music project I have been working on since the early 1990s. I released two albums and a number of singles between 1994 and 1995, and since have used the name for occasional remixes if it has been appropriate stylistically.

23 Dave Simpson, 'Nancy Elizabeth', *The Guardian*, 15 March 2008, section Music <http://www.guardian.co.uk/music/2008/mar/15/popandrock.reviews> [accessed 28 March 2013].

24 Tim Lawrence, 'Disco Madness: Walter Gibbons and the Legacy of Turntablism and Remixology', *Journal of Popular Music Studies*, 20 (2008), 276–329.

by attracting an audience that might follow my work.

3.2 Creative Process

My intention was to completely replace the original musical arrangement with my own work. I wanted to compose a rhythm part that in some sense emphasised the fragility I perceived in Nancy's voice, rejecting the stiff mechanical feel of the original in favour of a fluid and constantly evolving rhythmic texture. I used an early iteration of the stochastic drum machine to program this part, using a collection of samples I had made in an earlier circuit-bending session as the first seven percussion sounds. By using a whole take of Elizabeth's vocals in the eighth sample slot and randomly specifying the playback position each time it was triggered, short clips of her vocal are treated as a rhythm part²⁵. This has a dual function, to bind the timbre of the voice with the rhythm part and to again emphasise the broken or fragile quality I perceived in her voice by actually breaking it into pieces and using the fragments to build part of the rhythm.

I also use a sequence of dissonant organ-like drones from the beginning of the track to provide a deliberately unstable, shifting tonal reference before the voice enters for the first time. This was constructed by randomly passing fragments of Nancy's voice to a phase vocoder module I had built in Pure Data and layering the output. The phase vocoder stretches these short vocal fragments into long drones.

I deliberately delay the entry of the kick drum until towards the end of Nancy's first verse. I use this approach to engineer an extended sense of suspense or anticipation, which is resolved in time for the second verse where Nancy's

²⁵ The use of short vocal clips as a rhythm part is a technique also found in UK Garage and House music.

performance becomes more strident.

3.3 Conclusions

Retrospectively I have considered two pieces of music that I was aware of around that time which may have unconsciously provided stylistic context for the remix, or at least were contemporary examples of combinations of song structure with voice and electronics. *The Light 3000* by Schnieder TM²⁶ was an unsolicited remix of a song by The Smiths, *There is a Light That Never Goes Out*²⁷, which uses a similar glitchy rhythmic device but which resists the use of a kick drum. The way in which the disjointed, unstable organ accompaniment functions in *Das Liebe* by Barbara Morgenstein²⁸ is at times reminiscent of the way in which I use the phase vocoder drones in *Feet of Courage*.

This remix was a success in the sense that it was accepted by the record label, approved by the artist and went on to receive some BBC Radio 1 airplay. More importantly for me however, it showed a potential way forward for integrating certain features of my stochastic drum machine with more conventional DAW approaches to composition. It was also a useful tool in subsequent work with Monika Načeva where it provided a starting point for the discussion of a much larger project.

26 Schnieder TM, Kpt.michi.gan, *The Light 3000* (UK: For Us, 2003).

27 The Smiths, *There Is a Light That Never Goes Out* (Rough Trade, 1986).

28 Barbara Morgenstern, *Das Liebe* (Germany: Monika Enterprise, 1998).

4. The Bridge

Film soundtrack for electronics, solo cello and digital delay

The music for *The Bridge*²⁹ was composed for a commission by Opera North for the Leeds International Film Festival in November 2008. The brief was to write a soundtrack for electronics and a small instrumental ensemble for live performance accompanying the screening of the film at the festival. The score is included as a separate document and as a PDF on the disk **TIMWRIGHT_FOLIO_D1**. I have included two recordings of the soundtrack in the folio, a recent live recording of a performance by Psappha at Islington Mill, Salford and a studio recording made at the Music Research Centre.

The compositional process touched on several areas of interest which I outline below.

4.1 The Film

The Bridge is based on the short story by Ambrose Bierce, *An Occurrence at Owl Creek Bridge*³⁰ set in the American Civil War. It describes the last moments of Peyton Farquhar, a supporter of the rebel cause who is tricked by a Confederate scout into sabotaging a bridge and is executed for his crime. The story is noted for its use of a liminal narrative device where the moment between life and death is extended to describe the “feverish fantasy in the surging near-death experience of a condemned man”³¹. This device is also a key feature of the film.

²⁹ Charles Vidor, *The Bridge*, 1929.

³⁰ Ambrose Bierce, *Tales of Soldiers and Civilians* (New York: Lovell Coryell & Company, 1891).

³¹ Don Habibi, ‘The Magical Moment: The Liminal, Distended Time Flashforward of

The Bridge was directed by Charles Vidor in the USA and was originally released in 1929.

4.2 Practical Considerations

The first creative decisions I made were pragmatic. Given that I had limited experience of scoring for classical acoustic instruments but was familiar with playing stringed instruments I chose to write for the cello. Synchronisation between the electronics and the cello with the film was an important consideration. To ensure precise synchronisation of my soundtrack with the film the most elegant approach would be to pre-record the electronics and combine them on the same media.

4.3 Creative Approach

I found watching the film a powerful emotional experience. The sense of anticipation before the execution, the images of Farquhar's wife and child, the relief at his apparent escape and the subsequent realisation that everything is not quite as it seems all had a powerful emotional effect on me. My instinctive response was to draw back from trying to compose anything that might actually undermine the drama by overemphasising the emotional narrative and instead to try an experiment with an abstracted structural approach, possibly providing an interesting contrast to the narrative.

So as a structural device I modulated the speed of three independent trains of clicks. This was an attempt to introduce sound in such a way as to convey a sense of change or development while minimising the introduction of musical information, both in terms of its material and behaviour.³²

Ambrose Bierce', *The Ambrose Bierce Project Journal*, 1 (2005).

32 Of course unintended cultural and contextual references are immediately apparent,

The film has a very clear dramatic structure:

- a) the introduction and build up to the execution
- b) the liminal fantasy
- c) the moment of death and the closing scene

In the moments leading up to the execution I felt that the use of any sound at all would only serve to diminish the power and directness of the visual narrative. The moment when the drummer boy starts to drum seemed like an appropriate point to fade out the sound. This visual sound cue acts as a transition to the internalised state where Farquhar is imagining his wife and child in his last moments. The silence also functions to greatly intensify the impact of the sound returning as Farquhar hits the water.

Between b) and c) the main character is caught up in a fantasy that we discover must have occurred in the split second before death. By slowly introducing the 'alien' sound of an acoustic instrument into what was previously an exclusively electronic sound world I am trying to subtly suggest that a transition of some kind is happening, that the narrative has entered a new phase. I approached the cello writing in much the same intuitive way I would an electronic part, experimenting with a first order Markov chain to generate the notes based around a sequence of chords.

ranging from ticking watches through whirring projectors to glitch electronica.

4.4 Discussion

My intention was to experiment with a compositional approach where the sound materials and algorithmic organisational strategies inverted the expected correlation between the dramatic narrative and the soundtrack. This approach generated some unexpected relationships which I found interesting. In particular the use of a minimal palette of sounds and silence actually seemed to intensify the emotional impact of the scene leading up to the execution in a way that avoided melodrama.

It was quickly pointed out to me that the clicks at times appeared to be imitating the sound of old film, and at other times the whirring of an analog projector. It is difficult to imagine why this did not occur to me, but it was unintended.

The piece was performed for the first time by the Manchester based contemporary music group Psappa, conducted by Nicholas Kok, in Leeds in November 2008 as part of Back to The Electric Palace. It has since been performed by Psappa at the Lancaster Institute for Contemporary Arts in October 2009, Islington Mill in Salford and the University of Nottingham in March 2013.

5. 8 Switches

Video file with stereo soundtrack

8 Switches is a computer generated audio-visual piece lasting twenty minutes, presented here as a high frame rate video file with stereo sound. It is the first work in the folio where the creative process resulted in my development of a visual component which became integral to the composition. This was an unexpected

outcome of my experiments with algorithmic composition. The visual element was introduced initially as a simple method for visualising the behaviour of the sound events I was experimenting with.

As work on *8 Switches* progressed the visual element took on an equal compositional importance to the sound. Visual perceptual effects resulting from strobing became a part of the aesthetic of the piece. In order to maximise the impact of those effects *8 Switches* should ideally be played on a screen that dominates the audience's field of vision.

5.1 Compositional Approach

8 Switches has two contrasting layers of sound. The first is generated by rule based control of sound events generated using a probability distribution, the second by a live processed version of the first. They are represented by distinct visual systems.

Eight sound generators are used, each one of which plays a different short percussive sample. Each sample can be played back over a wide range of pitches, from different start positions into the soundfile, through a high pass filter and with an amplitude envelope.

The monochrome visual system represents short sound events as black or white dots. The y-coordinate of the dots accompanying the sound from each generator is constrained to a horizontal line. The diameter of each dot is related to the sound's amplitude envelope and its pan position mapped to its x-coordinate.

This representational system results in a dot being displayed for the length of time that the sound is present, if for example an event sounded several times whilst being panned from the right speaker to the left speaker, a sequence of dots would

appear to traverse a horizontal line across the screen from right to left. My intention is that the synchronised on-off nature of the relationship, the spatial mapping and the fact that the louder the sound the bigger the dot's diameter should combine to produce a perceptual link between the two events giving the sensation of a single event. As the time between sound events approaches the limit of persistence of vision, around 40ms, and if the pan position of the sound events is constant, a single sustained dot will be visible.

A second, qualitatively different layer of sound acts as a timbral and rhythmic contrast to the output of the eight sound generators. This is represented visually as a background plane which uses a dynamic horizontal greyscale gradient to illustrate the amplitude and left/right balance of the sound — if a loud sound is panned hard left a gradient from white to black is displayed from the left side of the screen to the right.

The second layer of sound was produced by performing a run of the first layer and processing it with a phase vocoder module in Pure Data. This was then edited and recombined with the output from the eight generators. Its timbre is varied, but in general has a smooth, continuous character in contrast to the output of the eight generators which is of a more granular nature.

An important feature of the second layer of sound is that when its overall loudness crosses a pre-determined threshold the colour of the dots is inverted — i.e. they turn from white to black or vice versa. The original reason for this was to maintain the visibility of the dots as the colour of the background tended towards white. It quickly became clear that if the loudness of the second layer wavers around the threshold value the dots would rapidly alternate between black and white which

led to several interesting visual phenomena which I discuss below.

8 Switches started its life as one long performance piece, where simple operations on the behaviour of the sound generators were controlled in real time using a MIDI control surface. The decision was made to divide it into distinct sections which investigated the most interesting subsets of these operations. As the behaviours in each section were so different, short gaps were used to clearly separate them, also allowing time for eyes and ears to recover.

While the underlying stochastic engine of the piece was preserved, the live improvisational approach of the original was rejected in favour of a composed final version. There were three reasons for this, firstly the output of the algorithmic layer was not consistent — I found that I preferred the output of some runs of the system in comparison to others. Secondly I wanted to produce a fixed piece of work that I would be able to distribute electronically or physically. Lastly, live runs or performances of the pieces were not possible because my computer was not able to reliably process all of the information in real time.

5.2 Discussion

Several levels of perceptual relationship are apparent when watching and listening to *8 Switches*.

The first is a high level relationship where the behaviour of the sound events is dense and fast and changes in timbre are visible in changes in the overall shape of the dots, without individual events being discernible:

If we consider the first section between approximately 0:48 to 1:50 into the file, the following instructions are operating:

- 1) pick one of the eight generators at random
- 2) randomise the pan position of every event for that generator
- 3) wait a randomly specified time then stop randomising pan
- 4) start to slowly drift back to a central pan position

go to 1)

Several observations can be made about this section. Firstly when the pan positions of all of the sounds are central, we see eight solid dots. As the layer of processed sound is percussive and rhythmically regular a strobing effect occurs, which rapidly inverts the colour of the dots. The sounds are being produced at a high density, creating a noisy granular timbre. The diameter of each dot is varying with the loudness of the sound (the loudness is varying because each sound event is starting from a randomly selected offset into the soundfile). When the sequence of instructions above starts it is clear visually that some kind of process is happening, but is not necessarily audible. There is still a strong perceptual coherence between the image and the sound in that the textural changes in sound are still visible in the overall behaviour of the dots.

A second level of perceptual relationship is where individual sound events are perceived as being linked to the detailed behaviour of the image.

If we consider the sixth section from approximately 15:20 into the file, a more musical development is occurring. The rhythmic organisation becomes increasingly quantised and as the sounds enter one by one a coherent rhythm is being established. At first, each event is individually identifiable with a high degree of perceptual coherence between sound and image.

As the complexity of the sound increases a third level of relationship is apparent, where there is a less detailed gestural relationship:

Although patterns in the sound are clear from around 17:27 into the file, and the dots are still individually discernible, the visual accompaniment gives only an impression of density and rhythm.

Visual perceptual effects also occur when the behaviour of the system leads to flashing and strobing. The third piece, from around 7:00, is the most striking example of this. A fast strobing occurs as the brightness of the background layer follows the envelope of the background sound. Because the duration of the dots representing the sound from the generators is longer than the length of time it takes for the background image to change from black to white, we see multiple inverted concentric dots appearing for each short sound. This layering of fast paced inversions is perceptually confusing — the dots appear to take on a silvery, mercurial quality and become detached from the background, at times appearing as if they were holes through the screen, and sometimes appearing as if they float in front of the screen.

5.3 Contexts

My development of the visual component of *8 Switches* was intuitive in that I was not deliberately pursuing a theory of visual representation of sound or trying to work in an established tradition of visual music. My attention has since been drawn to other work in the field of visual music and I have found that *8 Switches* is unusual in comparison to much contemporary practice in its minimal aesthetic, in the consistency of the relationship between the audio and visual components and in its exploration of perceptual phenomena.

The greyscale colour space and the restricted set of geometric shapes in a flat two dimensional space have a similarity with some animated films made in the first half of the twentieth century, for example Egging's *Symphonie Diagonale*³³ and *Dots*³⁴ by Norman MacLaren. Its aesthetic has little in common with much of the contemporary visual music I am aware of, perhaps being more aligned to mid and early twentieth century Modernist visual art. Parallels have been drawn to some of the work of the Bauhaus artist László Moholy-Nagy.

In contrast to the abstract geometry of *8 Switches*, many contemporary computer generated works, for example Denis H Miller's *White Noise*³⁵, *Static Cling* by Bill Alves³⁶ or *Patah* by Diego Garro³⁷ use complex shading and textures, often suggestive of physical materials moving and overlapping in a three dimensional space.

In Garro's *Patah* and *Pointes Precaires*³⁸ gestural behaviours in the electroacoustic soundtrack are clearly linked to movement and changes in shape of the images but the use of complex visual textures and short cuts of video gives rise to cultural associations and possible layers of meaning which dominate my experience of the work. While *Static Cling* and other work by Alves, for example *Aleph*³⁹ and *Breath of the Compassionate*⁴⁰ make use of repeated patterns and geometry which

33 Viktor Egging, *Symphonie Diagonale*, 1924.

34 Norman McLaren, *Dots*, 1940.

35 Denis H Miller, *White Noise*, 2009.

36 Bill Alves, *Static Cling*, 2000.

37 Diego Garro, *Patah*, 2010.

38 Diego Garro, *Pointes Precaires*, 2004.

39 Bill Alves, *Aleph*, 2002.

40 Bill Alves, *Breath of the Compassionate*, 2009.

give an impression of being related to the repetitive minimalist processes used in the composition of the soundtracks, the resulting visual aesthetic is often reminiscent of Hindu or Buddhist mandalas.

The consistency of the relationship between image and sound in *8 Switches* is in part a result of the same data being used as the starting point to generate both the audio and the visual elements combined with a simple process of sonification. It is also due to my choice of a system of simple geometric entities circles/points, lines and planes which is intended to offer a minimal level of representation which might allow the underlying algorithmic processes to be grasped. In this sense *8 Switches* shares an approach with Burt's *Colour Projections*⁴¹, although the form, look and intent of the two works are very different.

The direct physical sensation of watching and listening to *8 Switches* was a central compositional concern, and in that sense the piece perhaps represents a development of ideas explored in the Op Art of the 1960s.

5.4 Performances/Releases

The first live improvised performance of *8 Switches* was as part of the Arena Festival of Contemporary Art, Leicester (2008). It has been performed in the UK at the Supersonic Festival, Birmingham (2009), at Sensorium in York and Dublin (2010) and screened at Sonar Cinema (Barcelona and Sao Paulo 2012) and the roBot festival in Bologna (also 2012).

The file I have included in the folio was released on a USB drive by the label Entr'acte in 2011.

41 Theo Burt, 'Composition Folio' (University of York, 2012).

6. The Sick Rose

Stereo soundfiles

The Sick Rose was a collaborative project with the vocalist Monika Načeva. The project was originally proposed as an album to accompany the programme for the exhibition *Decadence Now!* at the Galerie Rudolfinum in Prague, curated by Otto M. Urban. It was also commercially released as a cd album by the Czech record label, Christopher Robin⁴².

In the folio I have included the final mixes that I made and for reference, recordings of the original sketches I sent to Monika. The final mixes are in their pre-mastered state. While I consider the mastering a success for a commercially released album, sonic detail was sacrificed in favour of loudness which is not required in this context.

My work on *The Sick Rose* was a real-world, commercial application of much of my research. It incorporated stochastic and algorithmic compositional approaches and sophisticated synthesis and signal processing techniques in combination with conventional DAW based programming.

I am going to give an outline of how the collaborative process between Monika and myself worked, including some extracts from emails between us discussing the music, and then describe in a little more detail the compositional approach to one of the tracks, *Cestou Posvátným Hájem*.

6.1 Collaboration

There were two significant circumstantial factors which informed our initial

⁴² Tim Wright Monika Načeva, *The Sick Rose* (Christopher Robin, 2010).

approach to the project.

Firstly, Monika and I had worked together before. During production of her previous album, *Mami*⁴³ she had asked me to work on several of the songs. Michal Pavlíček, who was composing most of the material for the album sent me demo recordings of his voice and guitar to which I added electronic bass and percussion parts.

Secondly from the outset it was clear that the majority of development work on the album would happen at a distance, and that the time we had available to work in the same physical space would be limited to recording her vocal parts. A consequence of our working together remotely is that a significant part of our creative communication was documented in emails, extracts of which follow.

So to avoid misunderstandings and to deal with the geographical constraints it was important that our creative roles were clearly laid out from the start. Monika would decide on the lyrical content with reference to the exhibition. She chose poems and extracts of poems by Antonín Sova^{44, 45}, William Blake⁴⁶, Irma Geisslová, Karel Hlaváček⁴⁷, and an extract from Franz Kafka's letters to Mileně Jesenské⁴⁸. Monika also suggested that we record a cover version of *Gloomy Sunday*⁴⁹.

Although we would agree a general stylistic direction together I would write

43 Monika Načeva, *Mami* (RESPEKTedice, 2007).

44 Antonín Sova, *Do jezer stíny lesů padaly*, 1922.

45 Antonín Sova, *Cestou Posvátnýn hájem*, 1922.

46 William Blake, *The Sick Rose*, 1794.

47 Karel Hlaváček, *Večer Teskné Nálady*.

48 Franz Kafka, *Briefe an Milena* (Schocken Books, 1952).

49 Rezső Seress, *Gloomy Sunday*, 1933.

the music – ie. all of the sound material except the vocals⁵⁰. I would also engineer the recordings, mix the album and supervise the mastering.

Monika and I agreed that we wanted to produce music that was stylistically varied enough to function in different domains (radio, home listening, dance club) while holding together as an aesthetically coherent body of work. My starting point with the music was to try to draw together my interest in several areas of my creative musical practice. I wanted to continue to investigate my interest in algorithmic compositional methods, in particular Markov chains and stochastic rhythm programming, to use sound processing techniques not commonly used in the commercial domain and somehow to combine this with my interest in vintage analogue synthesisers.

I played Monika *Feet of Courage* as an example of my work at the time and sent the email below with an outline of my approach:

Thanks for the lyrics Please send me anything else you have - very rough translations are fine. It's helpful for me to have an overall feel of the lyrical content as soon as possible.

I'm starting to work on the music full-time as of now!

I'm going to use software that I have written to generate a lot of the music and rhythms initially. ... The software I'll be using can use maths or probabilistic methods to generate musical ideas ...

Just in case you're starting to worry that this sounds too dry and experimental -I do want to make a record that's engaging and

⁵⁰ Monika also wanted to also use a contribution from the Czech hiphop DJ, Five

mostly listenable! And has a groove.⁵¹

The methodological approach throughout the project was very straightforward. In the early stages I worked in my home studio putting together some sketches based on these creative aims, taking into account my understanding of Monika's vocal repertoire and the musical tastes we shared. I have included the original recordings of the sketches in the folio for reference. These sketches were presented to Monika, she was positive about some and not others, which were then dropped. When I anxiously sent Monika the first rough ideas this is the exchange which followed:

Demo backing tracks - written without direct reference to lyrics.

These are starting points - making a lot of use of simple parts for analogue synths, if this is too brazen let me know - it could become a signature of the album - which I would be happy with because I love the sound and I think it will work well with your voice - but I am aware it's not to everyone's taste!

Mon_1 - 70bpm - algorithmic rhythms with deep dubby bass and reggae break - can be very flexible with the arrangement.

Mon_2 - similar to Mon_1 - will send tomorrow evening

Mon_3 - after reading more of the lyrics this one is definitely too cheesy, lightweight and poppy, so I think I will discard this. Can send if you like but am 90% sure its not right.

Mon_4 - Moog Prodigy and Sequential Pro 1 live drone overdubs - 1st order Markov chains - probability of note

changing increases as song progresses. Ultra low sub-bass - can

⁵¹ Tim Wright, 'RE:lyrics', 7 March 2010.

you hear it?

Can completely replace drums + distortion if its too heavy!!!

Mon_5 _ Moog Prodigy, Sequential Pro 1 slow

overdubbed disco octaves going out of time with Korg

MonoPoly solo arpeggios and sirens. Slurred euphoria.⁵²

Monika's reply was concise but encouraging:

yo...

i like it very much!!!

i am starting to work...

M.⁵³

By the time of the first of two recording sessions in York I had continued to develop my ideas to a point where I had five working versions of tracks, and Monika had allocated texts to tracks and had practised melodic lines. During the recording process Monika made the decisions about how to perform the texts while I focussed on the engineering. When she had returned home I reviewed the recordings and started work on the mixes. We had discussed possible directions for new tracks when we were together including a cover version of *Gloomy Sunday*⁵⁴, also known as the *Hungarian Suicide Song*. One of the stylistic directions Monika was very keen to pursue was dubstep, so I thought it might be an interesting juxtaposition to try a dubstep version of this song. I transcribed the piano part from the version sung by Paul Robeson as a starting point for recording Monika's vocal.

⁵² Tim Wright, 'Music...', 14 March 2010.

⁵³ Monika Naceva, 'Re:updates', 14 May 2010.

⁵⁴ Seress.

The collaborative process continued in much the same way, I provided sketches which were either approved or rejected. If they were approved I continued to develop them. When we had all of the vocal recordings I started work on the mixes and final arrangements. It got easier to understand each others' approaches as the project developed, and Monika was very generous and trusting in my abilities to deliver a finished product to give me the degree of autonomy that she did.

6.2 Cestou Posvátným Hájem

I am going to describe in a little more detail my approach to this one track in particular as I think it is representative of the combination of compositional techniques I used in many of the other tracks.

Prior to being assigned lyrics, *Cestou Posvátným Hájem* had the working title *Mon_4*. As can be seen in the email above and by listening to the original sketch that I sent to Monika most of the sound materials were complete at an early stage in the track's development. In the email I describe the layers of drones I made by recording live overdubs of a detuned Moog Prodigy. I effectively defined the track's structure during a live take by slowly opening and closing the filter of a sustained Moog drone. There is an extended section where the filter is very slowly opening to its maximum at 2:30; it stays open to around 3:40 when it quickly drops to its minimum until it rises again to another peak at around 4:30 where it stays open for just under 30 seconds before closing again.

This original improvised structure can still be heard in the final version, although by the time of the second peak the raw synth sound has been transformed using a combination of EQ, reverb and distortion plug-ins in Logic Pro⁵⁵. After we

⁵⁵ *Logic Pro* (Apple).

had added the vocal part the decision was made to strip out all of the synthesiser parts under most of the whispered vocal. This had the combined effect of revealing the detail of the vocal processing which was running underneath the whispering and emphasising the peak when the drone returns after Monika raises her voice to speak.

A second part for multiple recordings of the Moog runs underneath the drones. I used a first order Markov chain written in Pure Data to generate the note information. I set up a chromatic note row and dynamically changed the transition probabilities in such a way that initially the probability of a transition from the starting note to any other notes was zero. I then linearly increased the probability of transitions to other notes. Table 1, Table 2 and Table 3 show example transition probability matrices at three points. In Table 1 the probability of the next note that the system chooses will be the same as the starting note is one, as time progresses there is small probability that a note a semitone away will be chosen and a high probability that the following will stay on the new note. By the end of the process, in Table 3 a transition between any pair of notes is equally possible.

	C	C#	D	D#	E	F
C	1	0	0	0	0	0
C#	0	1	0	0	0	0
D	0	0	1	0	0	0
D#	0	0	0	1	0	0
E	0	0	0	0	1	0
F	0	0	0	0	0	1

Table 1: Cestou... Transition Probabilities at $t=0$

	C	C#	D	D#	E	F
C	0.8	0.1	0	0	0	0.1
C#	0.1	0.8	0.1	0	0	0
D	0	0.1	0.8	0.1	0	0
D#	0	0	0.1	0.8	0.1	0
E	0	0	0	0.1	0.8	0.1
F	0.1	0	0	0	0.1	0.8

Table 2: *Cestou... Transition Probabilities at $t=0.1$*

	C	C#	D	D#	E	F
C	0.167	0.167	0.167	0.167	0.167	0.167
C#	0.167	0.167	0.167	0.167	0.167	0.167
D	0.167	0.167	0.167	0.167	0.167	0.167
D#	0.167	0.167	0.167	0.167	0.167	0.167
E	0.167	0.167	0.167	0.167	0.167	0.167
F	0.167	0.167	0.167	0.167	0.167	0.167

Table 3: *Cestou... Transition Probabilities at $t=1$*

I found the use of Markov chains in this way was useful in generating a large quantity of note data, whose overall behaviour was defined without having to manually programme every single event. Markov chains have been well used in musical analysis and composition⁵⁶ but I think it's worth drawing attention to this implementation because of its unusual context.

I have included a translation of the lyrics in Appendix III.

6.3 Recordings and Performances

The finished album was released as a cd on a Czech label called Christopher Robin⁵⁷. Many of the tracks were playlisted on the Prague based radio station Radio 1. *Do*

⁵⁶ Charles Ames, 'The Markov Process as a Compositional Model: A Survey and Tutorial', *Leonardo*, 22 (1989), 175–187.

⁵⁷ Monika Načeva.

Jezer Stíny Lesů Padaly and *Tančíš Sám Života Tanec* both spent several weeks at number one in Radio 1's Velká Sedma chart (translated as Big Seven). There were a number of live performances, notably at the opening of the Decadence Now! exhibition at the Galerie Rudolfinum in Prague in November 2010, and a tour of seven Czech cities in November 2011. The album was nominated for a Czech Grammy for Best Electronic Album of 2011.

7. Algorithms for Electronics, Fake Woodwind and Strings (Collection 1)

Video file with stereo sound

Algorithms for Electronics, Fake Woodwind and Strings is an ongoing work, which has evolved into a computer based audio visual performance system. Its sound is created by using a combination of synthesised sine tones and a large library of solo instrument and orchestral ensemble samples⁵⁸. I am going to describe some of the background to the composition and briefly describe the five pieces presented in the folio.

7.1 Background

Much has been written about the extent to which predictability in the organisation of musical events has an effect on the listener's musical experience. It is often argued that by setting up an expectation of what musical event is going to happen next, and then either fulfilling it immediately, after some delay or not at all is central to the musical experience^{59, 60}.

⁵⁸ *Vienna Symphonic Library* <http://www.vsl.co.at/en/65/71/84/1349.vsl>

⁵⁹ Leonard B. Meyer, 'Meaning in Music and Information Theory', *The Journal of Aesthetics and Art Criticism*, 15 (1957), 412–424.

⁶⁰ Samer Abdallah and Mark Plumbley, 'Information Dynamics: Patterns of Expectation

With *Algorithms...* I have designed a simple system where the degree of predictability with which pitch and articulation change can be shaped over time. My intention was to see whether statistically generated passages of pitch and rhythm would be perceived as *musical*, and whether there was an optimum area between complete unpredictability and total predictability which yielded the most interesting results.

As a way of investigating this I designed a system using Pure Data that uses twelve sine-wave generators to generate note events whose frequency is determined by a probability distribution⁶¹. Global initial conditions for duration, amplitude envelope, volume and pause between events are defined in terms of a constant value and a range within which a randomly generated offset is calculated. A group of functions is also defined to control how these parameters and the spread of the probability distribution vary over the time taken for each run of the system. The interface used to specify the starting conditions is shown in the box in the upper portion of Figure 1 and examples of the equations used can be found in Figure 2 through Figure 6 in Appendix IV.

In addition to the electronic parts I chose to orchestrate the note data using two tiers of the sample library. The first tier makes use of the Vienna Symphonic Library Special Edition chamber ensemble string samples, the second tier is constructed with the Vienna Symphonic Library Solo Instrument samples for violin, viola, cello, bass clarinet, alto flute and oboe. The box in the lower portion of Figure 1 show the interface which allows selection of the orchestration used for each run of the system.

and Surprise in the Perception of Music', *Connection Science*, 21 (2009), 89–117.

61 After some experimentation I used the Cauchy distribution

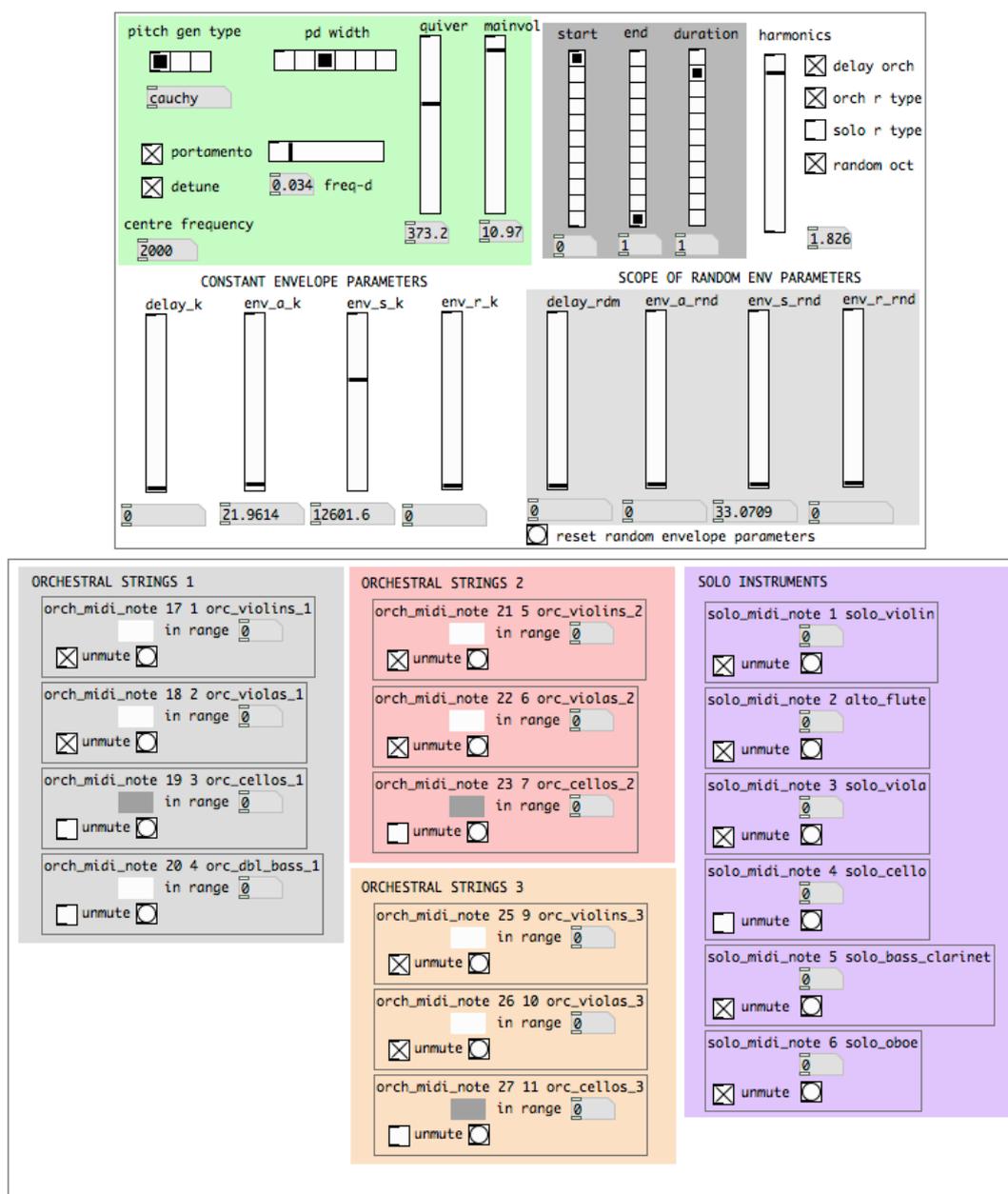


Figure 1: Pure Data GUI for Algorithms For Electronics...

The note information is prepared and streamed in separate MIDI channels from Pure Data to Logic Pro where the channels are assigned to the appropriate virtual instruments. Articulation information is collected from the volume, attack, sustain and releases value calculated by the sine-wave generators and is sent as velocity and MIDI continuous controller data to the instruments. This is mapped using the Vienna Instrument plug-ins to velocity and amplitude envelope information.

7.2 The Visual Component

The visual component is a progression of techniques developed in *8 Switches*, but differs in that there is no attempt to create a direct synaesthetic link between light and sound. Instead by using a combination of circles and lines I have experimented with ways of building a symbolic representation of *the relationships between the* frequencies that are created by the sine-wave generators.

As the notes from the twelve generators start and stop these relationships appear and disappear, so at times there is an apparent synchronisation between the sound and the image. As the notes cluster around the central starting frequency in unison the circles become concentric, and as the range of frequencies becomes more diverse the positions of the circles becomes more scattered.

7.3 The Five Pieces

I have generated many pieces with the system during its development, I chose the five that are presented in the folio to provide examples of some of the more interesting results. Screen grabs showing the equations which I used for each piece can be found in section 10.1 from page 56.

The five pieces alternate between full orchestrations and arrangements for solo alto flute then solo violin. The equations for the central faster piece are symmetrical as can be seen in Figure 4 on page 57.

The last piece makes use of a lookup table derived from the notes used by the cello part in the string arrangement in *Some Trees* (p.49). Rather than using the probability distribution to directly generate offsets from the starting frequency, in this case offsets into the lookup table are calculated resulting in a more obviously tonal

character.

7.4 Discussion

In many of the pieces in the folio I have used a hybrid approach to composition, where I have used algorithmic techniques to generate musical events, edited the results and then combined with material generated by other processes or from other sources. With this piece I was interested in exploring a purely algorithmic approach to composition where the output of the system is left unaltered, in part with the intention of designing a system which I could use in live performance.

The choice of sine tones as the sound material was not particularly successful in that discrimination of different notes was difficult when the spread of the probability distribution was small. By choosing to orchestrate the output of the system with recognisable acoustic samples it was possible to increase discrimination of the frequencies being generated. For example if two notes were generated with frequencies near middle C, then one might be played by a viola sample and one by a violin sample, making discrimination easier.

In fact the use of familiar acoustic sounds had a profound effect on the way in which groupings of randomly generated notes and rhythms started to become perceived as 'musical' and even melodic lines. The fact that these sounds are usually associated with music created by humans rather than probability distributions perhaps leads us to hear musical phrases rather than disconnected sequences of notes. This sensation is subverted when the system generates note data that is out of the range of humans' capabilities – for example the end of the third piece which becomes impossibly fast.

Up to this point I haven't mentioned my use of colour in the piece. After a certain amount of research into the use of different colour spaces for mapping pitch I came to the conclusion that I should design my own. I implemented a simple HSV scheme which gave me enough control over the mapping for my purposes.

7.5 Performances

An early, multichannel audio set of three pieces generated by the system was performed at the opening gala of the Prague Writers' Festival in the Czech Republic in April 2012.

8. Bastard Structures 2

Video file with stereo sound

Bastard Structures 2 is a performance system for light and sound produced in collaboration with Theo Burt. The video file in the folio is a recording of a performance in York in April 2012. I am going to give an explanation of our roles in the collaboration, give an overview of each section of the piece with some comments on the ideas and creative process with particular focus on my own contribution.

8.1 Collaboration

Our roles during a performance of *Bastard Structures 2* are clearly defined. We each use a computer, a soundcard and a video projector to independently produce sound and image⁶². The images from the projectors are projected into the corner of a room and are aligned to precisely overlap, covering a square on each wall. Our sound is mixed together and played back through two speakers, one at each side of the

⁶² There is some communication between the computers via a network, more of which later.

projection area.

My sound material consists of drum samples that I recorded from a Roland TR808 drum machine. The samples are played back through either the left or right speaker and are accompanied by a simultaneous flash of colour which fills the square on the left or right wall. Burt projects geometric shapes which he personifies with a system similar to the one he developed for his piece *Colour Projections*⁶³.

Bastard Structures 2 is a development from an earlier work, *Bastard Structures* where we experimented using two projectors to superimpose sections of two of our works, my piece *8 Switches* and Burt's piece, *Colour Projections*. The combination of Burt's slowly moving geometric shapes and the dramatic dynamic of *8 Switches* was surprisingly successful in generating an interesting dynamic between visual perceptual effects and cognitive structural and behavioural concerns. This piece further investigates that dynamic.

8.2 Section 1 (0:10 to 6:36)

I use two drum sounds, a hi hat in the left speaker accompanied by a red flash in the left square and a kick drum in the right speaker accompanied by a blue flash in the right square. Burt uses a red circle which fades in and out and slowly moves from one wall to the other as it turns blue.

Both Burt's and my material start in the left hand square; I trigger the hi hat slowly at first and gradually increase its frequency, while at the same time the rate at which Burt's sonified circle fades in and out increases. The interplay between my on-off flashing and the ramped fades of the circle generates interesting visual and audio effects as they go in and out of phase.

63 Burt.

When both are at maximum speed the circle begins to move towards the right hand square, almost imperceptibly at first. Eventually the circle crosses the boundary between the two squares and begins to appear on the second wall, it's colour changing to an alternating combination of red and blue. This is a striking moment the first time it is experienced, the audience's understanding of the physical boundaries of the work are suddenly broken. By the time the circle has become fully blue I trigger the kick drum on the right hand wall, again gradually increasing its frequency until it is the same as the frequency as the hi hat, though not in phase.

Again interesting visual and audio effects arise. This time there is the additional interaction of the phasing between the blue in the circle with the blue square, and the red in the circle with the red square. The circle appears to emerge from the corner and float in front of the walls.

8.3 Section 2 (6:48 to 11:14)

This section establishes a formal relationship between Burt's geometry and my strobing. Burt projects simple regular geometric shapes, a triangle, a square, a pentagon and so on, in one or other or both of the squares. Our two computers are linked so that when the number of sides of one of Burt's shapes changes a message containing the number of sides is sent to my patch. When one of Burt's shapes is present in one of the squares my computer plays a conga sample and a white flash at a steady rate related to the number of sides of the shape. The rate changes in proportion to the number of sides so that a unit of time is divided into three for a triangle, four for a square, five for a pentagon and so on.

8.4 Section 3 (11:15 to 15:52)

My contribution starts with bright white strobing accompanying detuned tom samples in both left and right squares/speakers. This stuns the eye while Burt generates more complex irregular polygons which appear fleetingly. The visual effect is disorientating, with dark haloes appearing around the shapes and strong afterimages left after they decay.

At 13:36 there is a dramatic reduction in tempo in the conga pattern and the time between the shapes becomes greater. In the gaps between the flashes the behaviour of Burt's shapes is revealed more clearly.

8.5 Section 4 (16:09 to end)

The last section is another example of another experiment with a formal relationship, this time between the number of sides of Burt's shapes and the behaviour of my system. This time I trigger a rapid series of kick drum samples every time there is a change in the number of sides of the shape on either wall. If the change occurs on the left wall the drum sounds are played through the left speaker and if it's on the right wall through the right speaker. The number of drum sounds played is equal to the number of sides.

The optical effects are striking, in particular at the end when the shape is rotating fast there is a strong impression that the triangle is floating in space in front of the screen.

8.6 Discussion

Bastard Structures 2 is still very much a work in progress but shows considerable scope for further development.

Interestingly the formal relationships that were set up in Section 2 were not picked up on by any of the audience members that I have spoken to. In my experience the work has had a very direct physical impact on audiences, who have been much more concerned with the excitement (or in some cases discomfort) created by the combination of loud sound and bright flashing lights than with the structural and pattern based relationships that were set up.

8.7 Performances

Bastard Structures 2 was performed in February 2013 at the Paradiso in Amsterdam as part of the Sonic Acts festival. Previous performances were at Soundfjord, London (December 2012), Millers Yard, York (March 2012) and the Rymer Auditorium in the MRC at the University of York.

9. Untitled (Two pieces for surround)

Multichannel (5.1) audio files

My aim with Two Pieces... was to investigate an approach with an emphasis on spontaneity and the use of space as a compositional element.

9.1 Background

In order to instil a sense of immediacy in the music I took a spontaneous improvisatory approach in the initial stages of the composition with a view to assessing, editing and compiling the materials I had created at a later stage. As with Some Trees I was interested in developing my practice with and understanding of the software tools I had already developed rather than building new ones. The initial phase of the composition for both pieces was in fact accomplished quickly (in the

space of a few hours), the later mixing and editing stages were problematic and time consuming.

Two contrasting pieces of music by other artists were influential in the composition, *Legba in Dub* by HHY And The Maccumbas⁶⁴ and *Path With No End* by Merzbow⁶⁵

The elements in *Legba in Dub* that I found interesting and intended to expand upon were the use of broken rhythms and the dub inspired use of space. The rhythms are loose and sound fractured or even broken, but remain just coherent enough to give a clear sense of forward propulsion. With the stochastic drum machine it is possible to incrementally move from this sort of rhythmic state to either completely disordered or tightly quantised rhythms, which was a dynamic I wanted to explore. The track makes extensive use of delay, reverberation and equalisation effects to produce an array of spatial cues. With *Two Pieces...* I was interested in investigating the use of similar techniques in 5.1 surround sound.

I have a long held interest in creating systems that generate a sound that is perceived as a single sonic object (rather than multiple layers of sounds) and has enough variety of timbre and rhythmic flexibility to have and to extend the function of drum kit or a breakbeat. In *Path With No End* the main rhythmic loop that runs through the track has this quality (although the sound that functions as a snare drum is distinct).

9.2 Creative Approach

I used the same general approach for both pieces. I began by recording experiments

64 HHY & The Macumbas, *Legba In Dub* (UK: Wire Magazine, 2011).

65 Merzbow, *Path With No End* (Vivo, 2007).

moving between broken and quantised rhythms from the stochastic drum machine, the audio output of which was routed through a variety of plug-ins in Logic Pro in real time. I was interested in the sound transforming possibilities created by using a combination of amplifier simulation plug-ins and feedback within Logic itself, for example by routing the output of auxiliary mixer objects back through themselves⁶⁶.

With a view to generating material derived from these experiments that might be interesting to spatialise, I pursued my experiments with feedback into the analogue domain by recording a 'performance' of myself passing the recordings I had already made through two vintage hardware delay units, a Yamaha E1010 analogue delay and a Lexicon PCM41 digital delay. By changing the amount of the output of each that was routed to the input of the other in real time I was able to move from typical 'echo' type delay effects to intense ringing feedback.

I also introduced some synthesiser textures from three vintage analogue monosynths, a Sequential Circuits Pro 1, a Yamaha CS30 and a Moog Prodigy.

Once I had all of the materials recorded and collected together in separate arrangements in Logic Pro I began the process of organisation and editing.

9.3 The Pieces

In both pieces my intention was to create an immersive experience by simulating an artificial sense of space. This was achieved with the use of a surround reverb in Logic Pro and using Logic's surround pan controls to distribute the recordings from the delay units around all five speakers. I wanted to create a dynamic between this diffused spatial material as background, and the percussive and synth parts which are

⁶⁶ The use of digital feedback within Logic is an interesting parallel to the analogue feedback techniques used by noise artists like Merzbow.

panned to the front of the room as foreground.

The first piece focusses on the development of the rhythmic sonic object I described above with the intention of conveying a sense of intense and exciting activity. The divide between background and foreground is breached at times by feeding fragments of the rhythmic object through the reverb, a technique which is often used in stereo in dub.

More emphasis is placed on creating transitions between different spatial and timbral behaviours in the second piece. The foreground created by the rhythm parts is now intended to be around the whole perimeter of the room, the background in a space behind it. This is disrupted by a passage where the three analogue synthesisers are each presented in mono through the left, right and centre speakers.

9.4 Discussion

The construction of these two pieces from recordings of my live interaction with the hardware and software was partially successful in conveying a sense of immediacy and dynamism.

Mixing the pieces was challenging for two reasons. Firstly while the network of digital feedback and distortion I had set up in Logic Pro was easy to set up, it was difficult to edit because of the interlinked nature of the channel routing – if I changed the equalisation on one channel it had a knock-on effect on all of the linked channels. Secondly the lack of consistency between different 5.1 systems made it very difficult to produce a mix that it was possible to guarantee that travel well. To hear the pieces as intended without the diffusion being performed live, it should be listened to in the Rymer Auditorium in the Music Research Centre at the University of York.

10. Some Trees

Multichannel (5.1) Audio File

Some Trees began as a collaborative project with Monika Načeva. We were asked to compose a tribute to the American poet John Ashbery who was the guest of honour at the 2012 Prague Writers' Festival. Monika provided Czech translations of excerpts from two of Ashbery's poems which she read over the later parts of the piece, and we were asked to include a recording of him reading his poem *Some Trees*. For the purposes of the folio I thought it was appropriate not to use Monika's readings of the poems in order to provide a clearer focus on my contribution to the piece.

This piece was written quickly, making use of the technologies I had already developed in my earlier research. I have mentioned above the disjunct I found between two modes of creative practice—the process of designing or writing patches for Pure Data and the process of using those patches more like an *instrument*. *Some Trees* is an example of the latter approach.

Some Trees (1955)⁶⁷ was one of the earliest poems published by John Ashbery (1927-). Considered a member of the New York School in the 1950s and 1960s, Ashbery's work is influenced by Dada and French Surrealism and is often thought of as 'dauntingly difficult'⁶⁸.

67 John Ashbery, *Some Trees*, Yale Series of Younger Poets (New Haven, 1956).

68 Meghan O'Rourke, 'The Instruction Manual', *Slate*, 9 March 2005

http://www.slate.com/articles/news_and_politics/the_highbrow/2005/03/the_instruction_manual.html [accessed 23 March 2013].

10.1 Creative Approach

In many ways the compositional approach to *Some Trees* was a development of the way in which I approached *The Sick Rose*. As it was commissioned as a one-off performance with no likelihood of a commercial release there was a greater freedom to experiment with form and content. Monika and I did not have an opportunity for rehearsal time to develop ideas together, so I arrived in Prague with the completed track which I played to her in my hotel on the night before the performance.

In the later stages of my work on *The Sick Rose*, I was developing an interest in writing for strings, albeit virtual ones. So in fact before I had even heard the poem I started composing the string arrangement found towards the end of the piece. I used a similar approach to the one which I had used for *The Sick Rose*, which was an intuitive process of writing notes with a mouse in Logic Pro and slowly building up the full arrangement, in this case for a chamber ensemble of violins, violas, cellos and double bass with solo cello and violin parts. The string parts are based around a twenty one bar cello figure which is repeated four times.

The next stage of the composition was to use the transitions between the notes in this twenty one bar figure to make a lookup table for the synthesis patch I had used in *Algorithms for Electronics...* Most of the pieces composed in *Algorithms...* use a probability distribution to calculate the frequency of the next note as an offset from the central frequency. In the case of *Some Trees* the probability distribution is used to calculate the offset into the table. This results in an unpredictable pattern of notes being generated which is related to the notes in the twenty one bar figure.

I used this system to generate the portamento sine wave synth parts which run through most of the piece.

The granular textures and rhythm parts are generated using the stochastic drum machine. It is the only piece in the folio where its output has not been significantly altered (apart from some minor edits), and is the result of recording a single take of me interacting with the GUI.

I chose to leave the recording of the poem intact, with alterations to the timing between some of the lines allowing space for the electronics. My response to the poem in the compositional process was concerned with the material qualities of the voice, its pacing and its rhythm.

Appendices

I. Accompanying Material

The work itself can be found on the three accompanying DVDs.

Disk: TIMWRIGHT_FOLIO_D1

D1_1_Feet of Courage (Germ_Remix).wav

Stereo soundfile.

D1_2_The Bridge v1 (MinwhiSong).mov

29.97 fps movie file, codec: h.264 — stereo sound. With studio cello performance by Minwhi Song.

D1_2_The Bridge v2 (JenLangridge).mov

29.97 fps movie file, codec: h.264 — stereo sound. With live cello performance by Jen Langridge.

D1_3_8 Switches.mov

60 fps movie file, codec: h.264 — stereo sound. Rendered offline with Pure Data/GEM.

Disk: TIMWRIGHT_FOLIO_D2

D2_4_The Sick Rose final mixes

Folder containing the nine final mixes as stereo wav files.

D2_4_The Sick Rose initial sketches

Folder containing fourteen initial sketches as stereo wav files.

D2_5_Algorithms for Electronics....mov

30 fps movie file, codec: Apple Pro Res 422 (HQ) with stereo sound. Screen recording with audio bounce-down. NB. The sample rate of the audio track in this video is 96kHz.

D2_6_BastardStructures2.mp4

30 fps movie file, codec: AVC coding with stereo sound. Film of live performance.

Disk: TIMWRIGHT_FOLIO_D3**D3_7_Untitled (2 Pieces For Surround) 1 of 2.wav**

Six channel soundfile (5.1 surround). Channel 1 = left, channel 2 = right, channel 3 = centre, channel four = LFE channel 5 = left surround, channel 6 = right surround.

D3_7_Untitled (2 Pieces For Surround) 2 of 2.wav

Six channel soundfile (5.1 surround). Channel 1 = left, channel 2 = right, channel 3 = centre, channel four = LFE channel 5 = left surround, channel 6 = right surround.

D3_8_Some Trees.wav

Six channel soundfile (5.1 surround). Channel 1 = left, channel 2 = right, channel 3 = centre, channel four = LFE channel 5 = left surround, channel 6 = right surround.

II. Stochastic Drum Machine

The stochastic drum machine (SDM) is a tool that I developed using Miller Puckette's Pure Data data flow language. I have used the SDM in the composition of several of the pieces in the folio so I thought it would be helpful to outline its scope and function below.

In common with hardware drum machines, for example the Roland TR808 and TR909, the stochastic drum machine has two functional units: a sound generator and a sequencer. The sound generator in this case is sample based and is has eight sample slots with 256 note polyphony. The sequencer uses a probability distribution to organise the timing of the sample playback with up to 64 divisions per semiquaver. High level controls, for example *density* or *spread*, can be manipulated in real time using MIDI control or on screen faders to shape the stochastic drum machine's output, more precise control can be programmed directly in Pure Data.

There is of course no need to restrict the palette of samples to percussion sounds, and the way in which the probability distribution is implemented gives a wide range of rhythmic possibilities — from subtly shifting quantised grooves to dense granular textures.

III. Translation of *Cestou Posvátnýn hájem*

Excerpt from *The Path of the Sacred Grove* by Antonín Sova. Translated by Martin Neal.

The sacredness of giant trees

and the sacrificial altar of the grove,

venerable boulders, ancient boundary stones.

Long and forsaken, solemnly shadowy quarry,

silvery clouds above like a famous myth.

It occurs to me that everything waits here and is prepared

for those who would meet again after long ago farewells.

Several clear stars shine above the trees,

other witnesses and judges

who see and hear, are not here

IV. Algorithms for Electronics... Equations

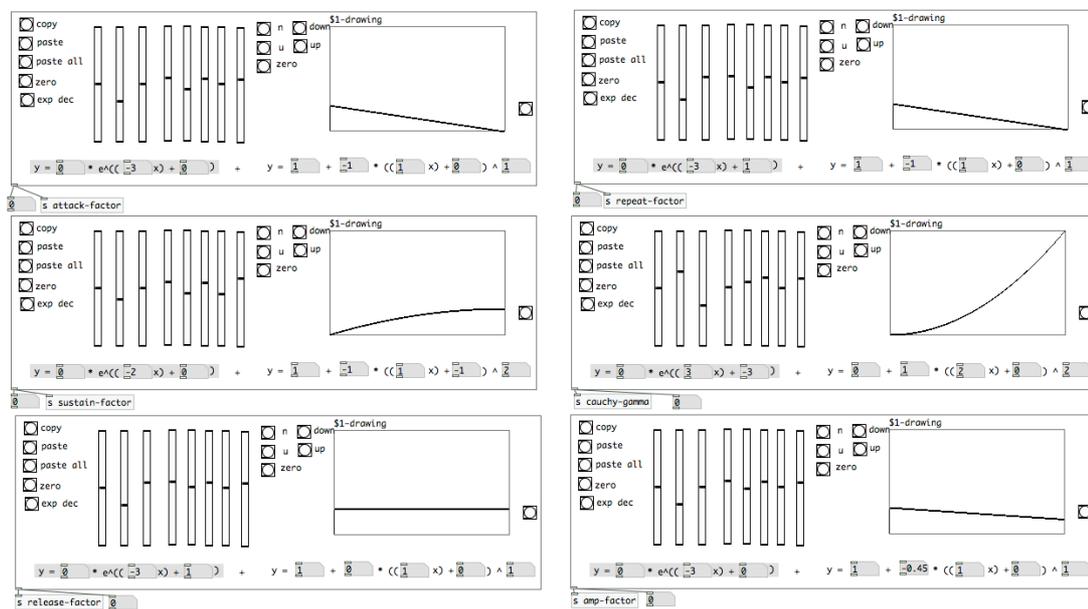


Figure 2: Algorithms... Equations for 1/5

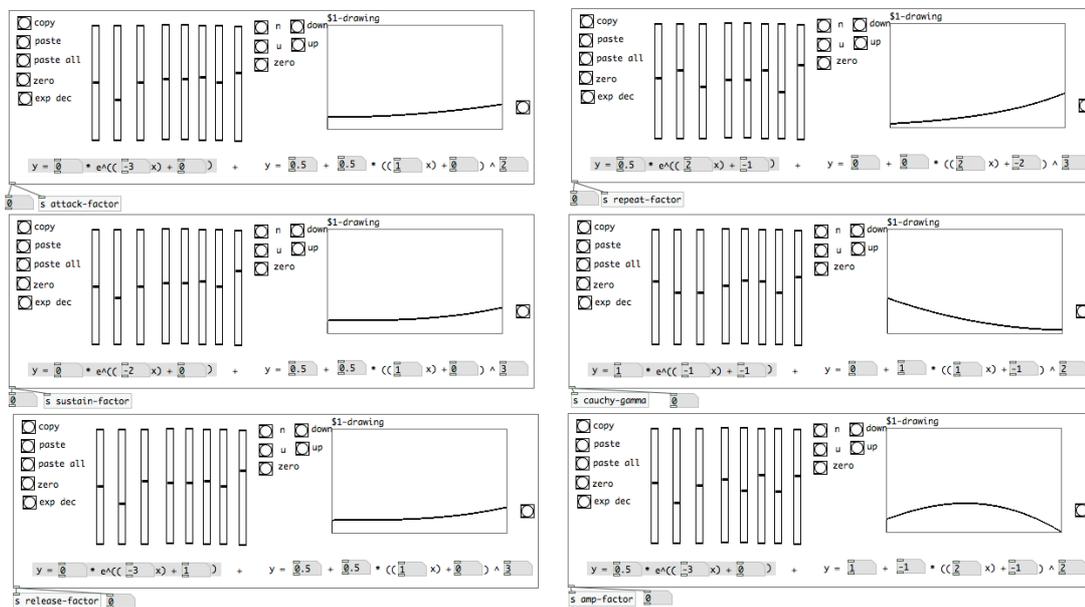


Figure 3: Algorithms... Equations for 2/5

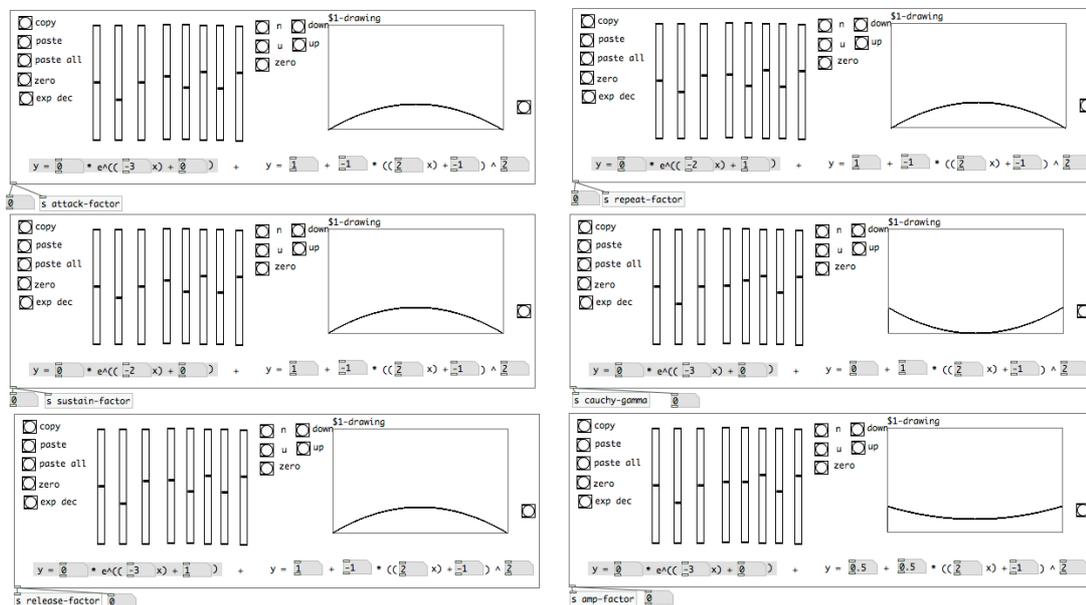


Figure 4: Algorithms... Equations for 3/5

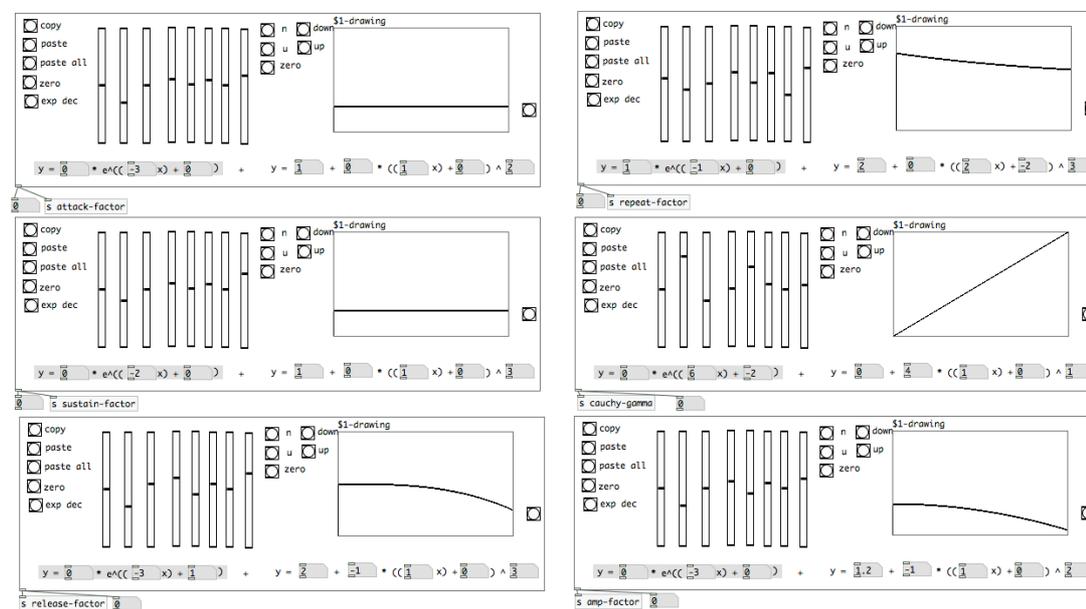


Figure 5: Algorithms... Equations for 4/5

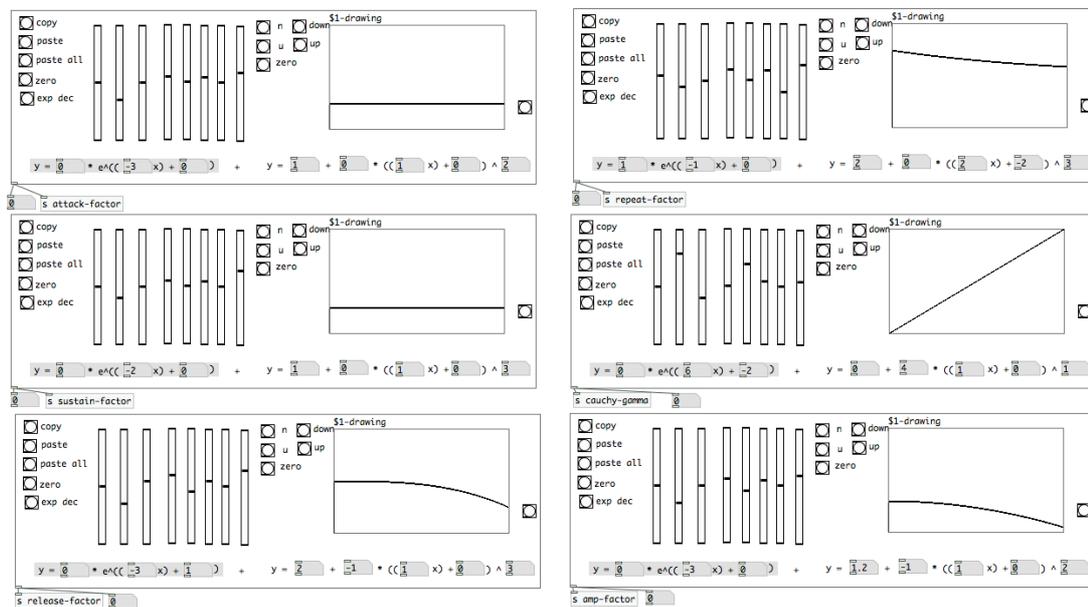


Figure 6: Algorithms... Equations for 5/5

Resource List

I. References

- Abdallah, Samer, and Mark Plumbley, 'Information Dynamics: Patterns of Expectation and Surprise in the Perception of Music', *Connection Science*, 21 (2009), 89–117
- Ames, Charles, 'The Markov Process as a Compositional Model: A Survey and Tutorial', *Leonardo*, 22 (1989), 175–187
- Bierce, Ambrose, *Tales of Soldiers and Civilians* (New York: Lovell Coryell & Company, 1891)
- Blake, William, *The Sick Rose*, poem, 1794
- Burt, Theo, 'Composition Folio' (University of York, 2012)
- Habibi, Don, 'The Magical Moment: The Liminal, Distended Time Flashforward of Ambrose Bierce', *The Ambrose Bierce Project Journal*, 1 (2005)
- Hesmondhalgh, David, 'The British Dance Music Industry: A Case Study of Independent Cultural Production', *The British Journal of Sociology*, 49 (1998), 234–251
- Hlaváček, Karel, poem, *Večer Teskné Nálady*
- John Ashbery, *Some Trees*, Yale Series of Younger Poets (New Haven, 1956)
- Kafka, Franz, *Briefe an Milena* (Schocken Books, 1952)
- Lawrence, Tim, 'Disco Madness: Walter Gibbons and the Legacy of Turntablism and Remixology', *Journal of Popular Music Studies*, 20 (2008), 276–329
- Meyer, Leonard B., 'Meaning in Music and Information Theory', *The Journal of Aesthetics and Art Criticism*, 15 (1957), 412–424
- O'Rourke, Meghan, 'The Instruction Manual', *Slate*, 9 March 2005
http://www.slate.com/articles/news_and_politics/the_highbrow/2005/03/the_instruction_manual.html [accessed 23 March 2013]
- Naceva, Monika, 'Re:updates', personal email to Tim Wright, 14 May 2010
- Simpson, Dave, 'Nancy Elizabeth', *The Guardian*, 15 March 2008, section Music
<http://www.guardian.co.uk/music/2008/mar/15/popandrock.reviews> [accessed 28 March 2013]
- Sova, Antonín, *Cestou Posvátnýn hájem*, 1922
- , *Do jezer stíny lesů padaly*, 1922

Wright, Tim, 'Music...', personal email to Monika Načeva, 14 March 2010

Wright, Tim, 'RE:lyrics', personal email to Monika Načeva, 7 March 2010

II. Music

Harvey, Jonathan, *Mortuos Plango, Vivos Voco*, 1980

Harrison, Jonty, *Klang*, 1982

HHY & The Macumbas, *Legba In Dub* (UK: Wire Magazine, 2011)

Ligeti, György, *Atmosphères*, 1961

Merzbow, *Path With No End* (Vivo, 2007)

Mike Oldfield, *Tubular Bells* (Virgin Records, 1973)

Maxwell Davies, Peter, *Eight Songs for a Mad King*, 1969

Monika Načeva, Tim Wright, *The Sick Rose* (Christopher Robin, 2010)

Morgenstern, Barbara, *Das Liebe* (Germany: Monika Enterprise, 1998)

Načeva, Monika, *Mami* (RESPEKTedice, 2007)

Phuture, *Acid Tracks* (Trax Records, 1987)

Pink Floyd, *Dark Side of The Moon* (EMI Records, 1973)

Schnieder TM, Kpt.michi.gan, *The Light 3000* (UK: For Us, 2003)

Schnittke, Alfred, *Concerto Grosso No. 1, for Two Violins, Harpsichord, Prepared Piano and Strings*, 1977

Seress, Rezső, *Gloomy Sunday*, 1933

Smalley, Denis, *Pentes*, 1974

The Beach Boys, *Pet Sounds* (Capitol Records, 1966)

The Smiths, *There Is a Light That Never Goes Out* (Rough Trade, 1986)

Wishart, Trevor, *Vox Cycle* (Virgin Classics, 1990)

Xenakis, Iannis, *Metastasis*, 1954

III. Video

Alves, Bill, *Aleph*, 2002

———, *Breath of the Compassionate*, 2009

———, *Static Cling*, 2000

Egging, Viktor, *Symphonie Diagonale*, 1924

Garro, Diego, *Patah*, 2010

———, *Pointes Precaires*, 2004

McLaren, Norman, *Dots*, 1940

Miller, Denis H, *White Noise*, 2009

Vidor, Charles, *The Bridge*, 1929

IV. Software

Composers Desktop Project (Composers Desktop Project)
<http://www.composersdesktop.com>

Logic Pro (version 9.1.8), Apple, n.d. <http://www.apple.com/uk/logic-pro>

Piché, Jean, and Alexandre Burton, *Cecilia* <http://www.csounds.com/cecilia>

Puckette, Miller, *Pure Data* <http://puredata.info>

Vercoe, Barry, *CSound* <http://www.csounds.com>

Vienna Symphonic Library (Vienna Symphonic Library) <http://www.vsl.co.at>